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RADIATION PROTECTION No. 209

Nuclear Science and Technology

Environmental Radioactivity in the European Community

2023

DG ENER: Nuclear Energy, Safety and ITER
JRC: Nuclear Safety and Security

2025

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Quarterly average values of radioactivity levels in airborne particulates, surface water, drinking water, milk and mixed diet are reported for the twenty-seven countries of the European Union (sparse and dense network) for the year 2023.

PREFACE

Under the terms of Article 36 of the Euratom Treaty, European Union Member States shall periodically communicate to the Commission information on environmental radioactivity levels on their national territory. Since the early 1960s, the Commission has compiled and published this information as a series of reports. The current report, covering the year 2023, is the 38th in the series.

This report endeavours to improve the clarity of information on levels of radioactivity in the European environment by making use of standardised reporting levels. These reporting levels are supported by more detailed radioactivity levels from a limited number of stations that provide high sensitivity measurements.

As part of its DG Energy support programme, the Directorate for Nuclear Safety and Security of the EC Joint Research Centre (JRC) has introduced all environmental radioactivity results received from the Member States into the Radioactivity Environmental Monitoring (REM) database. The JRC collated, checked and loaded the data, prepared the tabulations and figures as appropriate and provided the draft of the report. I would like to express my gratitude for the JRC's assistance and for the co-operation provided by the national authorities who supplied the original data.

This report is addressed to all who are concerned with radioactivity in the European environment.

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Deputy Director-General
Responsible for the coordination
of Euratom policies and Energy
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CONTENTS

I INTRODUCTION

A. General

This report presents a summary of the available data on levels of radioactivity in some environmental media in the European Union (EU) Member States for the year 2023. These data are obtained from official reports published by the responsible authorities and from data transmitted directly to the Commission by the national authorities and from individual laboratories. Member States provide environmental radioactivity data to the EU to comply with Articles 35 and 36 of the Euratom Treaty (see Appendix A). Continuous or semi-continuous monitoring of air and water is undertaken in Member States. Monitoring of food products, such as milk or mixed diet is considered an acceptable surrogate for the Article 35 requirement to monitor soil[1].

Individual monitoring laboratories tend to retain measurement techniques that have proven reliable over the years and are of sufficient sensitivity for radiological protection purposes. Measurement techniques, and thus measurement sensitivities, may, therefore, vary between laboratories and countries. This can make the interpretation and comparison of data across Europe difficult.

In order to facilitate the presentation of the results, it has been agreed[2] to use uniform reporting levels (see Appendix B) as a benchmark. If the results for a certain sample type - radionuclide combination are above their corresponding reporting level (RL), then the measured values are stated in this report. Otherwise they are reported as "< RL". Measured values are submitted either as a specific number or as known to be less than a certain value. When only known to be less than a certain value, the measured value is referred to as a constraint (<) value. Constraint (<) values above the corresponding reporting level are not considered in the calculations for this report. If the results for a certain sample type - radionuclide combination consist only of constraint (<) values above the reporting level, this is indicated with the Δ symbol in data tables. The reporting levels used in this report were derived such that they would indicate a resultant effective dose value of 1/1000th of a mSv (0.001 mSv).

It must be emphasised that the reporting levels are only meant to be a tool for presenting data and should not be confused with maximum permitted levels of radioactive contamination.

Radiation in the environment comes from space, from the earth, from air, from water, food and other natural sources. It also comes from radioactive waste, consumer products, atmospheric nuclear weapons testing and other artificial sources. Ionising radiation from natural and artificial sources do not differ in kind or effect on humans. The world average effective dose from all sources of radiation is 3.0 millisievert (mSv) per year (2.4 mSv for natural sources and 0.6 mSv for artificial)[3] [2]. Across the Member States of the European Community the annual effective dose for members of the public from natural sources ranges from about 1.5 mSv to just above 6 mSv, with a population-weighted average annual effective dose of 3.2 mSv[4] [2].

In normal circumstances, variations in time and space for the data from the many sampling locations which are distributed all over the Member States' territories (referred to as the "**dense network**"[5] [1]) are gradual. For this reason daily, weekly or even monthly variations per sample location are not of radiological significance. The data are therefore presented as regional averages (Table 1) except for surface water where single location samples are reported.

Although most values are below reporting levels, it is valuable to present the actual concentrations for a small number of locations. This allows any trends in radionuclide concentrations to be monitored over time. To achieve this, a number of representative locations were selected, this is referred to as the "**sparse network**"[6] [1]. High sensitivity measurements are performed at these locations and the individual results are presented graphically.

As in the previous report [3], the following combinations of sample and radionuclide categories are reported, as per the Commission Recommendations to Article 36 of the Euratom Treaty (2000/473/Euratom) [1] also mentioned in Appendix A:

Sampling media	**Radionuclide categories**	
	Dense network	**Sparse network**
airborne particulates	gross ß ^{137}Cs	^{7}Be ^{137}Cs
surface water	residual ß ^{137}Cs	^{137}Cs
drinking water	^{3}H ^{90}Sr ^{137}Cs	^{3}H ^{90}Sr ^{137}Cs
milk	^{90}Sr ^{137}Cs	^{90}Sr ^{137}Cs
mixed diet	^{90}Sr ^{137}Cs	^{90}Sr ^{137}Cs

---

[1] According to [1], "The monitoring of levels of radioactivity in soil does not allow a direct assessment of the exposure of the population. The exposure related to soil contamination is more directly assessed on the basis of ambient dose rate and foodstuff contamination. Experience has shown that the incorporation of soil data in the monitoring serves little useful purpose".

[2] Official Journal of the European Communities L 191, 27.07.2000, p. 9 (Annex III).

[3] European Atlas of Natural Radiation, Publication Office of the European Union, Luxembourg, 2019, p. 32.

[4] European Atlas of Natural Radiation, Publication Office of the European Union, Luxembourg, 2019, p. 173.

[5] Official Journal of the European Communities L 191, 27.07.2000, p. 2.

[6] Official Journal of the European Communities L 191, 27.07.2000, p. 2.

However, not all of the above combinations of sample and nuclide type are routinely monitored by each Member State.

Every effort has been made to collect all the available data, thus, most of the blank entries correspond to the absence of measurements. In some cases, the available results may have not been received.

All the radionuclides sampled, except strontium-90 (^{90}Sr) and caesium-137 (^{137}Cs), can be of either natural or artificial origin. The two exceptions are of artificial origin, mainly from past atmospheric weapons testing and from radioactive routine or accidental discharges from nuclear facilities.

The sampling locations incorporated in this report are intended to be as representative as possible of regional or national situations. However, while measurements local to and possibly influenced by nuclear installations have been discounted wherever practical, in certain cases national data are strongly dependent on such monitoring programmes.

B. Structure of the report

This report is composed of three main parts:

The **text part** consists of a general introduction followed by one chapter for each medium; this includes general information on the sample type, the occurrence of natural radionuclides therein, a description of sample preparation and analysis and a short discussion of the results.

The **results** are presented by sample and nuclide type, sample types are identified with appropriate symbols. All data from the dense network is presented, followed by that from the sparse network.

- The dense network results are presented graphically (with the exception of surface water as this sample type does not allow for geographical presentation) and in tabular form. The graphical representation illustrates the annual average radioactivity concentrations for each geographical region (see Section C). Four shades are used to indicate the concentrations on a scale ranging from less than the reporting level to ten times the reporting level. In addition, each sampling location is indicated. Next to the graphical representation the results are presented in tabular form. These results are averaged over geographical regions and over a particular time period (quarter, semester or whole year, depending on the availability of data). The total number of sampling locations and the number of measurements used to calculate the annual averages are given for each geographical region. In addition, the monthly maximum and the month in which this occurred are given for those values above the appropriate reporting level.
- The results for the sparse network are preceded by a map illustrating the sampling locations. The data are presented as time versus activity concentration graphs from 1984 onwards (where the data is available). Between one and three nearby locations are illustrated on each graph. Full lines represent actual sampling periods whereas dotted lines link measurement results over unsampled time periods. The appropriate reporting level is indicated by a horizontal line. The choice of 1984 as a start date enables the pulse of radioactivity which entered the environment of the EU from the 1986 Chernobyl accident in the Ukraine to be seen clearly.

The **appendices** to this report provide additional information on the Euratom Treaty, the calculation of reporting levels, the averaging procedures used, the data sources, the bibliography and information about the REM data bank. The addresses of the national authorities and laboratories that contributed to this report are given in Appendix D, while the national reports of environmental monitoring data are given in Appendix E. All data presented in this report are also stored in the REM data bank, at the JRC-Ispra, Italy (see Appendix F), and can be accessed with the REMdb online query described in the "Related Information" section at the end of this introduction.

Finally, and with the aim of enlarging the readership of this report, a glossary provides background information on frequently used terms in radiation protection.

C. Geographical divisions

For the larger Member States the data is divided according to geographical divisions. The partitioning of Croatia, Finland, France, Germany, Italy, Poland, Romania, Spain and Sweden has been based on administrative regions (Table 1) and results in a total of 43 geographical divisions of the EU (Figure 1).

II. AIRBORNE PARTICULATES

Airborne radioactive materials may occur in either gaseous or particulate form. In general, the latter is of greater potential radiological significance because it may be deposited and hence remain in the local environment. Consequently, most national routine monitoring networks measure only the particulate component. Atmospheric radioactivity is dominated by the naturally occurring, short-lived particulate decay products of gaseous radon (Rn = 1 to 20 Bq m^{-3} in outdoor air) [1]. Measurements of "total beta" radioactivity in airborne particulates must allow for this naturally occurring radioactivity. Other naturally occurring radionuclides measured in airborne particulates include beryllium-7 (^{7}Be) and potassium-40 (^{40}K).

Airborne particulate **sampling** is carried out by pumping air through filters at a flow rate of several hundred cubic meters per day. In most countries filters are changed daily and analysed for total beta activity following the decay of radon decay products. Individual radionuclide analyses are performed weekly, monthly or quarterly. Man-made alpha-emitting aerosols are rarely measured by routine monitoring networks as they are usually undetectable, even close to the nuclear installations where they are produced. Therefore, these measurements are not presented in this report. The sampling locations in the EU for gross beta and ^{137}Cs, considered in this report, are illustrated on the maps in figs. A1 and A2, respectively.

Minimal **treatment** of the air filters is required, on the whole, they are measured directly or they may be ashed or compressed to improve the counting geometry and hence counting efficiency.

Results: Several Member States have provided **gross beta (gross-ß)** data (Table A1) and **^{137}Cs** data (Table A2) for the dense network. For the sparse network those stations were selected that provide a good coverage of the European territory and for which measurable concentrations were reported. The results for the naturally occurring **^{7}Be** and artificial radionuclide **^{137}Cs** are given in Figures A4 to A17 and Figures A18 to A31, respectively. The ^{137}Cs activity concentration trends clearly show the 'Chernobyl peak' (26 April - 10 May 1986), followed by a return to pre-Chernobyl concentration values. The Chernobyl-peak values may differ by several orders of magnitude at different locations, due to differences in the airborne activity and also differences in the sampling time used (ranging from hours to weeks).

III. SURFACE WATER

Surface water is one of the compartments into which authorised discharges of radioactive effluents from nuclear installations are made. Radionuclides in surface waters can be found in the water phase or associated with suspended particles and can eventually become incorporated into sediments and living species. Natural radionuclides in river water include ^{3}H at levels of 0.02 - 0.1 Bq l^{-1}, ^{40}K (0.04 - 2 Bq l^{-1}), radium, radon and their short-lived decay products (< 0.4 - 2 Bq l^{-1}). The main fraction of tritium (^{3}H) in surface water however is due to man’s activities.

Samples are either taken continuously and bulked for monthly or quarterly analysis, or alternatively, spot samples are taken periodically several times a year and analysed individually. Some laboratories remove suspended material from the water sample for separate analysis.

Treatment of the water may consist of filtration or evaporation (for direct measurement of the residue), ion-exchange and subsequent washing of the ion exchange column. More elaborate chemical separation techniques are used to determine radionuclides such as strontium-90 (^{90}Sr). To determine ^{3}H concentrations, generally the water is multiple distilled.

Results: Most of the sampling locations considered (Fig. S1 to S34) lie on rivers into which authorised discharges of radioactive effluents are made. Surface water samples may, therefore, contain detectable radioactive contaminants traceable to installations at appreciable distances upstream from the sampling locations and this appears to be reflected in some cases in the results obtained. Furthermore, this has the effect of clouding the usual distinction made between sampling carried out for the purposes of general environmental monitoring and that for the surveillance of nuclear power plants. Nevertheless, since the rivers in question are all water courses of major significance, the results have been considered to be nationally representative.

The results on beta activity given here (Tables S1 – S5) refer to **residual-ß** (total beta less natural ^{40}K activity). For France, the national reports indicate total beta for the water phase and for suspended matter, and the potassium content separately; the residual beta activity could be calculated using a conversion factor of 28.02 +/- 0.76 Bq/g potassium. Also **^{137}Cs** is reported (Tables S6 – S10).

For the sparse network those stations were selected for which measurable concentrations of ^{137}Cs were reported and which provided a good coverage of the European territory on major rivers and in the sea (Fig. S35). The results are presented in Figs. S36 to S49.

It should be noted that while some above average values appear to be associated with discharges from nuclear installations the results are still well below levels which might be considered of any significance in terms of health.

IV. DRINKING WATER

Drinking water is monitored because of its vital importance for man, even though a severe radioactive contamination of this medium is rather improbable. The most important natural radionuclides in drinking water are ^{3}H (0.02 - 0.4 Bq l^{-1}), ^{40}K (typically 0.2 Bq l^{-1} but varies greatly), radium, radon and their short-lived decay products (0.4 - 4.0 Bq l^{-1}). Occasionally, the presence of ^{3}H and radium may also be due to man's activities.

Samples may be taken from ground or surface water supplies, from water distribution networks, mineral waters etc. Spot samples are taken a few times a year and analysed individually or samples are taken daily and bulked for monthly or quarterly analysis.

Sample **treatment** usually consists of sample evaporation for direct measurement of the concentrate or separation on ion-exchange columns. More elaborate chemical separations are required for ^{90}Sr determination, whereas ^{3}H is generally measured following multiple distillation of the sample.

Results: ^{3}H values are presented in Table W1. For the sparse network, 27 stations reported measured concentrations (Figs. W5 to W16). For **^{90}Sr** the levels are shown in Table W2 and, for the sparse network, in Figs. W17 to W25. For **^{137}Cs** the results are presented in Table W3 and, for the sparse network, in Figs. W26 to W38.

V. MILK

Consumption of milk and dairy products has been shown to be one of the most important pathways for uptake of radionuclides from environment to man.

Samples are mostly taken at dairies covering large geographical areas in order to obtain representative samples. They are generally taken on a monthly basis; but sometimes only during the pasture season. The samples may be analysed separately or bulked for regional or national average evaluations.

Treatment usually consists of drying the sample for gamma spectroscopic analysis and chemical separation for ^{90}Sr.

Results: Generally the concentrations of the stable elements calcium (Ca) and potassium (K) are determined because of the similarity of their metabolic behaviour with strontium (Sr) and caesium (Cs) respectively. Typical values in milk are 1 to 2 g l^{-1} for calcium and potassium. The average radioactive concentrations reported in the tables were mainly calculated from data which were themselves averages in time (daily, weekly or monthly) and space. For **^{90}Sr** quarterly averages are shown in Table M1. **^{137}Cs** quarterly averages are presented in Table M2.

VI. MIXED DIET

The aim of measuring radioactivity in mixed diet is to get “integral” information on the uptake of radionuclides by man via the food chain. Rather than expressing the radioactivity content of foodstuffs per unit weight, it is more appropriate to estimate the activity consumed per day per person (Bq d^{-1} p^{-1}). An important natural radionuclide is ^{40}K (typically 100 Bq d^{-1} p^{-1}).

Foodstuffs can be measured as separate ingredients. However, due to differences in the composition of national diets, the trend is to sample complete meals to give a representative figure for the contamination of mixed diet. Nevertheless knowledge of the contamination of the individual ingredients together with the composition of the national diet can also lead to a representative figure.

Samples are taken as ingredients or as complete meals, mostly at places where many meals are consumed (i.e. factory restaurants, schools).

Treatment usually consists of mixing the sample prior to gamma spectroscopic measurement of ^{137}Cs and chemical separation to determine the ^{90}Sr activity.

Results: Generally the concentrations of the stable isotopes of calcium and potassium are determined because of the similarity of their metabolic behaviour with strontium and caesium, respectively. Typical values in mixed diet are 0.7 to 1.5 g d^{-1} $person^{-1}$ for calcium and 3 to 4 g d^{-1} $person^{-1}$ for potassium. For **^{90}Sr** the quarterly averages are shown in Table D1. The sparse network results are presented in Figs. D4 – D13. **^{137}Cs** quarterly averages are given in Table D2. The measurements reported by the sparse network stations shown in the report clearly show a decreasing trend of caesium contamination in mixed diet after the Chernobyl accident (Figs. D14 to D25).

RELATED INFORMATION

Monitoring Reports available in electronic format

The list of all the published (and downloadable) Monitoring Reports is available here:

https://remon.jrc.ec.europa.eu/About/Environmental-Monitoring/Monitoring-Reports-Download

REMdb online query

Although the Monitoring Reports describe the collected information as complete as possible, this communication medium does not allow to show the amount of data in all its details. A new interface, called REMdb Query, provides an interactive access to the collected and verified environmental monitoring data in the European Union.

The new interface can be accessed from the "Maps" section, Routine Monitoring icon of web site https://remon.jrc.ec.europa.eu/ or directly from:

https://remap.jrc.ec.europa.eu/Routine.aspx

Unlike this report, the online maps also include data from some non-EU countries, accepted on a voluntary basis.

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1. Commission Recommendation 2000/473/Euratom, OJ L191 of 27.7.2000
2. G. Cinelli, M. De Cort and T. Tollefsen, “European Atlas of Natural Radiation”, Publication Office of the European Union, Luxembourg, 2019
3. Rood, B. M., Martino, S., Guglielmelli, A., de la Rosa Blul, J. C., Hernandez Ceballos, M. A., Sangiorgi, M. and Tanner, V., Environmental Radioactivity in the European Community 2021-2022, Publications Office of the European Union, Luxembourg, 2025, doi: 10.2760/0033668, JRC141853.

Fig . 1
Definition of the geographical regions used in the data tables and figures

Azores (Portugal)

Madeira (Portugal)

Canary Islands (Spain)

Malta

Luxembourg

Table 1

Definition of country partitions. Country codes according to ISO 3166/4217

Country	Short description	Detailed description
AT	Austria	
BE	Belgium	
BG	Bulgaria	
CY	Cyprus	
CZ	Czech Republic	
DE-N	Germany - North	Bremen, Hamburg, Mecklenburg-Vorpommern, Niedersachsen and Schleswig-Holstein
DE-C	Germany - Central	Hessen, Nordrhein-Westfalen, Rheinland-Pfalz and Saarland
DE-S	Germany - South	Baden-Württemberg and Bayern
DE-E	Germany - East	Berlin, Brandenburg, Sachsen, Sachsen-Anhalt and Thüringen
DK	Denmark	
EE	Estonia	
ES-N	Spain - North	Aragon, Asturias, Cantabria, Galicia, Navarra, Pais Vasco and Rioja
ES-C	Spain - Central	Castilla - La Mancha, Castilla - Leon, Extramadura and Madrid
ES-S	Spain - South	Andalucia, Canarias, Ceuta y Melilla and Murcia
ES-E	Spain - East	Baleares, Cataluña and C. Valenciana
FI-N	Finland - North	Lapland and Oulu
FI-S	Finland - South	Western Finland, Eastern Finland, Southern Finland
FR-NW	France - Northwest	Bretagne, Centre, Ile de France, Nord-Pas-de-Calais, Haute Normandie, Basse Normandie, Pays de la Loire and Picardie
FR-NE	France - Northeast	Alsace, Bourgogne, Champagne-Ardennes, Franche-Comté and Lorraine
FR-SW	France - Southwest	Aquitaine, Languedoc-Roussillon, Limousin, Midi-Pyrénées and Poitou-Charentes
FR-SE	France - Southeast	Auvergne, Corse, Provence-Alpes-Côte-d'Azur and Rhône-Alpes
GR	Greece	
HR-A	Croatia - Adriatic	Primorsko-goranska, Licko-senjska, Zadarska, Šibensko-kninska, Splitsko-dalmatinska, Istarska, Dubrovacko-neretvanska
HR-C	Croatia - Continental	Grad Zagreb, Zagrebacka, Krapinsko-zagorska, Varaždinska, Koprivnicko-križevacka, Medimurska, Bjelovarsko-bilogorska, Viroviticko-podravska, Požeško-slavonska, Brodsko-posavska, Osjecko-baranjska, Vukovarsko-srijemska, Karlovacka, Sisacko-moslavacka
HU	Hungary	
IE	Ireland	
IT-N	Italy - North	Emilia-Romagna, Friuli-Venezia-Giulia, Liguria,Lombardia, Piemonte, Trentino Alto Adige, Val d'Aosta and Veneto
IT-C	Italy - Central	Abruzzo, Lazio, Marche, Molise, Toscana and Umbria
IT-S	Italy - South	Basilicata, Calabria, Campania, Puglia, Sardegna and Sicilia
LT	Lithuania	
LU	Luxembourg	
LV	Latvia	
MT	Malta	
NL	the Netherlands	
PL-N	Poland - North	Kujawsko-Pomorskie, Lubuskie, Mazowieckie, Podlaskie, Pomorskie, Warminsko Mazurskie, Wielkopolskie, Zachodniopomorskie
PL-S	Poland - South	Dolnoslaskie, Lubelskie, Lodzkie, Malopolskie, Opolskie, Podkarpackie, Slaskie, Swietokrzyskie
PT	Portugal	
RO-N	Romania - North	Alba, Arad, Bacau, Bihor, Bistrita-Nasaud, Botosani, Brasov, Caras-Severin, Cluj, Covasna, Harghita, Hunedoara, Iasi, Maramures, Mures, Neamt, Salaj, Satu-Mare, Sibiu, Suceava, Timis and Vaslui
RO-S	Romania - South	Arges, Braila, Bucuresti-Ilfov, Buzau, Calarasi, Constanta, Dambovita, Dolj, Galati, Giurgiu, Gorj, Ialomita, Mehedinti, Olt, Prahova,Teleorman, Tulcea, Valcea and Vrancea
SE-N	Sweden - North	Övre Norrland and Mellersta Norrland
SE-S	Sweden - South	Stockholm, Östra Mellansverige, Sydsverige, Norra Mellansverige, Småland med öarna and Västsverige
SI	Slovenia	
SK	Slovakia	

Fig. A1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : airborne particulates
NUCLIDE CATEGORY : gross-β
MEASUREMENT UNIT : Bq m^{-3} (Bq per cubic metre)

⬜	EU (no relevant data reported)
🟨	EU (only relevant constraint values above the reporting level reported)
▨	Outside EU (in 2023)

🟧			annual avg.	< 0.005 Bq m^{-3}
🟧	0.005 Bq m^{-3}	<=	annual avg.	< 0.015 Bq m^{-3}
🟫	0.015 Bq m^{-3}	<=	annual avg.	< 0.05 Bq m^{-3}
⬛	0.05 Bq m^{-3}	<=	annual avg.	

. sample location (Coordinate Accuracy = Precise or Not Specified)
\+ regional average (Coordinate Accuracy = Reference Point of Region)

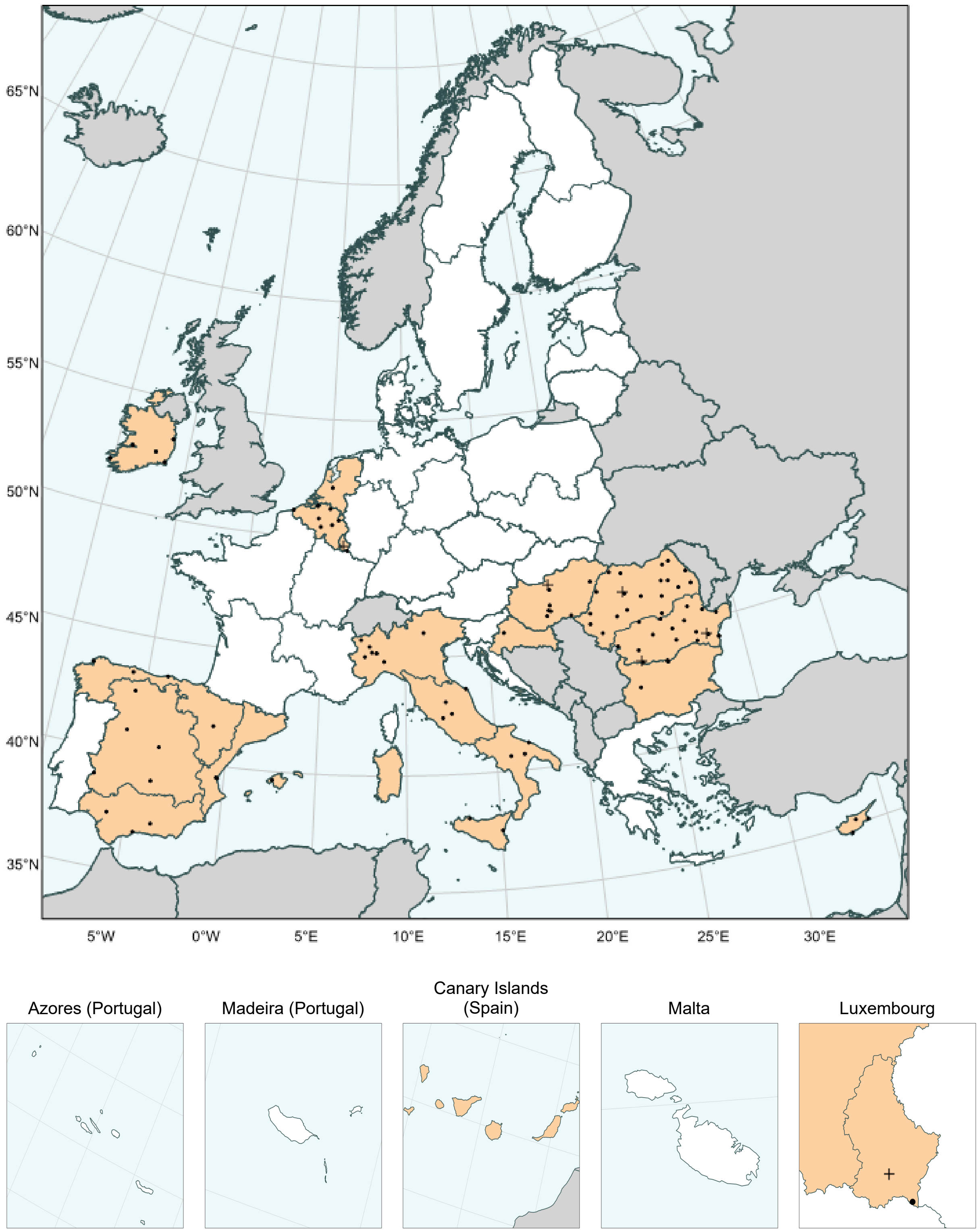


Table A1: Geographical and time averages

YEAR	:	2023
SAMPLE TYPE	:	airborne particulates
NUCLIDE CATEGORY	:	gross-β
MEASUREMENT UNIT	:	Bq m⁻³ (Bq per cubic metre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT									
BE	2364	8	< RL	< RL	< RL	< RL	< RL	< RL	9
BG	11	2		< RL	< RL	< RL	< RL	< RL	10
CY	513	3	< RL	< RL	< RL	< RL	< RL	< RL	10
CZ									
DE-N									
DE-C									
DE-S									
DE-E									
DE									
DK									
EE									
ES-N	211	4	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-C	264	5	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-S	158	3	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-E	159	3	< RL	< RL	< RL	< RL	< RL	< RL	10
ES	792	15	< RL	< RL	< RL	< RL	< RL	< RL	10
FI-N									
FI-S									
FI									
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR									
HR-A									
HR-C	12	1	< RL	< RL	< RL	< RL	< RL	< RL	10
HR	12	1	< RL	< RL	< RL	< RL	< RL	< RL	10
HU	779	8	< RL	< RL	< RL	< RL	< RL	< RL	12
IE	92	10	< RL	< RL	< RL	< RL	< RL	< RL	9
IT-N	4265	9	< RL	< RL	< RL	< RL	< RL	< RL	10
IT-C	526	4	< RL	< RL	< RL	< RL	< RL	< RL	9
IT-S	972	5	< RL	< RL	< RL	< RL	< RL	< RL	9
IT	5763	18	< RL	< RL	< RL	< RL	< RL	< RL	9
LT									
LU	77	2	< RL	< RL	< RL	< RL	< RL	< RL	9
LV									
MT									
NL	53	1	< RL	< RL	< RL	< RL	< RL	< RL	9
PL-N									
PL-S									
PL									
PT									
RO-N	13757	20	< RL	< RL	< RL	< RL	< RL	< RL	10
RO-S	15012	22	< RL	< RL	< RL	< RL	< RL	< RL	10
RO	28769	42	< RL	< RL	< RL	< RL	< RL	< RL	10
SE-N									
SE-S									
SE									
SI									
SK									

RL: reporting level for gross-β In air, i.e. 0.005 Bq m⁻³ (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Fig. A2: Geographical and time averages

YEAR	:	**2023**
SAMPLE TYPE	:	**airborne particulates**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq m^{-3}** (Bq per cubic metre)

⬜	**EU (no relevant data reported)**	🟪				**annual avg.**	**<**	**0.03**	**Bq m^{-3}**
🟨	**EU (only relevant constraint values above the reporting level reported)**	🟪	**0.03**	**Bq m^{-3}**	**<=**	**annual avg.**	**<**	**0.09**	**Bq m^{-3}**
		🟪	**0.09**	**Bq m^{-3}**	**<=**	**annual avg.**	**<**	**0.3**	**Bq m^{-3}**
▒	**Outside EU (in 2023)**	🟪	**0.3**	**Bq m^{-3}**	**<=**	**annual avg.**			

. **sample location (Coordinate Accuracy = Precise or Not Specified)**

\+ **regional average (Coordinate Accuracy = Reference Point of Region)**

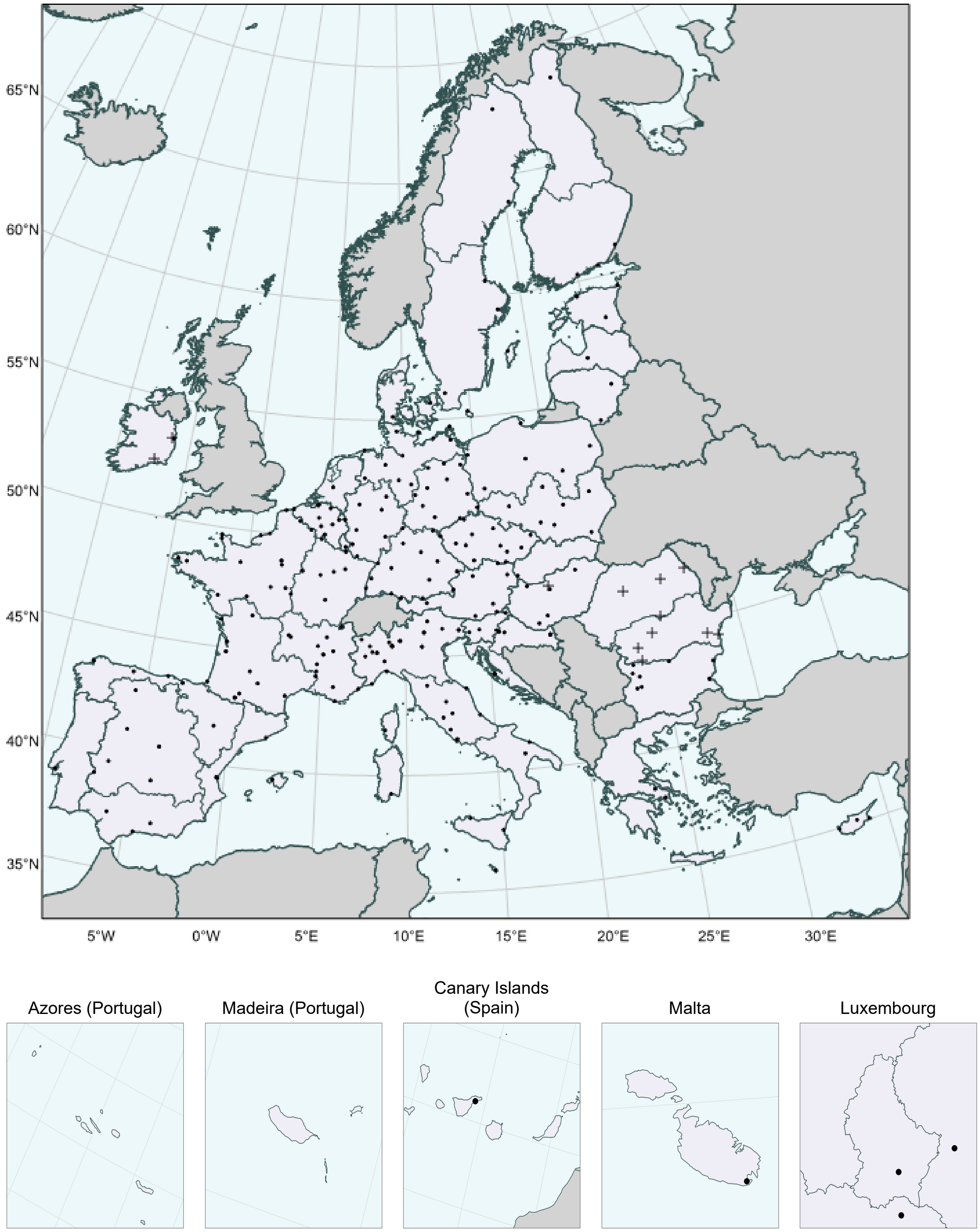


Table A2: Geographical and time averages

YEAR : **2023**
SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

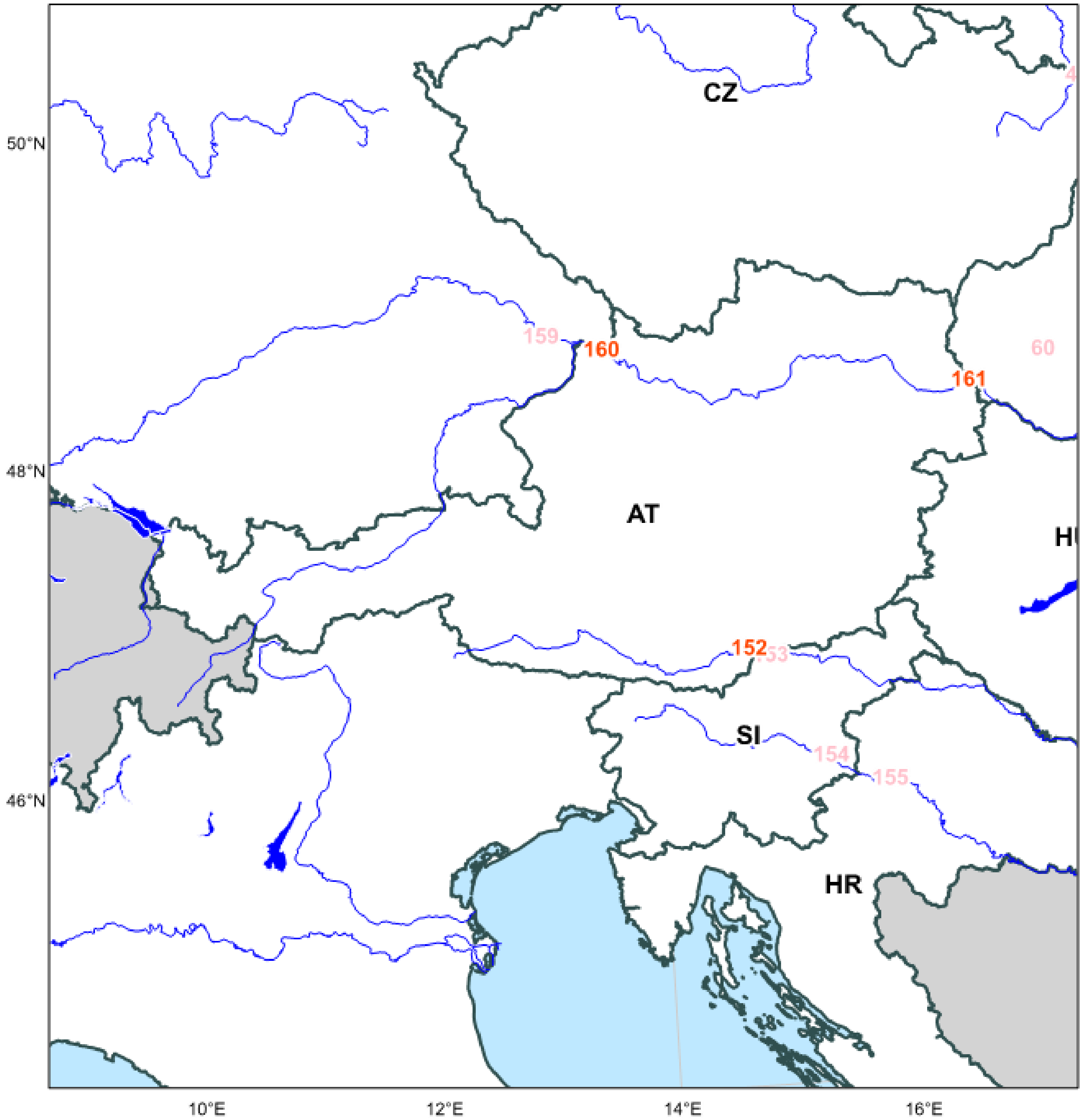
Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	548	16	< RL	< RL	< RL	< RL	< RL	< RL	10
BE	98	8	< RL	< RL	< RL	< RL	< RL	< RL	2
BG	142	8	< RL	< RL	< RL	< RL	< RL	< RL	10
CY	73	3	< RL	< RL	< RL	< RL	< RL	< RL	4
CZ	572	11	< RL	< RL	< RL	< RL	< RL	< RL	2
DE-N	512	11	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-C	417	9	< RL	< RL	< RL	< RL	< RL	< RL	9
DE-S	551	11	< RL	< RL	< RL	< RL	< RL	< RL	10
DE-E	478	11	< RL	< RL	< RL	< RL	< RL	< RL	4
DE	1958	42	< RL	< RL	< RL	< RL	< RL	< RL	4
DK	79	3	< RL	< RL	< RL	< RL	< RL	< RL	5
EE	140	4	< RL	< RL	< RL	< RL	< RL	< RL	5
ES-N	105	5	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-C	170	7	< RL	< RL	< RL	< RL	< RL	< RL	9
ES-S	185	4	< RL	< RL	< RL	< RL	< RL	< RL	3
ES-E	91	4	< RL	< RL	< RL	< RL	< RL	< RL	12
ES	551	20	< RL	< RL	< RL	< RL	< RL	< RL	6
FI-N	52	1	< RL	< RL	< RL	< RL	< RL	< RL	11
FI-S	444	3	< RL	< RL	< RL	< RL	< RL	< RL	5
FI	496	4	< RL	< RL	< RL	< RL	< RL	< RL	5
FR-NW	1062	17	< RL	< RL	< RL	< RL	< RL	< RL	8
FR-NE	512	10	< RL	< RL	< RL	< RL	< RL	< RL	12
FR-SW	535	13	< RL	< RL	< RL	< RL	< RL	< RL	11
FR-SE	604	14	< RL	< RL	< RL	< RL	< RL	< RL	7
FR	2713	54	< RL	< RL	< RL	< RL	< RL	< RL	11
GR	24	2	< RL	< RL	< RL	< RL	< RL	< RL	7
HR-A	3	2		< RL	< RL	< RL	< RL	< RL	4
HR-C	13	5	< RL	< RL	< RL	< RL	< RL	< RL	4
HR	16	7	< RL	< RL	< RL	< RL	< RL	< RL	4
HU	264	6	< RL	< RL	< RL	< RL	< RL	< RL	2
IE	109	3	< RL	< RL	< RL	< RL	< RL	< RL	9
IT-N	1894	25	< RL	< RL	< RL	< RL	< RL	< RL	4
IT-C	621	10	< RL	< RL	< RL	< RL	< RL	< RL	3
IT-S	544	6	< RL	< RL	< RL	< RL	< RL	< RL	4
IT	3059	41	< RL	< RL	< RL	< RL	< RL	< RL	9
LT	64	2	< RL	< RL	< RL	< RL	< RL	< RL	5
LU	53	1	< RL	< RL	< RL	< RL	< RL	< RL	12
LV	12	1	< RL	< RL	< RL	< RL	< RL	< RL	1
MT	24	1	< RL	< RL	< RL	< RL	< RL	< RL	8
NL	53	1	< RL	< RL	< RL	< RL	< RL	< RL	6
PL-N	12	6	< RL	< RL	< RL	< RL	< RL	< RL	1
PL-S	14	7	< RL	< RL	< RL	< RL	< RL	< RL	1
PL	26	13	< RL	< RL	< RL	< RL	< RL	< RL	1
PT	31	1	< RL	< RL	< RL	< RL	< RL	< RL	7
RO-N	3	3	< RL				< RL	< RL	1
RO-S	6	6	< RL				< RL	< RL	1
RO	9	9	< RL				< RL	< RL	1
SE-N	106	2	< RL	< RL	< RL	< RL	< RL	< RL	9
SE-S	212	4	< RL	< RL	< RL	< RL	< RL	< RL	5
SE	318	6	< RL	< RL	< RL	< RL	< RL	< RL	5
SI	54	5	< RL	< RL	< RL	< RL	< RL	< RL	12
SK	2	1	< RL				< RL	< RL	1

RL: reporting level for ^{137}Cs In air, i.e. 0.03 Bq m^{-3} (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. S1

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Austria

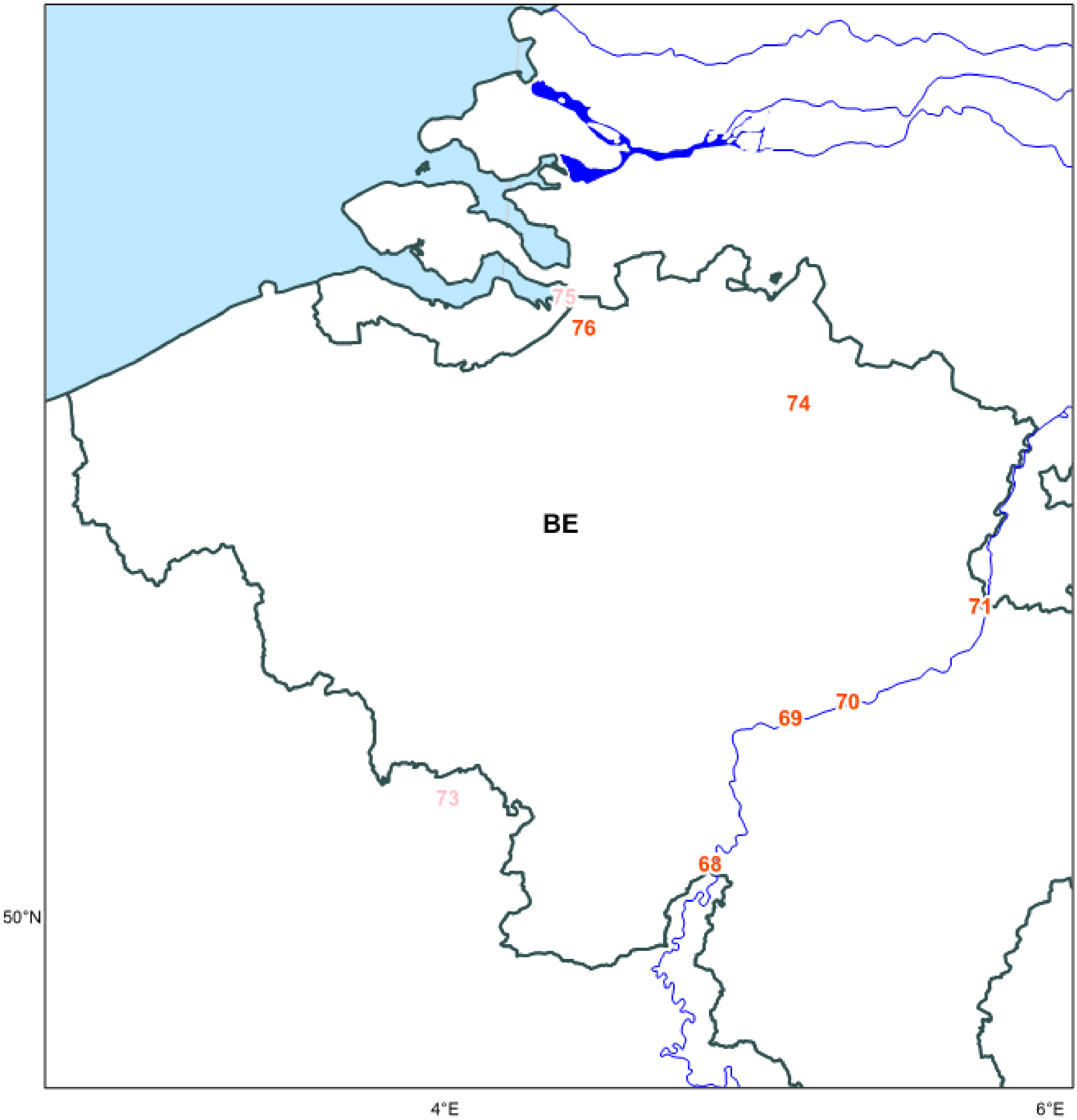


152	Schwabegg
160	Jochenstein
161	Wolfsthal

Fig. S2

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Belgium

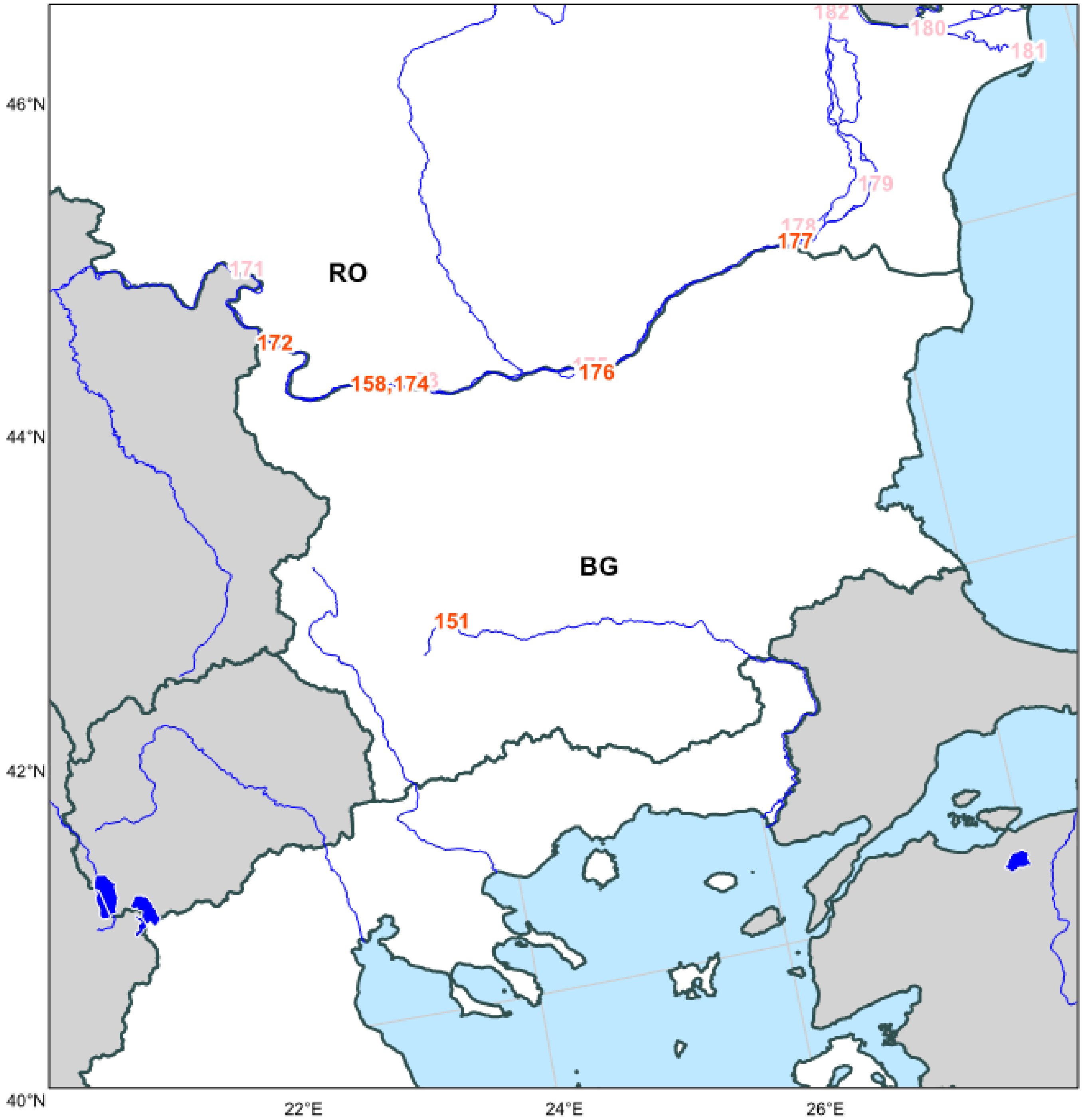
DENSE



68	Heer-Agimont
69	Andenne
70	Huy
71	Lixhe
74	Geel
76	Doel

Fig. S3

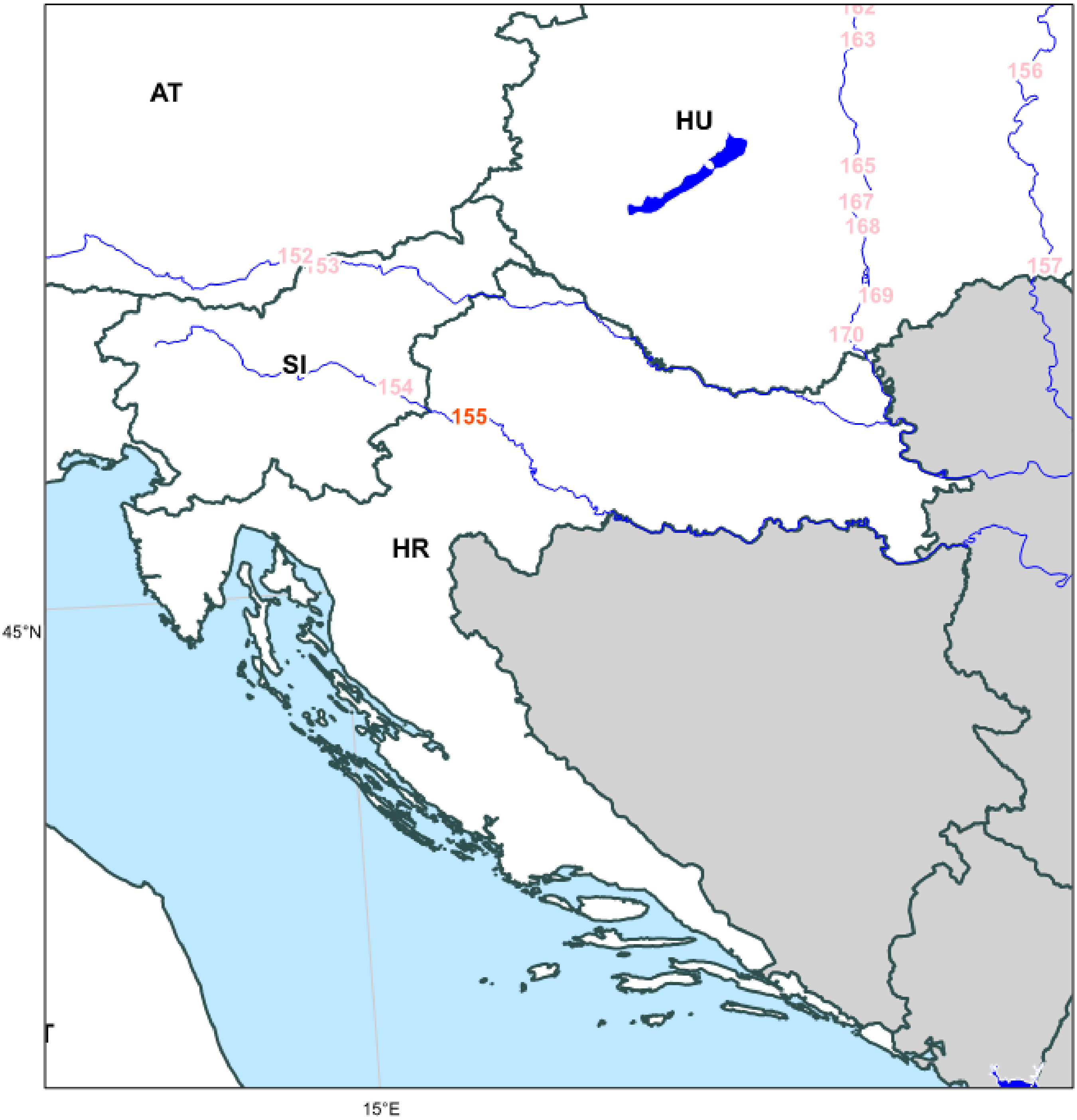
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Bulgaria



151	Kostenec
158	Kozloduy
172	Novo Selo
174	Oriahovo
176	Svishtov
177	Silistra

Fig. S4

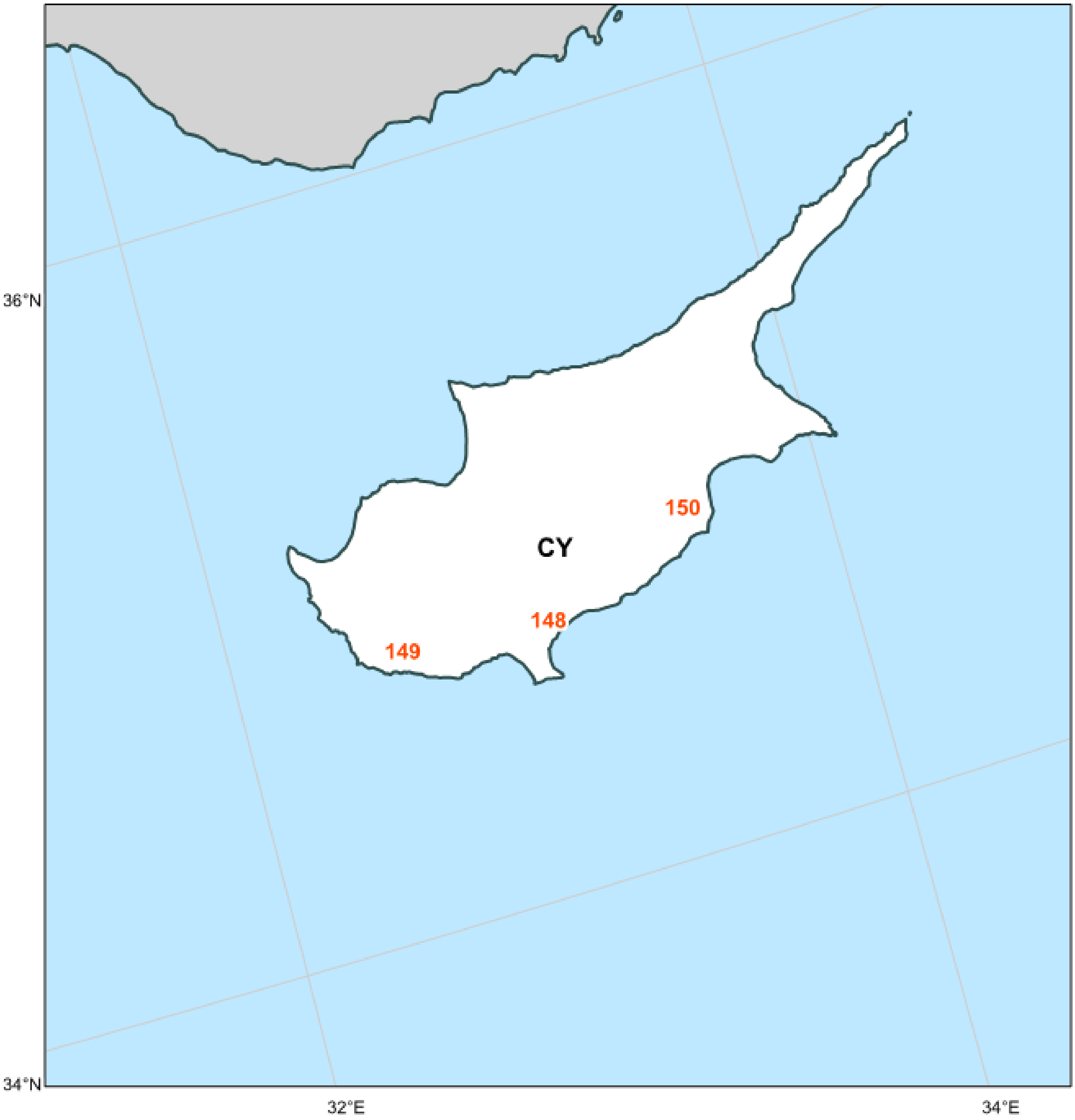
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Croatia



155 Zagreb

Fig. S5

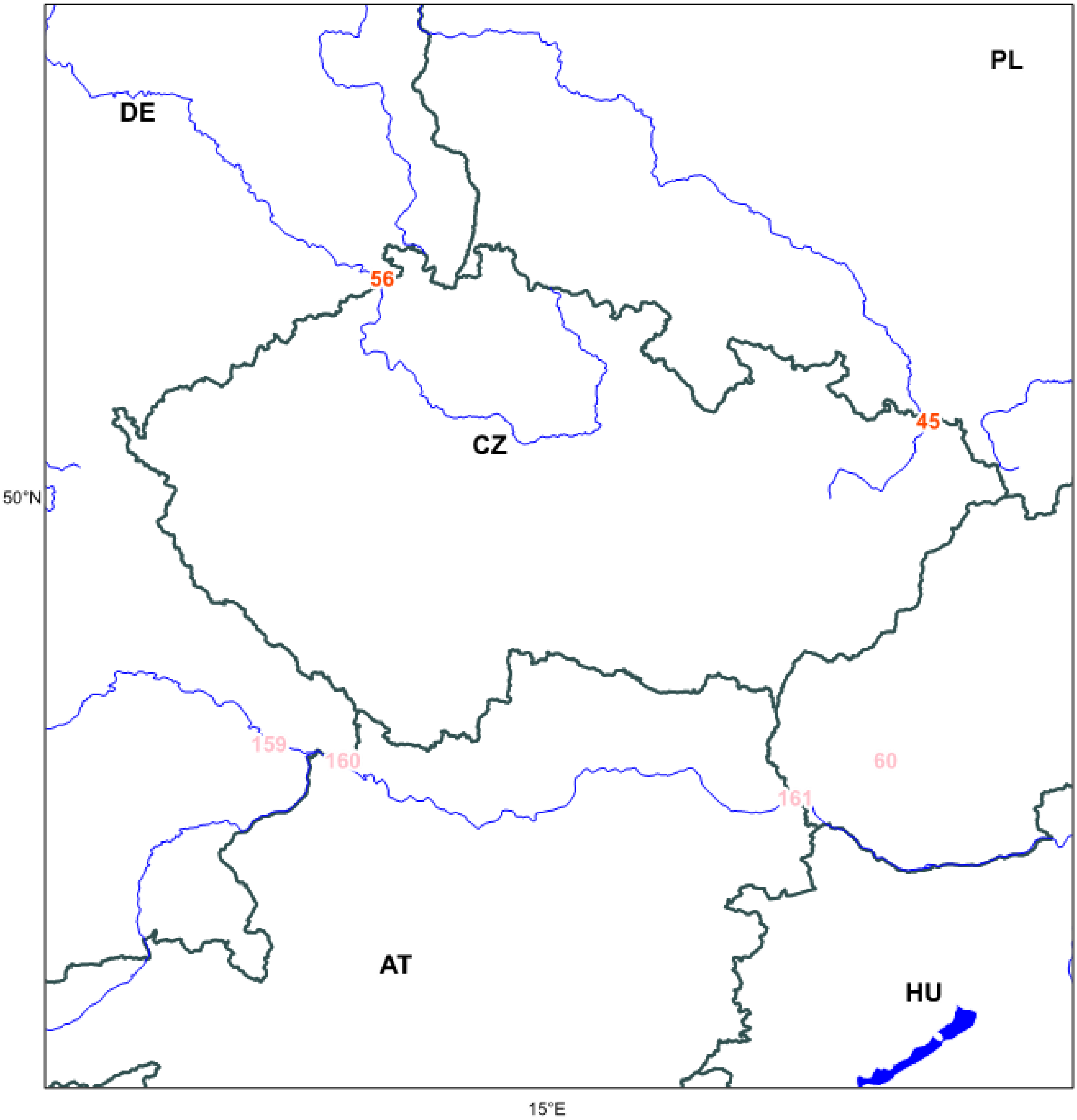
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Cyprus



148	Limassol
149	Asprokremmos Dam
150	Tersefanou Water Treatment

Fig. S6

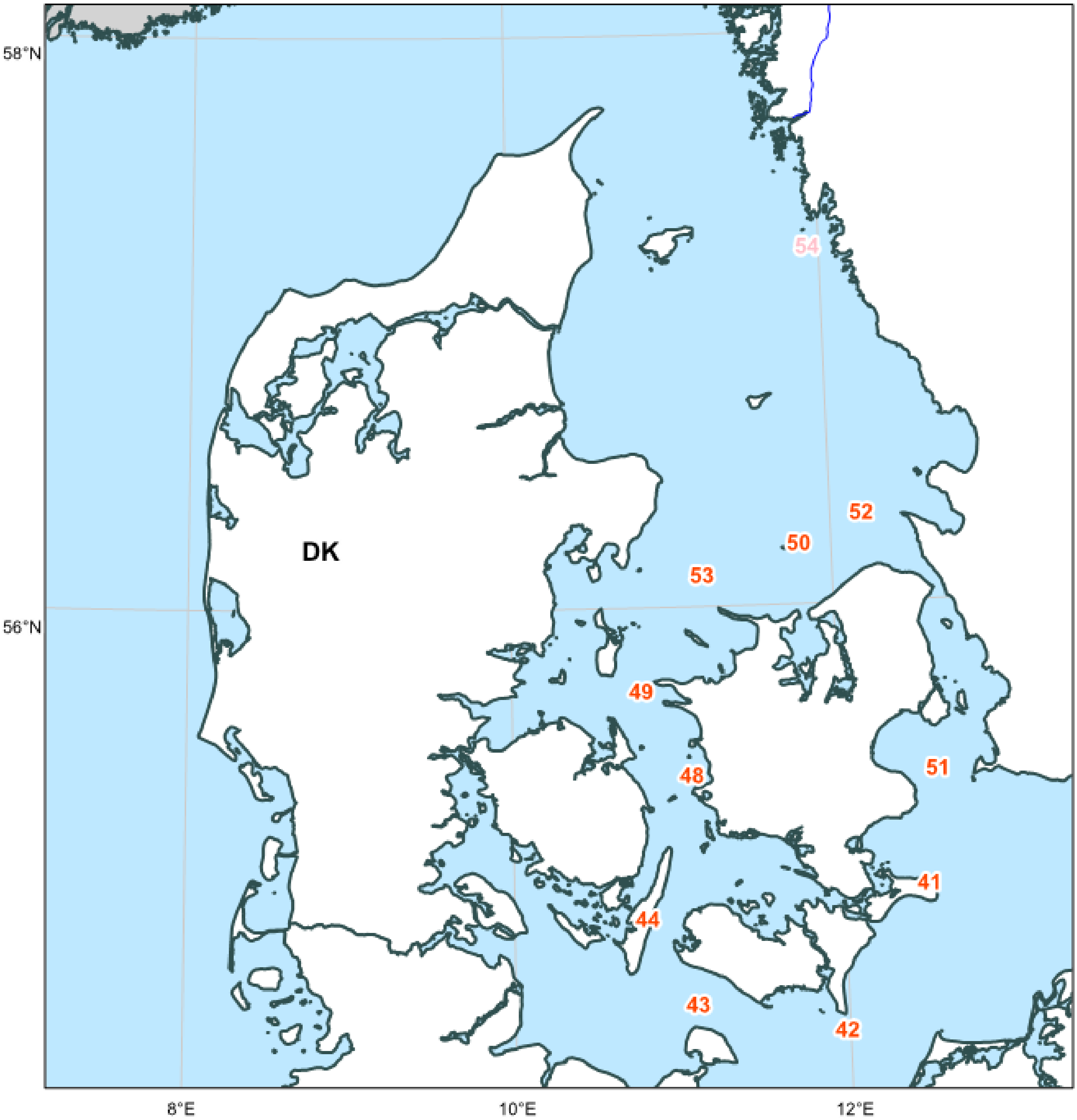
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Czech Republic



45	Bohumin
56	Hrensko

Fig. S7

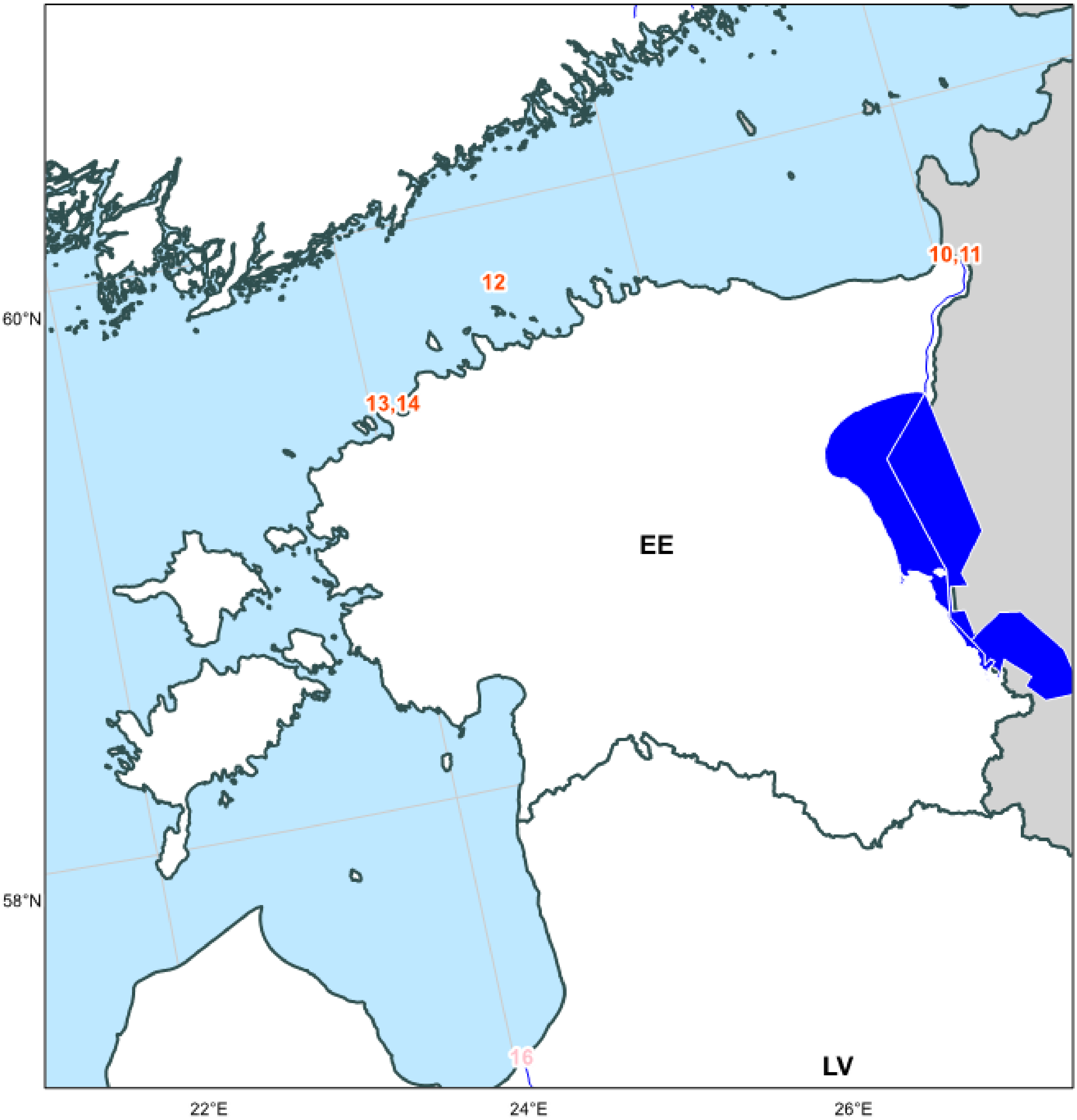
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Denmark



41	Moen
42	Gedser Odde
43	Femern Baelt
44	Langeland Baelt
48	Halskov Rev
49	Asnaes Rev
50	Hesseloe
51	The Sound S
52	Kullen
53	Kattegat-413

Fig. S8

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Estonia



10	Narva
11	Gulf Of Finland, N8
12	Gulf Of Finland, EE17
13	Gulf Of Finland, PE
14	Gulf Of Finland, PW

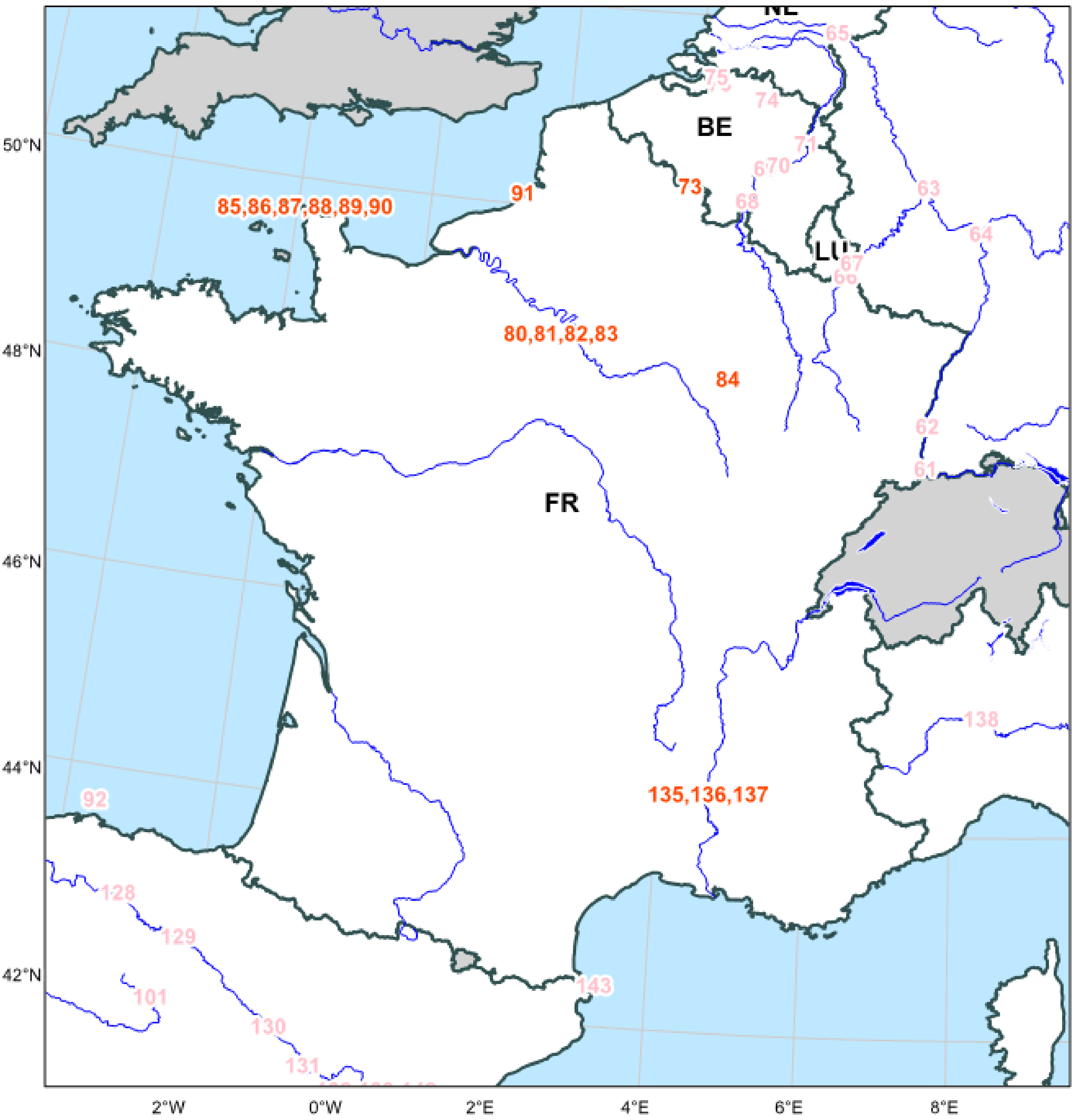
Fig. S9

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Finland

6	Kemi
7	Oulu
8	Pori
9	Kotka

Fig. S10

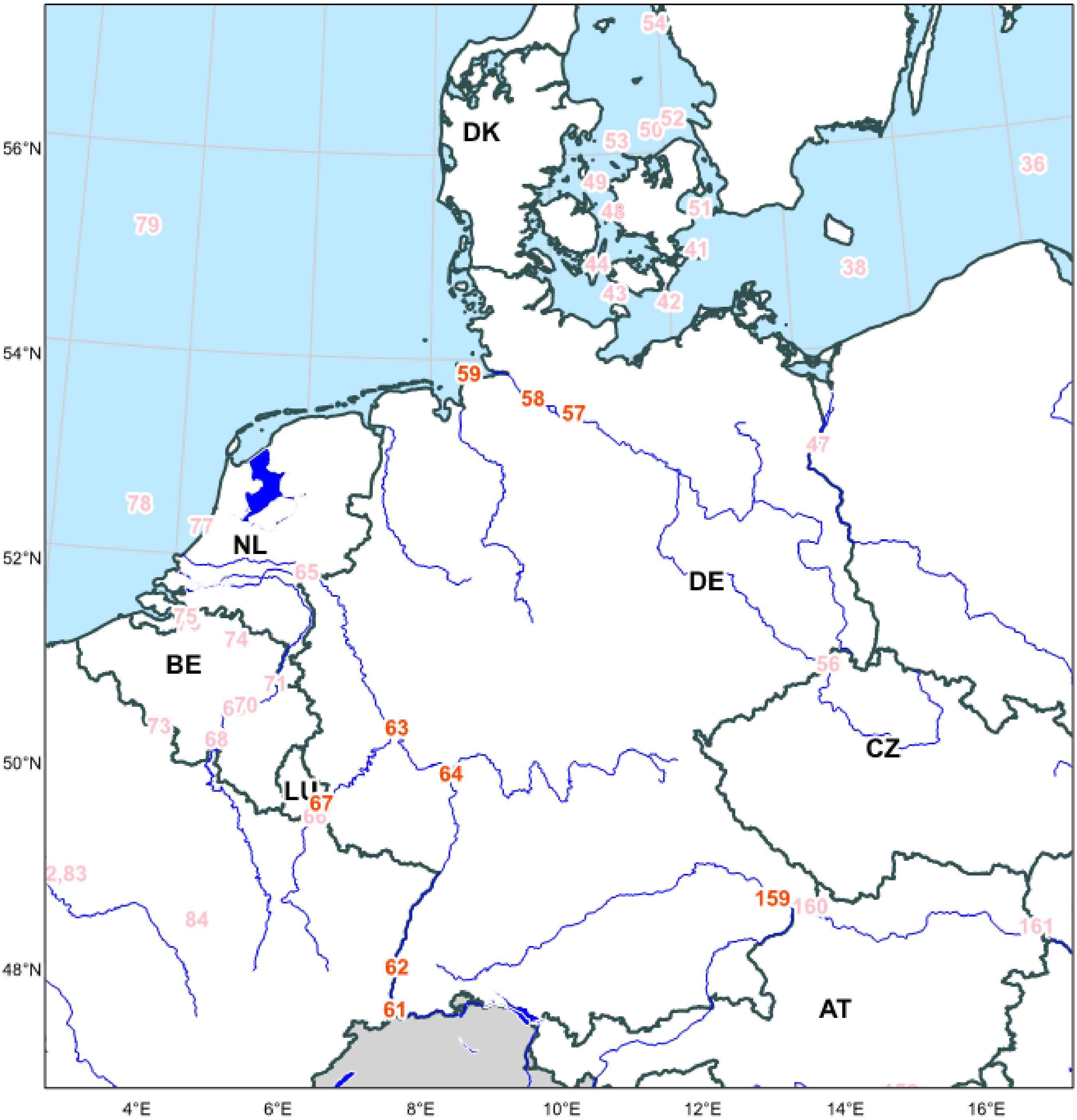
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): France



73	La Flamenne En Aval De La Somanu
80	Aqueduc Des Mineurs
81	Etang Neuf
82	Etang Colbert
83	Etang Vieux
84	Les Noues D'Amance Aval Csa
85	Les Moulinets Le Batardeau
86	Ruisseau Sainte-Hélène
87	Les Moulinets Source Recboc
88	Ruisseau Des Landes-R14
89	Ruisseau Des Combes
90	Ruisseau Le Grand Bel
91	Manche Le Tréport
134	Gaffière Amont Tricastin
135	Lauzon Aval Tricastin
136	Gaffière Aval Tricastin
137	Tout Amont Rhône

Fig. S11

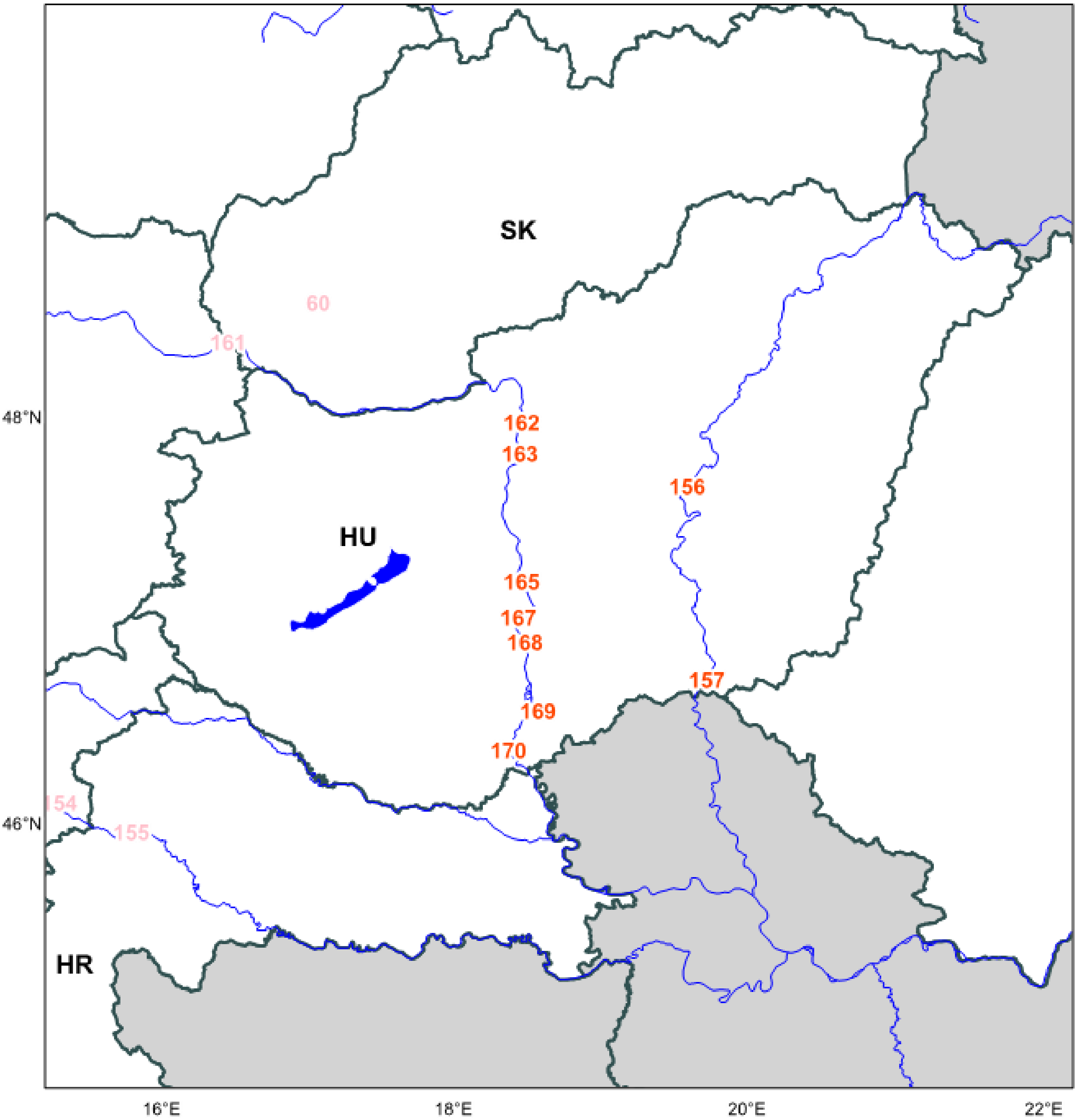
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Germany



57	Geesthacht
58	Wedel
59	Cuxhaven
61	Weil am Rhein
62	Breisach am Rhein
63	Koblenz
64	Trebur
67	Wincheringen
159	Vilshofen

Fig. S12

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Hungary



156	Szolnok
157	Tiszasziget I
162	Budapest - North I
163	Budapest - Budafok
165	Dunafoldvar II
166	Dunafoldvar I
167	Paks
168	Kalocsa
169	Baja
170	Mohacs

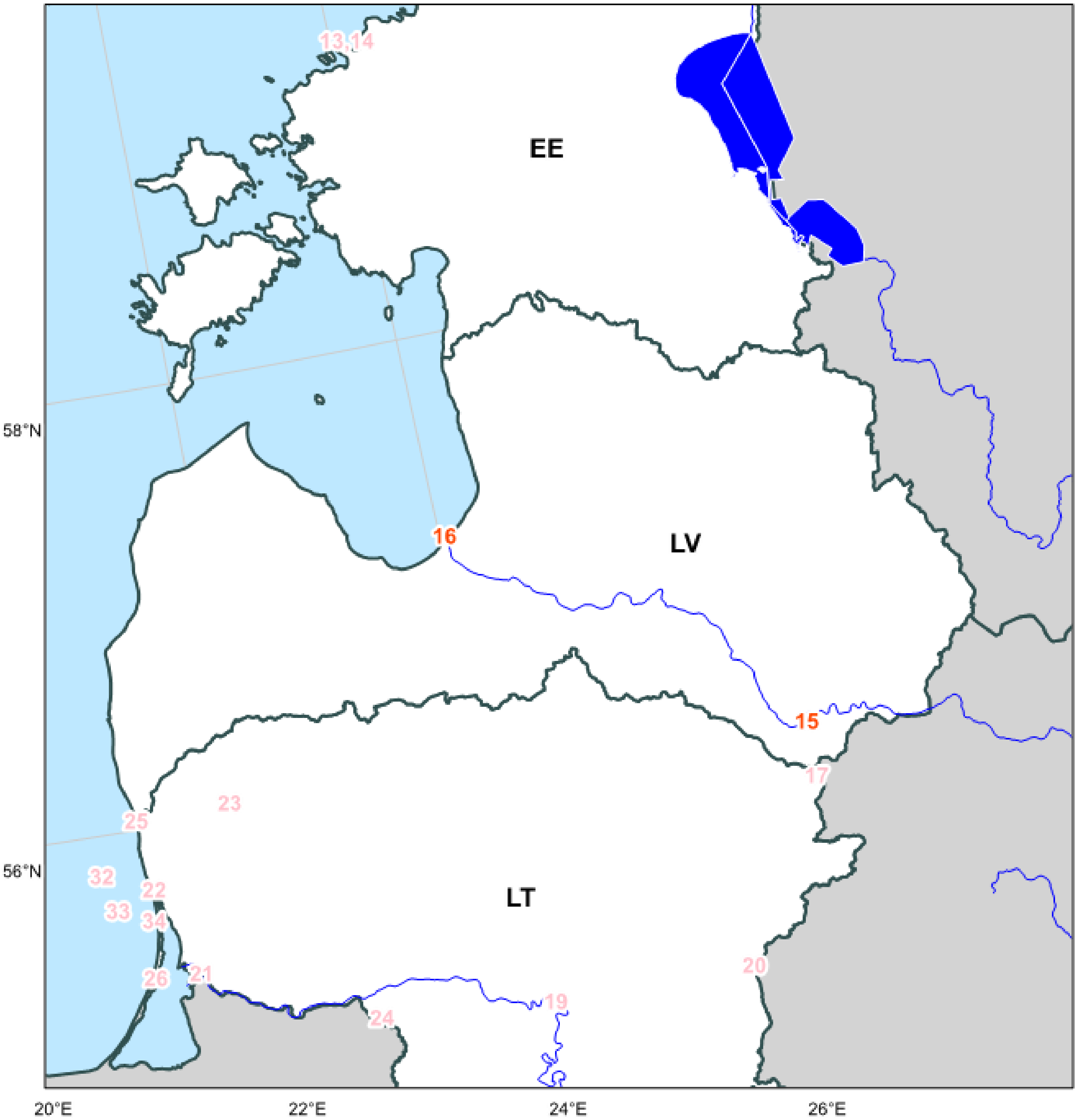
Fig. S13

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Italy

138 Casale Monferrato

Fig. S14

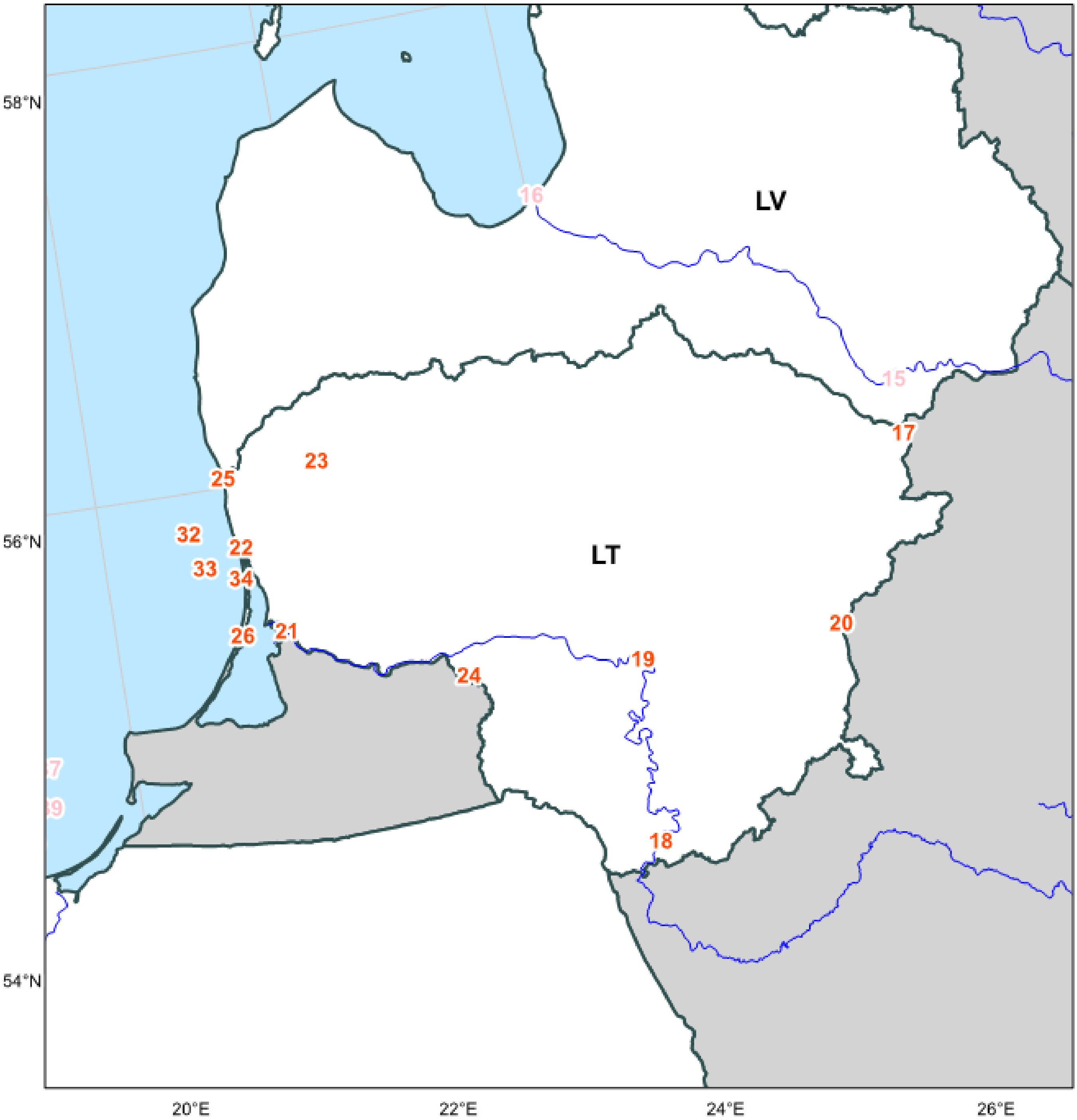
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Latvia



15	Daugavpils
16	Riga

Fig. S15

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Lithuania

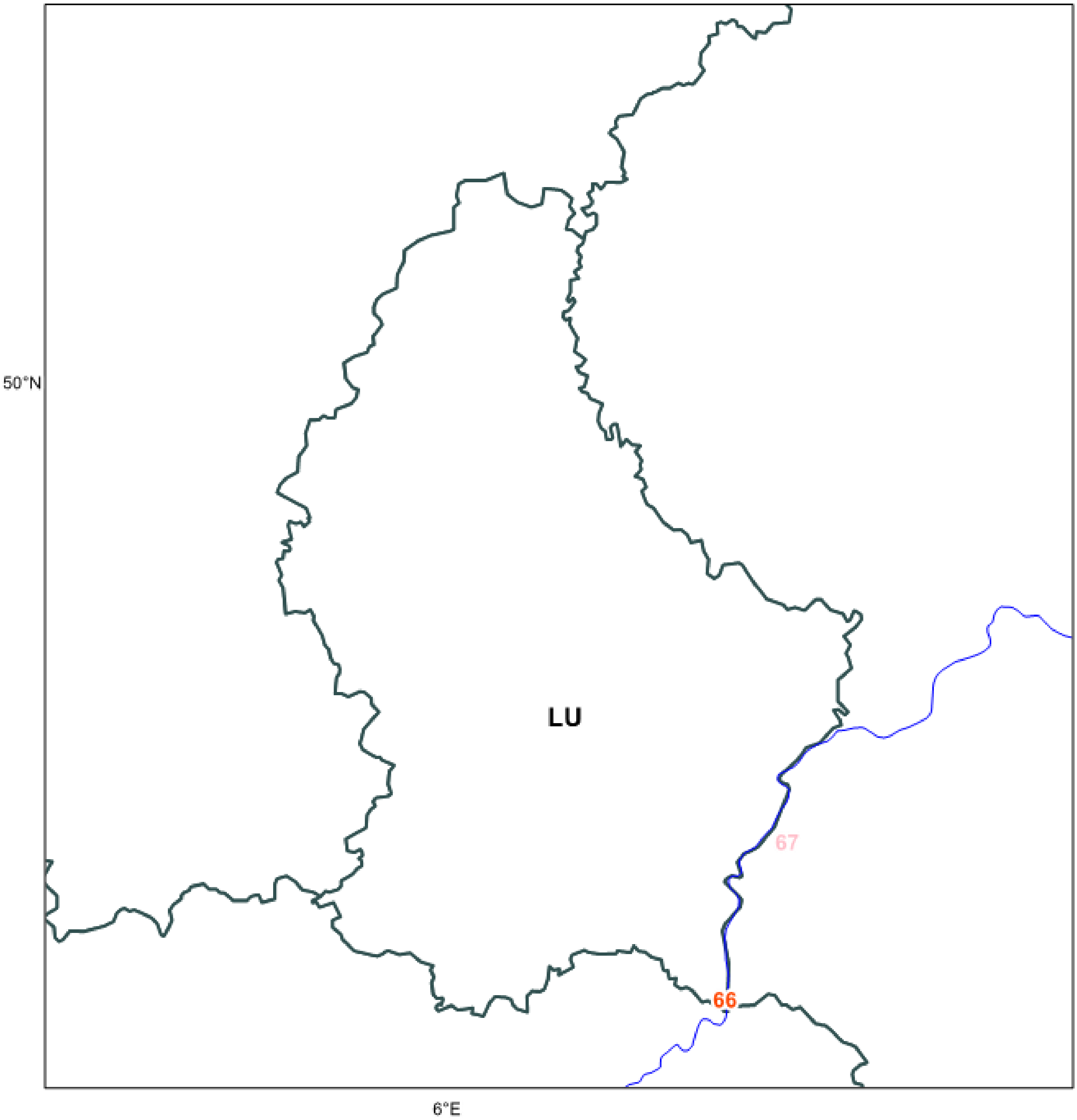


17 Drūkšiai Lake
18 Neman above Druskininkai
19 Kauno Marios
20 Neris River Near Buivydžiai
21 Skirvytė River
22 Akmena-Danė River
23 Plateliai Lake
24 Šešupė River Transb (Russia)
25 Šventoji River Mouth

26 Curonian Lagoon LT10
32 Baltic Sea LT64
33 Baltic Sea LT 20
34 Baltic Sea LT6

Fig. S16

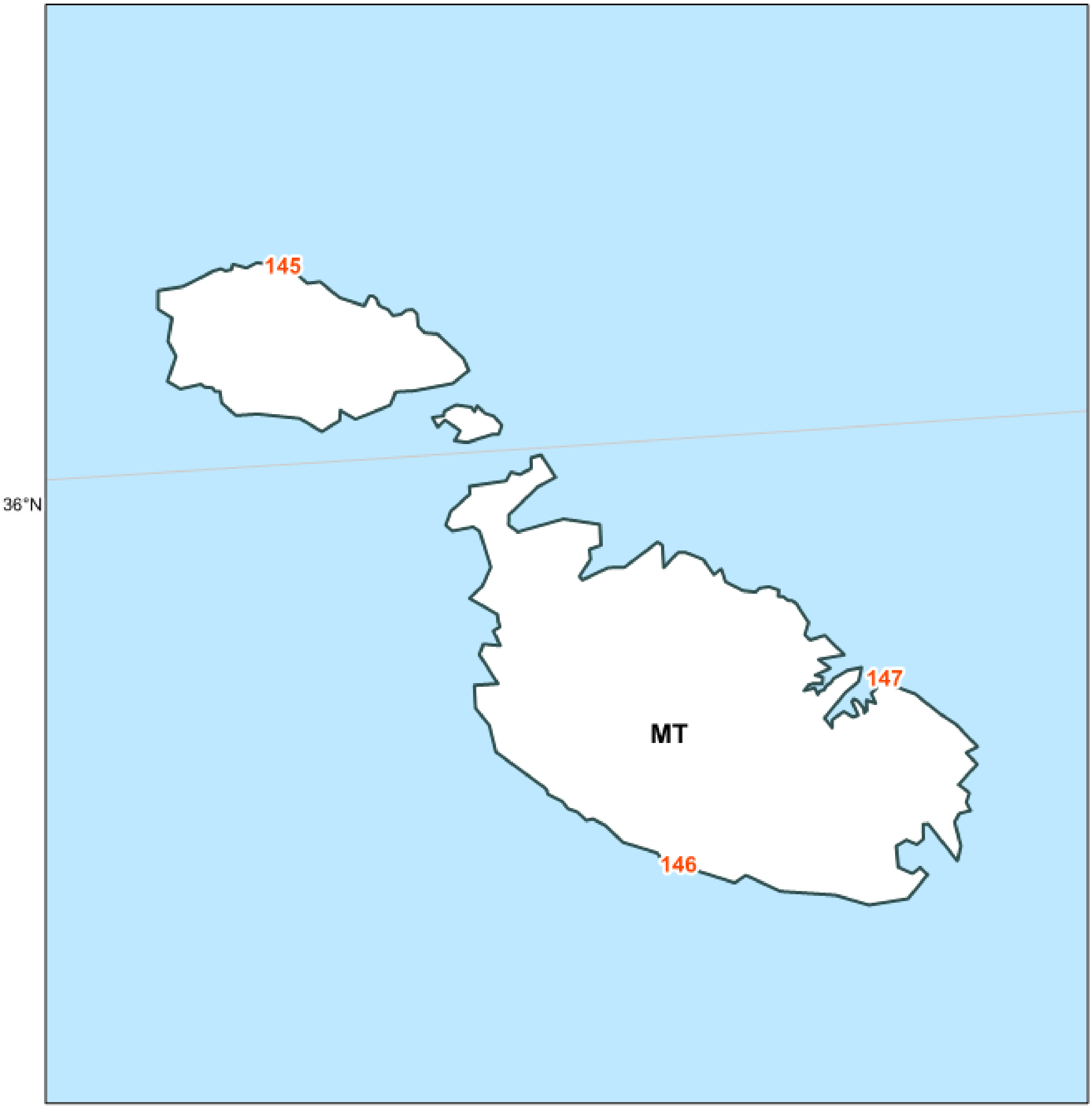
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Luxembourg



66 Schengen

Fig. S17

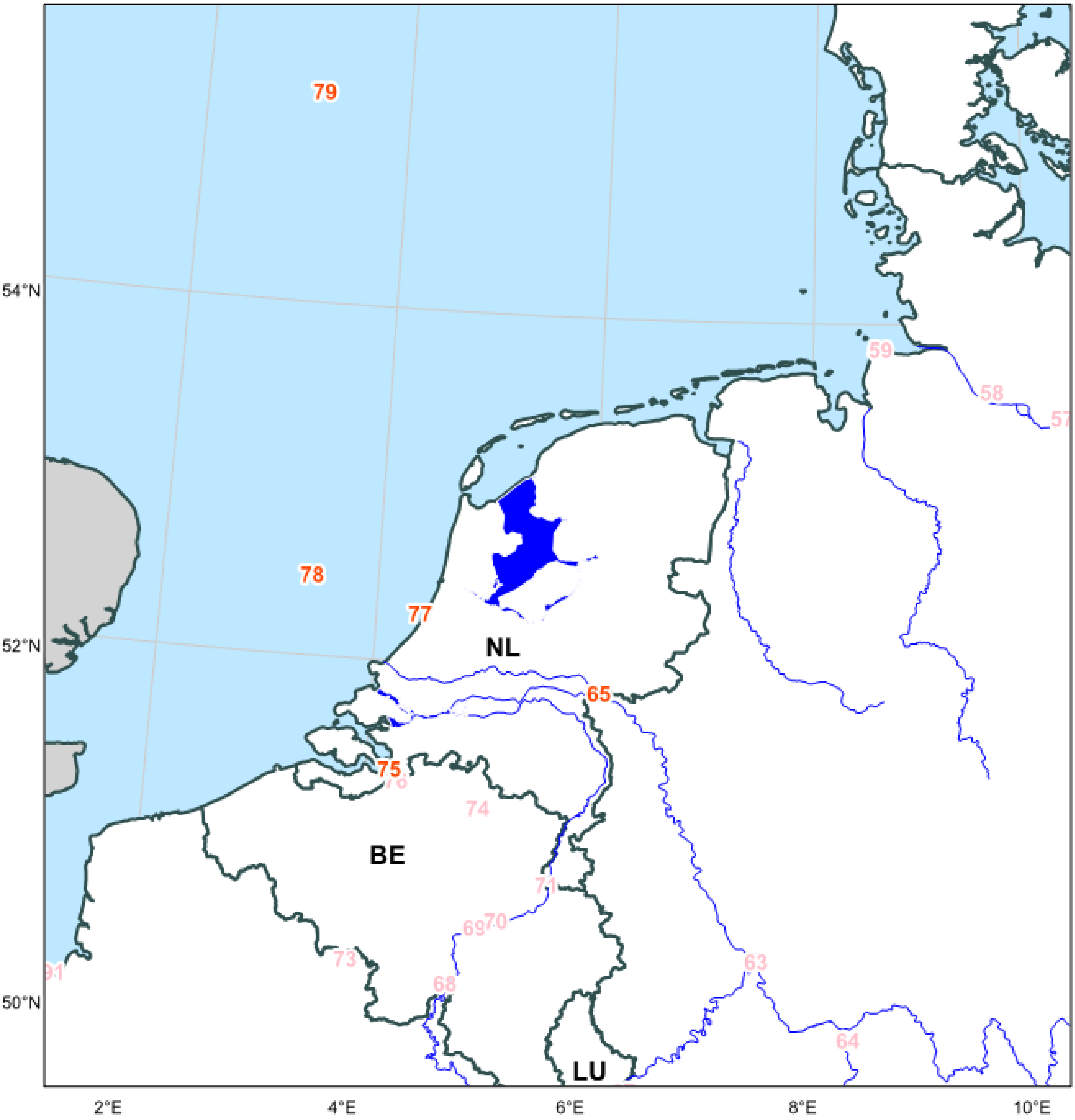
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Malta



145	Xwejni
146	Lapsi
147	Wied Ghammieq

Fig. S18

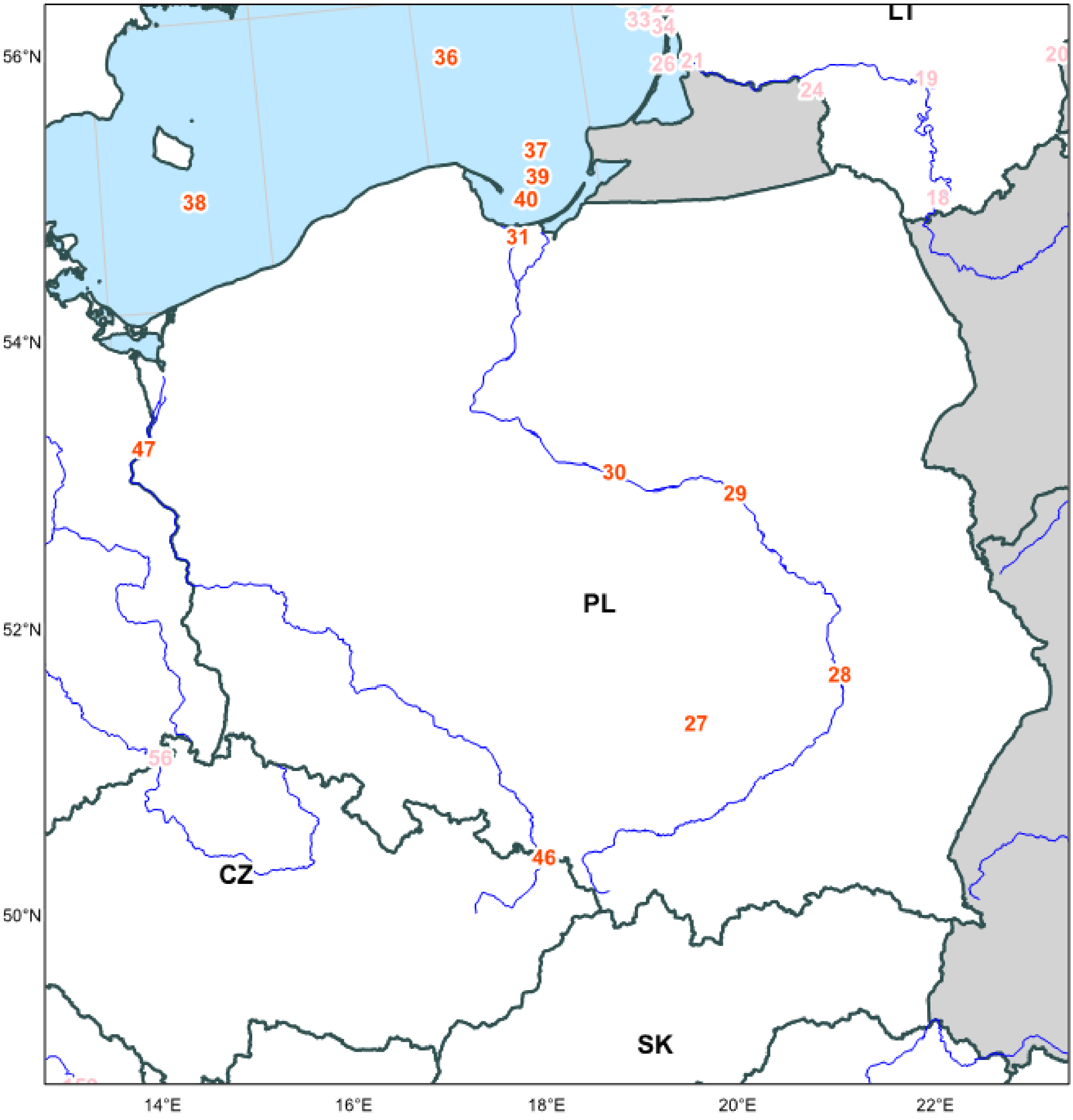
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): the Netherlands



65	Lobith
75	Schaar van Ouden Doel
77	Noordwijk, 2 km from coast
78	Noordwijk, 70 km from coast
79	Terschelling 235 km from coast

Fig. S19

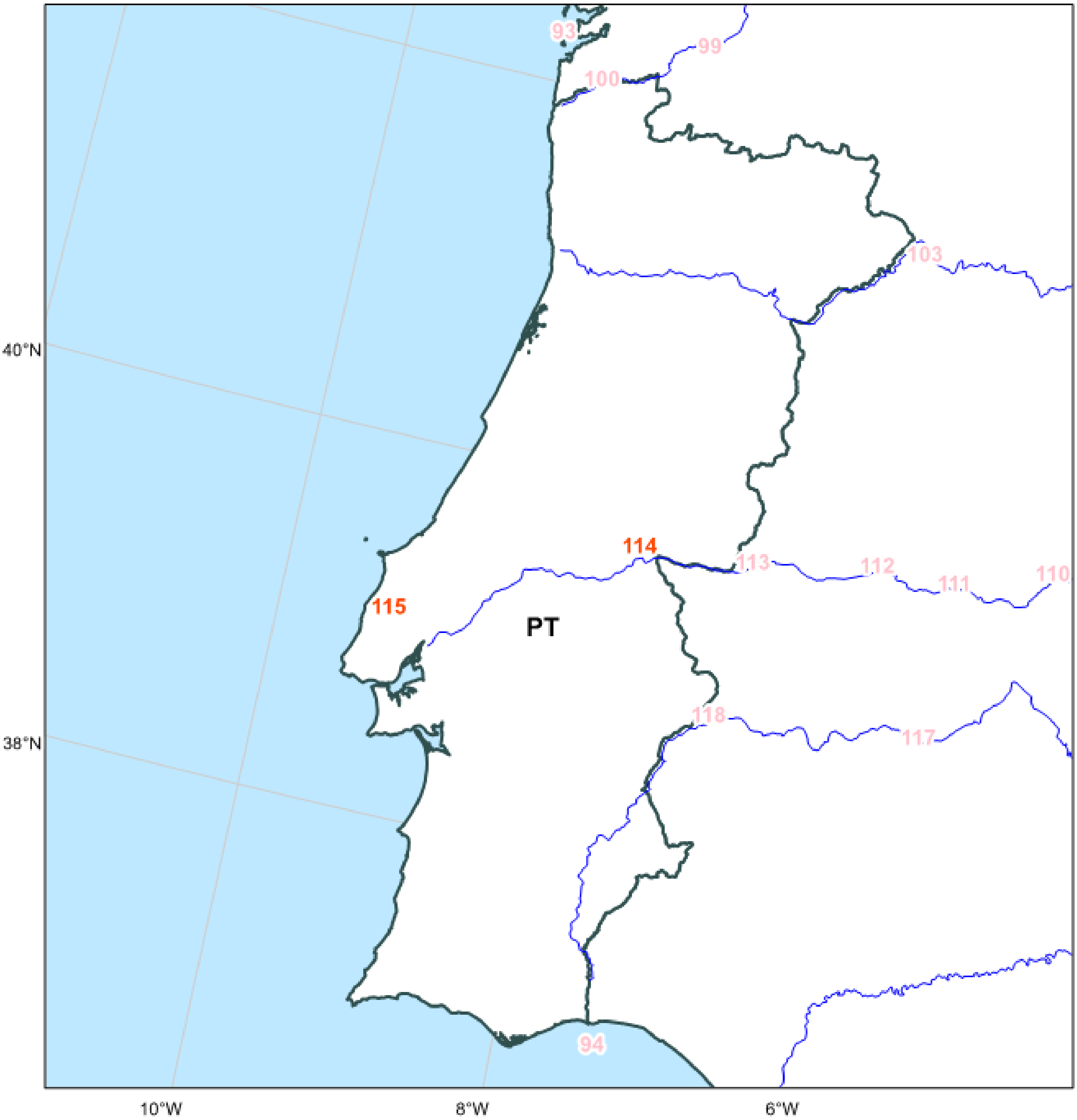
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Poland



27	Krakow Tyniec
28	Annopol
29	Warsaw
30	Plock
31	Kiezmark
36	Baltic Sea P-140
37	Baltic Sea P-1
38	Baltic Sea P-39
39	Baltic Sea P-116
40	Baltic Sea P-110
46	Chalupki
47	Krajnik

Fig. S20

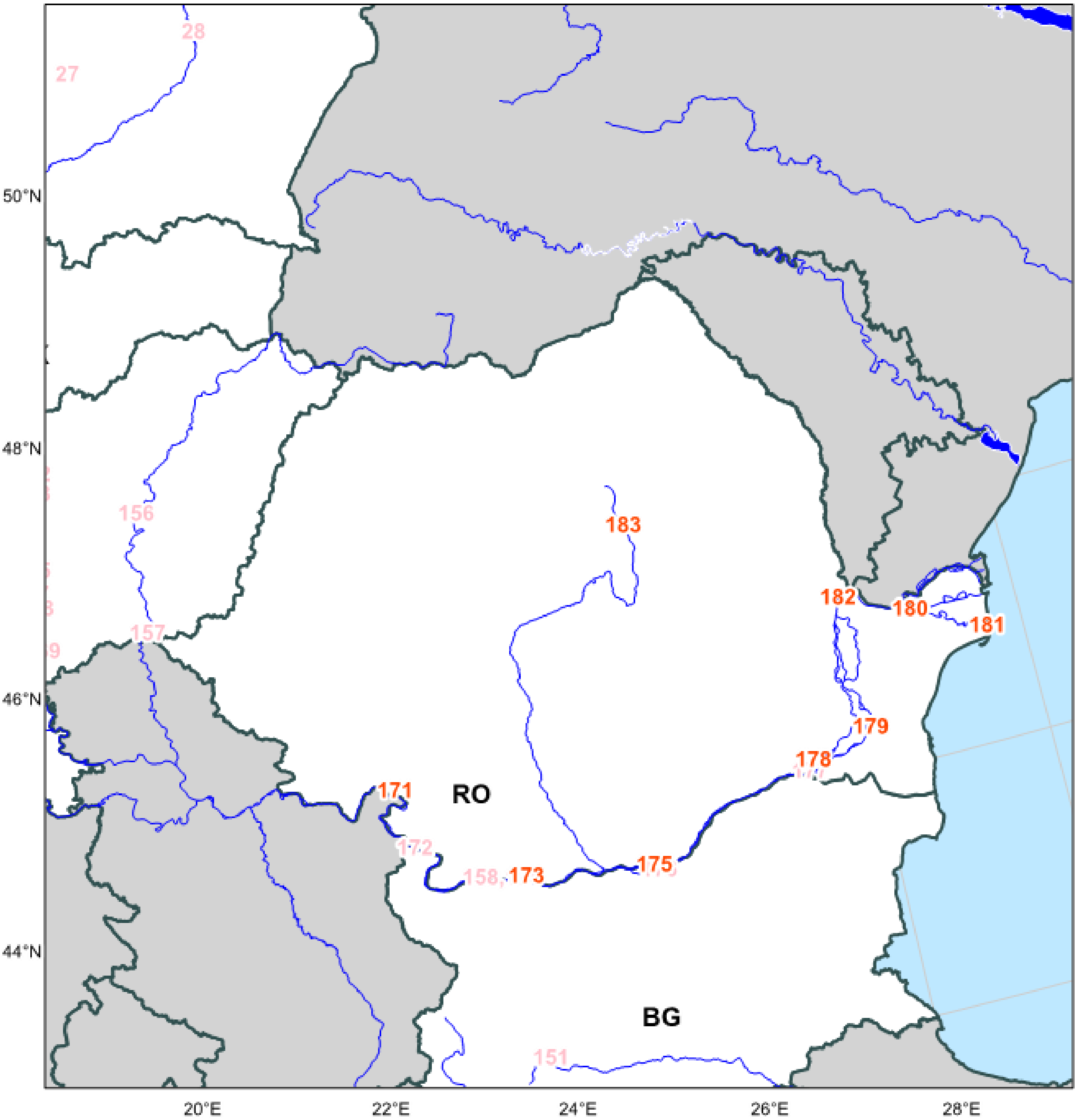
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Portugal



114	Vila Velha de Ródão
115	Valada Do Ribatejo

Fig. S21

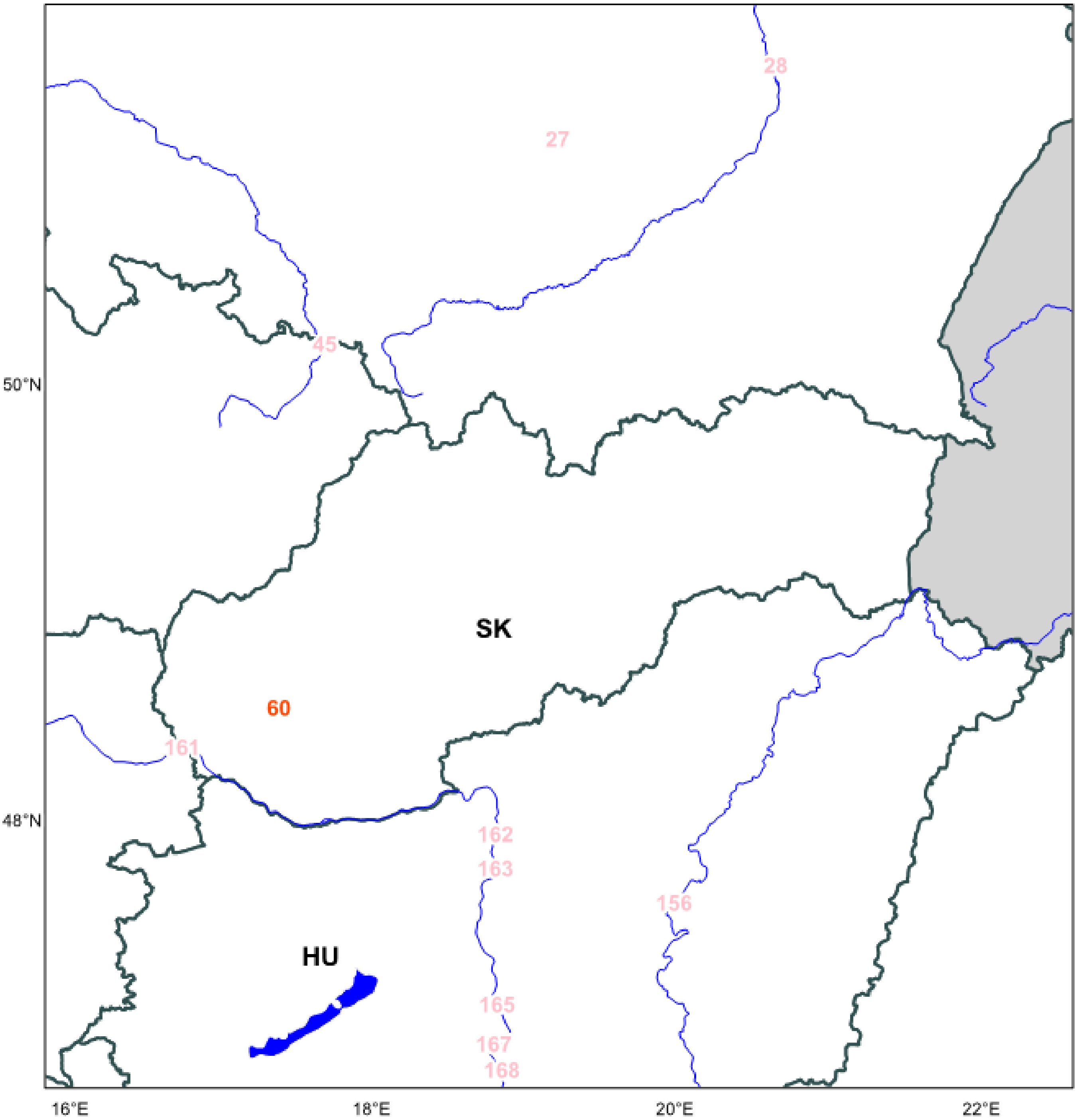
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Romania



171	Drobeta Turnu Severin
173	Bechet
175	Zimnicea
178	Calarasi
179	Cernavoda
180	Tulcea
181	Sfantu Gheorge Tulcea
182	Galati
183	Miercurea Ciuc

Fig. S22

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Slovakia

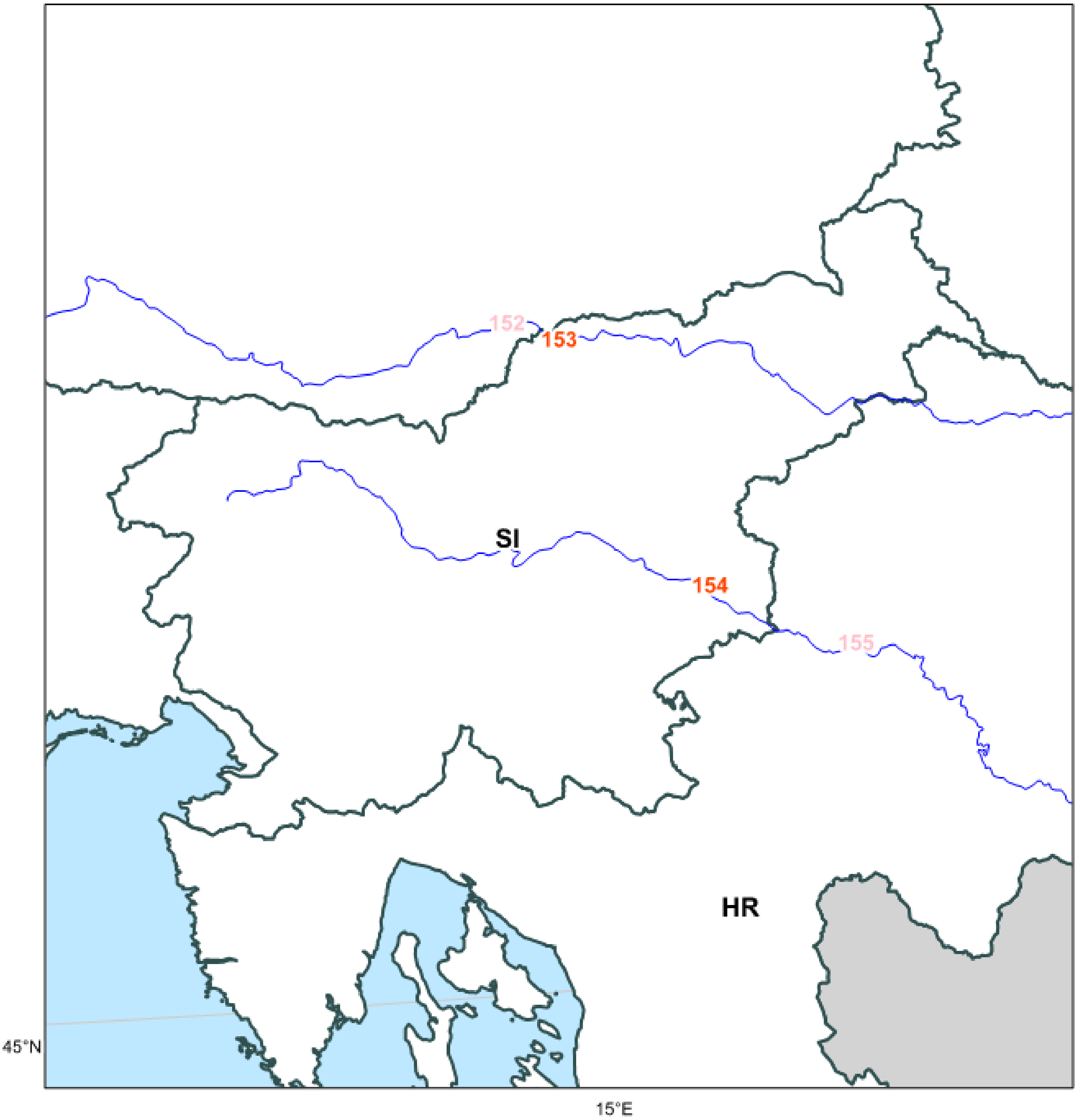


60 Sereď

DENSE

Fig. S23

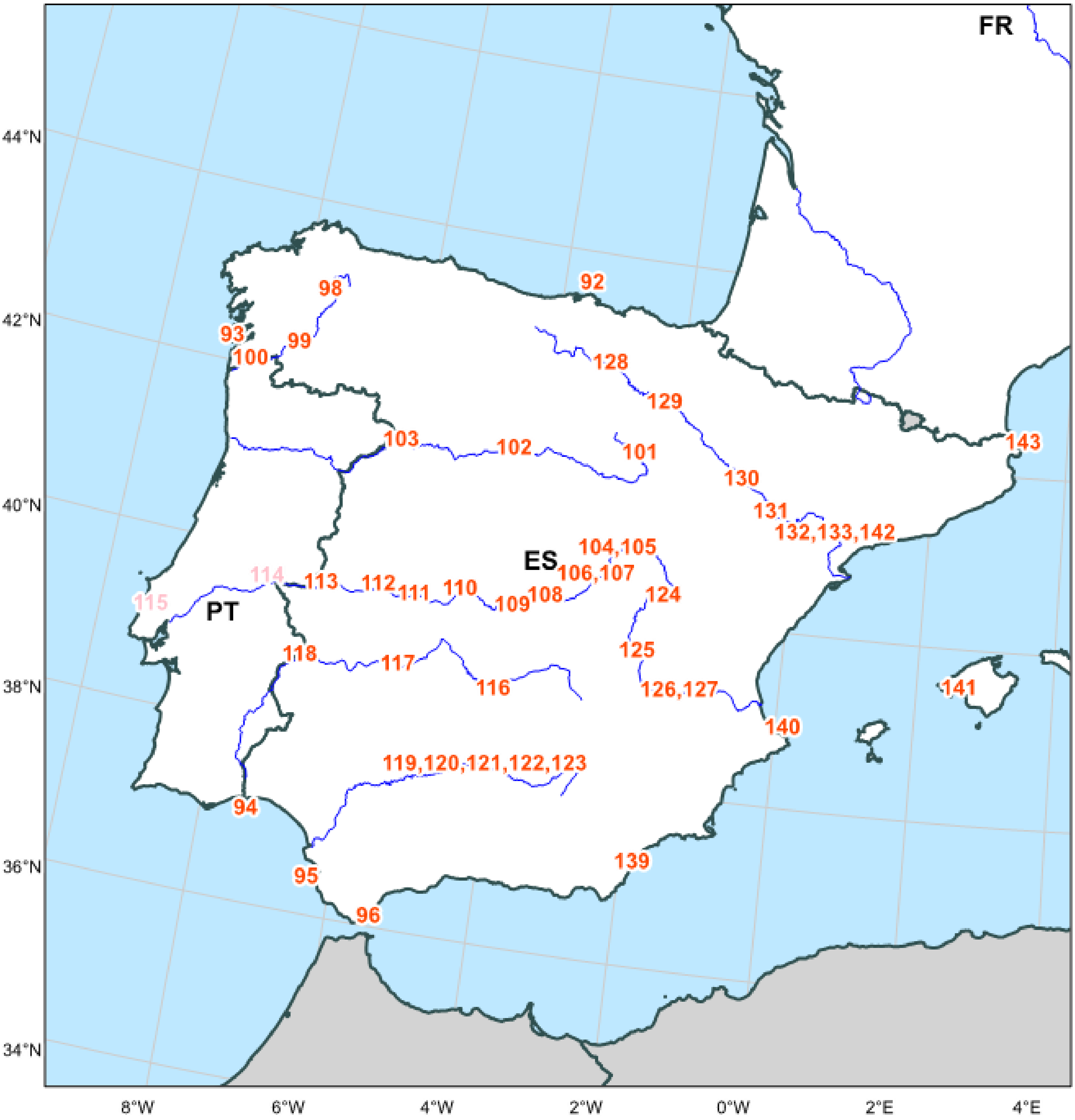
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Slovenia



153	Dravograd
154	Krsko

Fig. S24

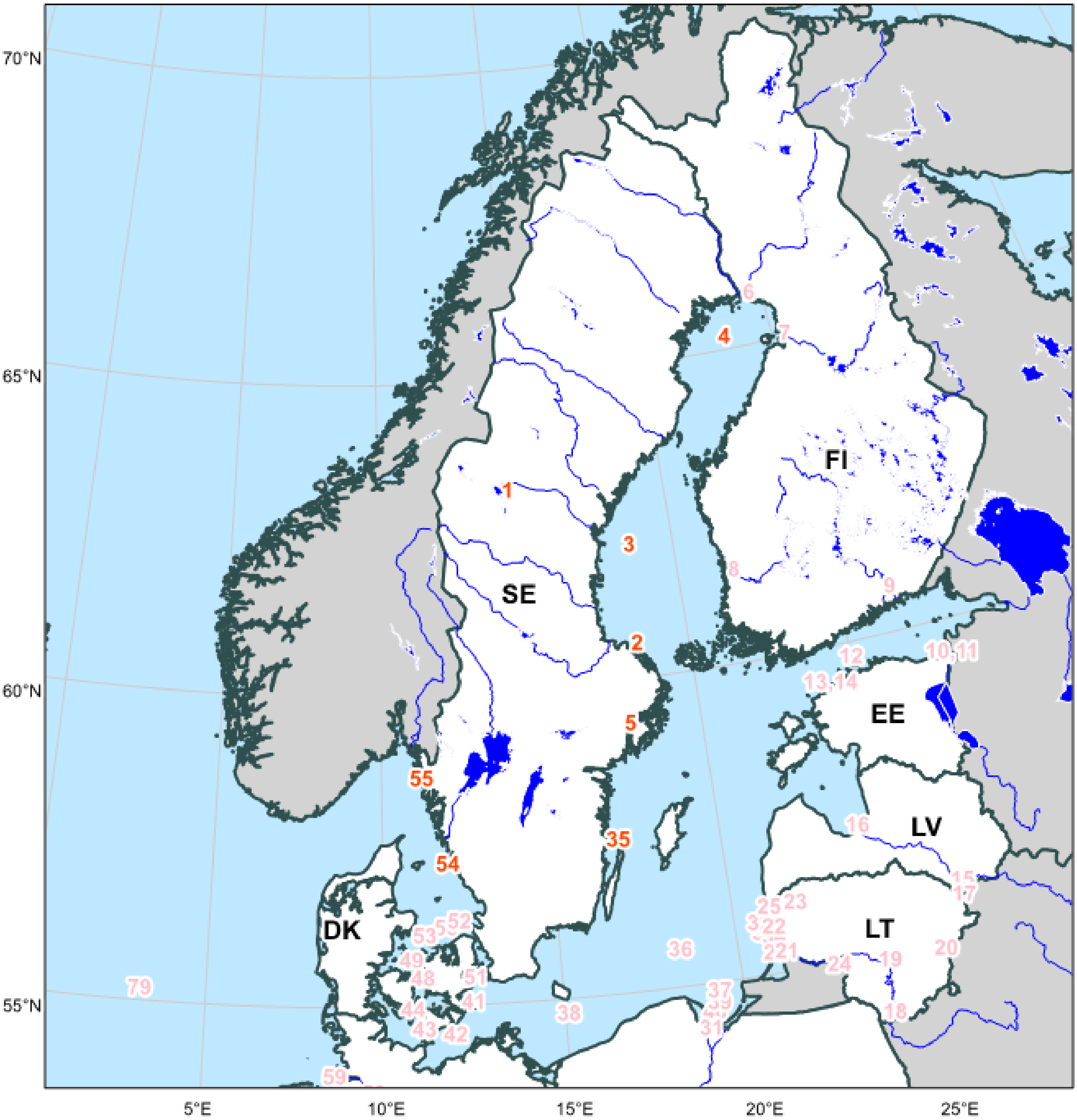
Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Spain



92	Cabo Ajo
93	Cabo Silleiro
94	Isla Cristina
95	Puerto de Cadiz
96	Estrecho de Gibraltar
98	Lugo
99	Orense
100	Caldelas De Tuy
101	Garray
102	Quintanilla
103	Villalcampo
104	Trillo Arriba
105	Trillo Abajo
106	Zorita Arriba
107	Zorita Abajo
108	Aranjuez
109	Toledo
110	Talavera
111	Valdecanas
112	Embalse de Torrejon
113	Embalse de Alcantara
116	Balbuena
117	Orellana
118	Puente Palmas
119	Posadas
120	El Carpio
121	Andujar Abajo
122	Andujar Arriba
123	Mengibar
124	Venta De Juan Romero
125	Embalse De Alarcon
126	Alcala Del Jucar
127	Cofrentes Abajo
128	Embalse de Sobrón
129	Mendavia
130	Zaragoza-Rio
131	Sastago
132	Ribarroja
133	Asco Abajo
139	Garrucha
140	Cabo de San Antonio
141	Puerto de Palma
142	Puerto de Tarragona
143	Cabo de Creus

Fig. S25

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Sweden

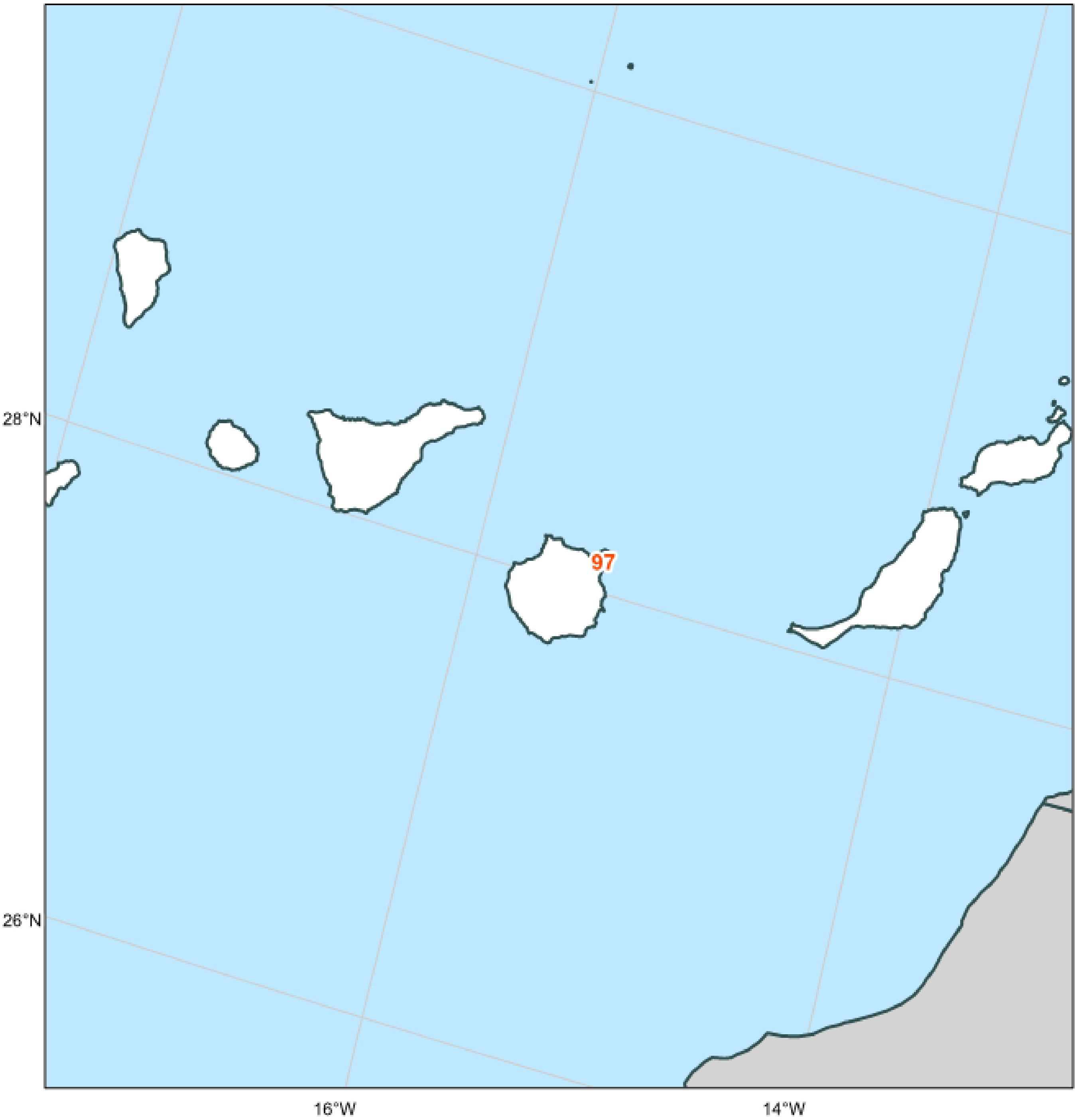


1	Oestersund-Storsjoen
2	Forsmark (F135)
3	Bottenhavet (C14)
4	Bottenviken (A5)
5	Norsborg
35	Oskarshamn (S36)
54	Ringhals (35)
55	Fjaellbacka

Fig. S26

Sampling locations for residual-β and ^{137}Cs in surface water (Tables S1 – S10): Canary Islands

DENSE



97 Puerto De Las Palmas

DENSE

Fig. S27: Time averages

YEAR	:	**2023**
SAMPLE TYPE	:	**surface water**
NUCLIDE CATEGORY	:	**residual-β**
MEASUREMENT UNIT	:	**Bq l^{-1}** (Bq per litre)

🟨 **EU (only relevant constraint values above the reporting level reported)**

⬜ **Outside EU (in 2023)**

🟧			annual avg.	<	0.6	Bq l^{-1}
🟧	0.6 Bq l^{-1}	<=	annual avg.	<	1.8	Bq l^{-1}
🟫	1.8 Bq l^{-1}	<=	annual avg.	<	6	Bq l^{-1}
🟫	6 Bq l^{-1}	<=	annual avg.			

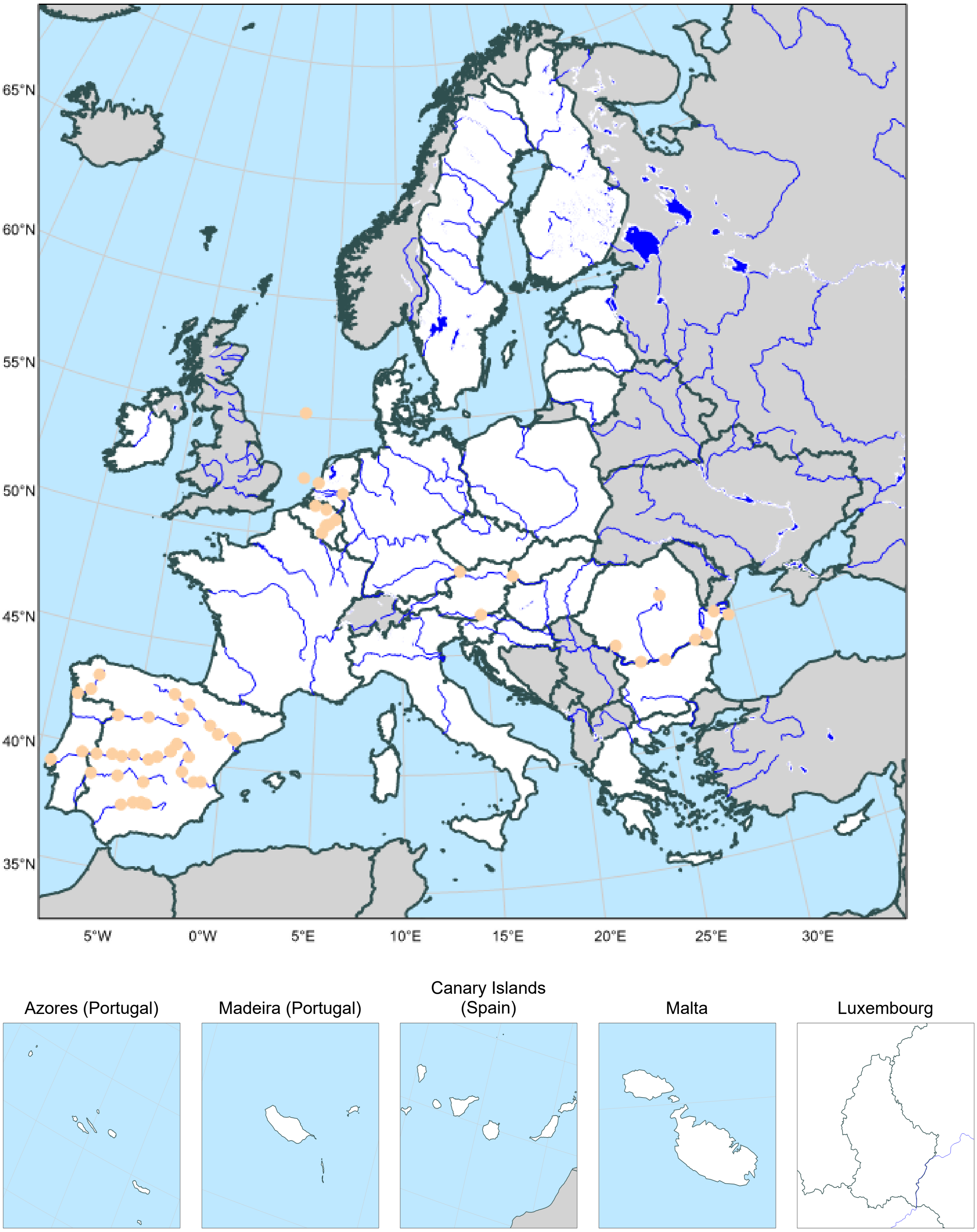


Fig. S28: Time averages

DENSE

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

		🟧				annual avg.	<	0.6	Bq l^{-1}
☐	EU (only relevant constraint values	🟧	0.6	Bq l^{-1}	<=	annual avg.	<	1.8	Bq l^{-1}
	above the reporting level reported)	🟫	1.8	Bq l^{-1}	<=	annual avg.	<	6	Bq l^{-1}
▨	Outside EU (in 2023)	🟫	6	Bq l^{-1}	<=	annual avg.			

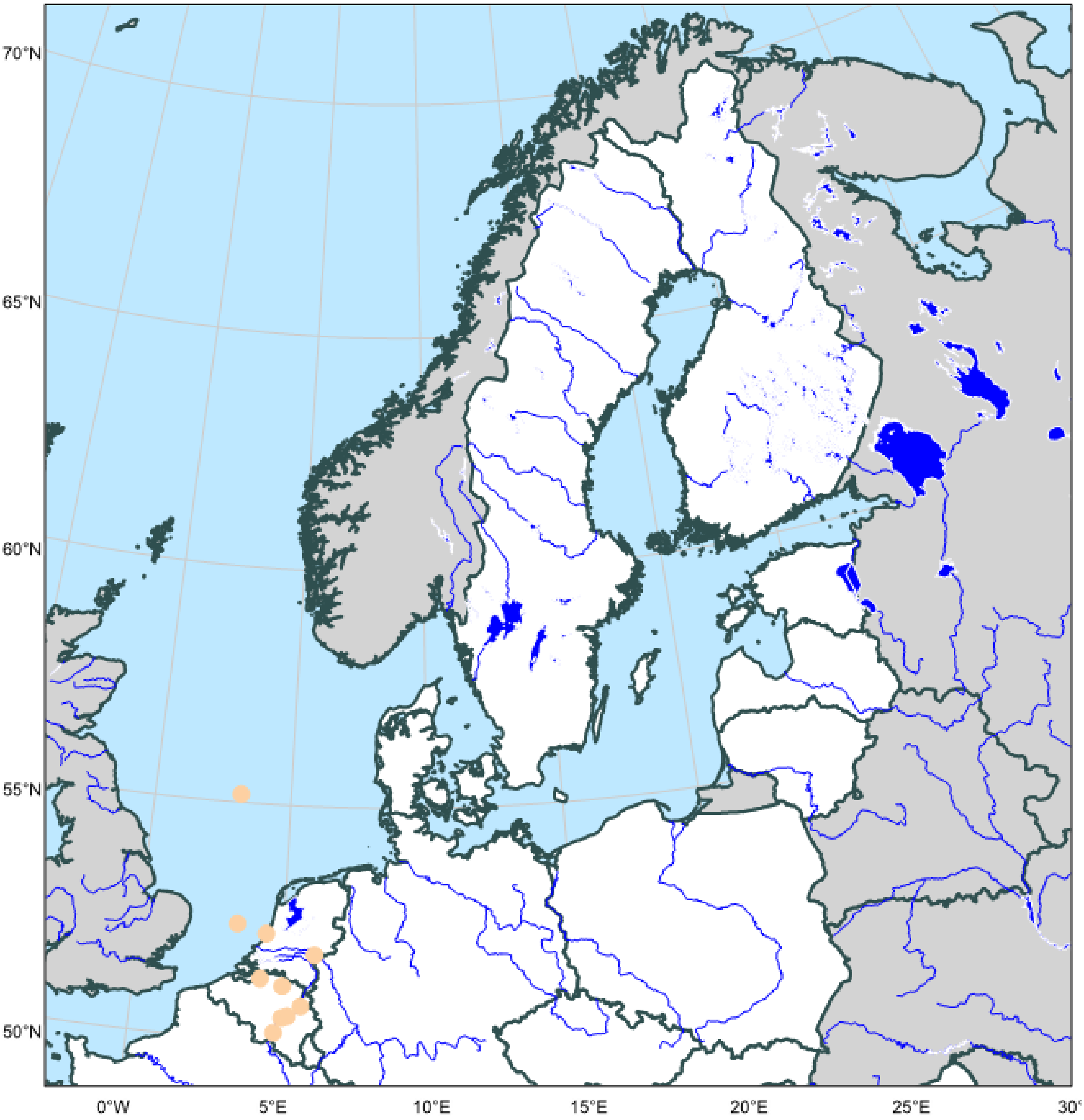


Fig. S29: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

🟨 EU (only relevant constraint values above the reporting level reported)
⬜ Outside EU (in 2023)

🟧 annual avg. < 0.6 Bq l^{-1}
🟧 0.6 Bq l^{-1} <= annual avg. < 1.8 Bq l^{-1}
🟫 1.8 Bq l^{-1} <= annual avg. < 6 Bq l^{-1}
🟫 6 Bq l^{-1} <= annual avg.

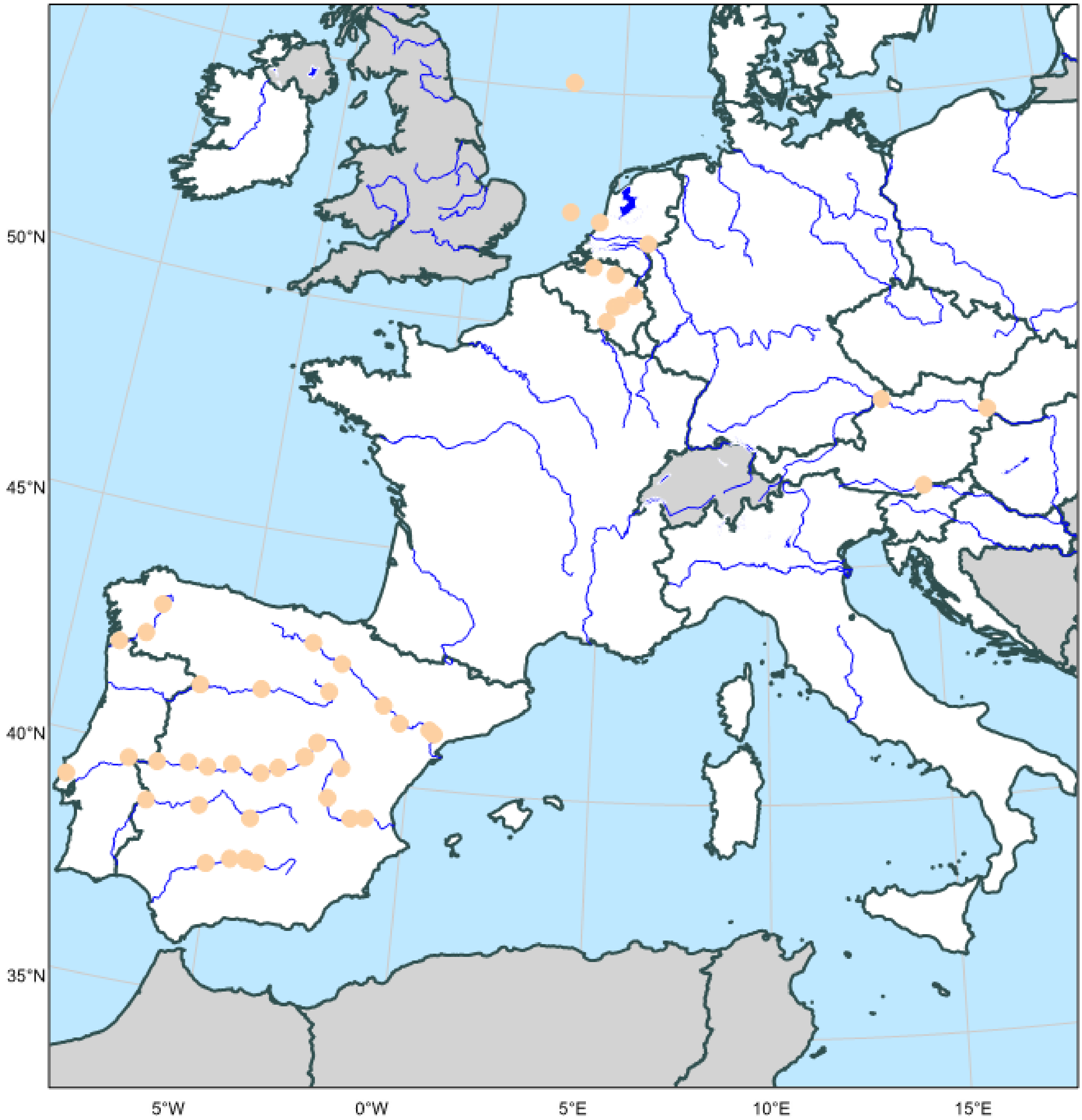


Fig. S30: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	residual-β
MEASUREMENT UNIT	:	$\mathrm{Bq\ l^{-1}}$ (Bq per litre)

🟨 EU (only relevant constraint values above the reporting level reported)

⬜ Outside EU (in 2023)

🟧				annual avg.	<	0.6	$\mathrm{Bq\ l^{-1}}$
🟧	0.6	$\mathrm{Bq\ l^{-1}}$	<=	annual avg.	<	1.8	$\mathrm{Bq\ l^{-1}}$
🟥	1.8	$\mathrm{Bq\ l^{-1}}$	<=	annual avg.	<	6	$\mathrm{Bq\ l^{-1}}$
🟫	6	$\mathrm{Bq\ l^{-1}}$	<=	annual avg.			

DENSE

Table S1: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Indalsaelven	1	Oestersund-Storsjoen	SE								
Gulf Of Bothnia	2	Forsmark (F135)	SE								
	3	Bottenhavet (C14)	SE								
	4	Bottenviken (A5)	SE								
Norrström	5	Norsborg	SE								
Kemijoki	6	Kemi	FI								
Oulujoki	7	Oulu	FI								
Kokemaenjoki	8	Pori	FI								
Kymijoki	9	Kotka	FI								
Narva	10	Narva	EE								
Gulf Of Finland	11	Gulf Of Finland, N8	EE								
	12	Gulf Of Finland, EE17	EE								
	13	Gulf Of Finland, PE	EE								
	14	Gulf Of Finland, PW	EE								
Daugava	15	Daugavpils	LV								
	16	Riga	LV								
	17	Drūkšiai Lake	LT								
Neman	18	Neman above Druskininkai	LT								
	19	Kauno Marios	LT								
	20	Neris River Near Buivydžiai	LT								
	21	Skirvytė River	LT								
	22	Akmena-Danė River	LT								
	23	Plateliai Lake	LT								
	24	Šešupė River Transb (Russia)	LT								
	25	Šventoji River Mouth	LT								
	26	Curonian Lagoon LT10	LT								
Vistula	27	Krakow Tyniec	PL								
	28	Annopol	PL								
	29	Warsaw	PL								
	30	Plock	PL								
	31	Kiezmark	PL								
Baltic Sea	32	Baltic Sea LT64	LT								
	33	Baltic Sea LT 20	LT								
	34	Baltic Sea LT6	LT								
	35	Oskarshamn (S36)	SE								
	36	Baltic Sea P-140	PL								
	37	Baltic Sea P-1	PL								

RL: reporting level for residual-β In surface water, i.e. 0.6 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Table S2: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Baltic Sea	38	Baltic Sea P-39	PL								
	39	Baltic Sea P-116	PL								
	40	Baltic Sea P-110	PL								
	41	Moen	DK								
	42	Gedser Odde	DK								
	43	Femern Baelt	DK								
	44	Langeland Baelt	DK								
Oder	45	Bohumin	CZ								
	46	Chalupki	PL								
	47	Krajnik	PL								
The Great Belt	48	Halskov Rev	DK								
	49	Asnaes Rev	DK								
The Sound	50	Hesseloe	DK								
	51	The Sound S	DK								
	52	Kullen	DK								
Kattegat	53	Kattegat-413	DK								
	54	Ringhals (35)	SE								
Skagerrak	55	Fjaellbacka	SE								
Elbe	56	Hrensko	CZ								
	57	Geesthacht	DE								
	58	Wedel	DE								
	59	Cuxhaven	DE								
Váh	60	Sereď	SK								
Rhine	61	Weil am Rhein	DE								
	62	Breisach am Rhein	DE								
	63	Koblenz	DE								
	64	Trebur	DE								
	65	Lobith	NL	13	< RL	< RL	< RL	< RL	< RL	< RL	5
Moselle	66	Schengen	LU								
	67	Wincheringen	DE								
Meuse	68	Heer-Agimont	BE	27	< RL	< RL	< RL	< RL	< RL	< RL	11
	69	Andenne	BE	27	< RL	< RL	< RL	< RL	< RL	< RL	9
	70	Huy	BE	27	< RL	< RL	< RL	< RL	< RL	< RL	10
	71	Lixhe	BE	27	< RL	< RL	< RL	< RL	< RL	< RL	3
	72	Eijsden	NL								
	73	La Flamenne En Aval De La Somanu	FR								

RL: reporting level for residual-β In surface water, i.e. 0.6 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

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Table S3: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Molse Nete	**74**	**Geel**	**BE**	*27*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*9*
Scheldt	**75**	**Schaar van Ouden Doel**	**NL**								
	76	**Doel**	**BE**	*24*	*< RL*	*< RL*	*< RL*	*9.3E-01*	*< RL*	1.7E+00	*12*
North Sea	**77**	**Noordwijk, 2 km from coast**	**NL**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*2*
	78	**Noordwijk, 70 km from coast**	**NL**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*2*
	79	**Terschelling 235 km from coast**	**NL**	*3*	*< RL*	*< RL*	*< RL*		*< RL*	< RL	*8*
Seine	**80**	**Aqueduc Des Mineurs**	**FR**								
	81	**Etang Neuf**	**FR**								
	82	**Etang Colbert**	**FR**								
	83	**Etang Vieux**	**FR**								
	84	**Les Noues D'Amance Aval Csa**	**FR**								
Channel	**85**	**Les Moulinets Le Batardeau**	**FR**								
	86	**Ruisseau Sainte-Hélène**	**FR**								
	87	**Les Moulinets Source Recboc**	**FR**								
	88	**Ruisseau Des Landes-R14**	**FR**								
	89	**Ruisseau Des Combes**	**FR**								
	90	**Ruisseau Le Grand Bel**	**FR**								
	91	**Manche Le Tréport**	**FR**								
Atlantic Ocean	**92**	**Cabo Ajo**	**ES**								
	93	**Cabo Silleiro**	**ES**								
	94	**Isla Cristina**	**ES**								
	95	**Puerto de Cadiz**	**ES**								
	96	**Estrecho de Gibraltar**	**ES**								
	97	**Puerto De Las Palmas**	**ES**								
Mino	**98**	**Lugo**	**ES**	*3*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*10*
	99	**Orense**	**ES**	*3*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*10*
	100	**Caldelas De Tuy**	**ES**	*3*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
Duero	**101**	**Garray**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	102	**Quintanilla**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	103	**Villalcampo**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
Tagus	**104**	**Trillo Arriba**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*12*
	105	**Trillo Abajo**	**ES**	*13*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*10*
	106	**Zorita Arriba**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*8*
	107	**Zorita Abajo**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*12*
	108	**Aranjuez**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*9*
	109	**Toledo**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*11*
	110	**Talavera**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*9*
	111	**Valdecanas**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*

RL: reporting level for residual-β In surface water, i.e. 0.6 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Table S4: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	residual-β
MEASUREMENT UNIT	:	Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Tagus	**112**	**Embalse de Torrejon**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	9
	113	**Embalse de Alcantara**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	10
	114	**Vila Velha de Ródão**	**PT**	2				< RL	< RL	< RL	10
	115	**Valada Do Ribatejo**	**PT**	2				< RL	< RL	< RL	10
Guadiana	**116**	**Balbuena**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	12
	117	**Orellana**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	118	**Puente Palmas**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	12
Guadalquivir	**119**	**Posadas**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	120	**El Carpio**	**ES**	3		< RL	< RL	< RL	< RL	< RL	4
	121	**Andujar Abajo**	**ES**	11	< RL	< RL	< RL	< RL	< RL	< RL	10
	122	**Andujar Arriba**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	123	**Mengibar**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
Jucar	**124**	**Venta De Juan Romero**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	8
	125	**Embalse De Alarcon**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	8
	126	**Alcala Del Jucar**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	11
	127	**Cofrentes Abajo**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	4
Ebro	**128**	**Embalse de Sobrón**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	1
	129	**Mendavia**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	4
	130	**Zaragoza-Rio**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	7
	131	**Sastago**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	132	**Ribarroja**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	9
	133	**Asco Abajo**	**ES**	27	< RL	< RL	< RL	< RL	< RL	< RL	7
Rhone	**134**	**Gaffière Amont Tricastin**	**FR**								
	135	**Lauzon Aval Tricastin**	**FR**								
	136	**Gaffière Aval Tricastin**	**FR**								
	137	**Tout Amont Rhône**	**FR**								
Po	**138**	**Casale Monferrato**	**IT**								
Mediterranean Sea	**139**	**Garrucha**	**ES**								
	140	**Cabo de San Antonio**	**ES**								
	141	**Puerto de Palma**	**ES**								
	142	**Puerto de Tarragona**	**ES**								
	143	**Cabo de Creus**	**ES**								
	144	**Rotondella**	**IT**								
	145	**Xwejni**	**MT**								
	146	**Lapsi**	**MT**								

RL: reporting level for residual-β In surface water, i.e. 0.6 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

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Table S5: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : residual-β
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Mediterranean Sea	147	Wied Ghammieq	MT								
	148	Limassol	CY								
	149	Asprokremmos Dam	CY								
	150	Tersefanou Water Treatment	CY								
Maritsa	151	Kostenec	BG								
Drau	152	Schwabegg	AT	24	< RL	< RL	< RL	< RL	< RL	< RL	4
	153	Dravograd	SI								
Sava	154	Krsko	SI								
	155	Zagreb	HR								
Tisza	156	Szolnok	HU								
	157	Tiszasziget I	HU								
Danube	158	Kozloduy	BG								
	159	Vilshofen	DE								
	160	Jochenstein	AT	15	< RL	< RL	< RL	< RL	< RL	< RL	10
	161	Wolfsthal	AT	12	< RL	< RL	< RL	< RL	< RL	< RL	9
	162	Budapest - North I	HU								
	163	Budapest - Budafok	HU								
	164	Dunaujvaros	HU								
	165	Dunafoldvar II	HU								
	166	Dunafoldvar I	HU								
	167	Paks	HU								
	168	Kalocsa	HU								
	169	Baja	HU								
	170	Mohacs	HU								
	171	Drobeta Turnu Severin	RO	365	< RL	< RL	< RL	< RL	< RL	< RL	12
	172	Novo Selo	BG								
	173	Bechet	RO	365	< RL	< RL	< RL	< RL	< RL	< RL	6
	174	Oriahovo	BG								
	175	Zimnicea	RO	365	< RL	< RL	< RL	< RL	< RL	< RL	10
	176	Svishtov	BG								
	177	Silistra	BG								
	178	Calarasi	RO	365	< RL	< RL	< RL	< RL	< RL	< RL	2
	179	Cernavoda*	RO	326	< RL	< RL	< RL	< RL	< RL	< RL	2
	180	Tulcea	RO	364	< RL	< RL	< RL	< RL	< RL	< RL	2
	181	Sfantu Gheorge Tulcea	RO	359	< RL	< RL	< RL	< RL	< RL	< RL	5
	182	Galati	RO								
Olt	183	Miercurea Ciuc	RO	365	< RL	< RL	< RL	< RL	< RL	< RL	6

RL: reporting level for residual-β In surface water, i.e. 0.6 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. S31: Time averages

DENSE

YEAR : 2023

SAMPLE TYPE : surface water

NUCLIDE CATEGORY : caesium-137 (^{137}Cs)

MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

▭	EU (only relevant constraint values above the reporting level reported)	🟧	annual avg. < 0.6 Bq l^{-1}
		🟧	0.6 Bq l^{-1} <= annual avg. < 1.8 Bq l^{-1}
		🟫	1.8 Bq l^{-1} <= annual avg. < 6 Bq l^{-1}
▨	Outside EU (in 2023)	🟫	6 Bq l^{-1} <= annual avg.

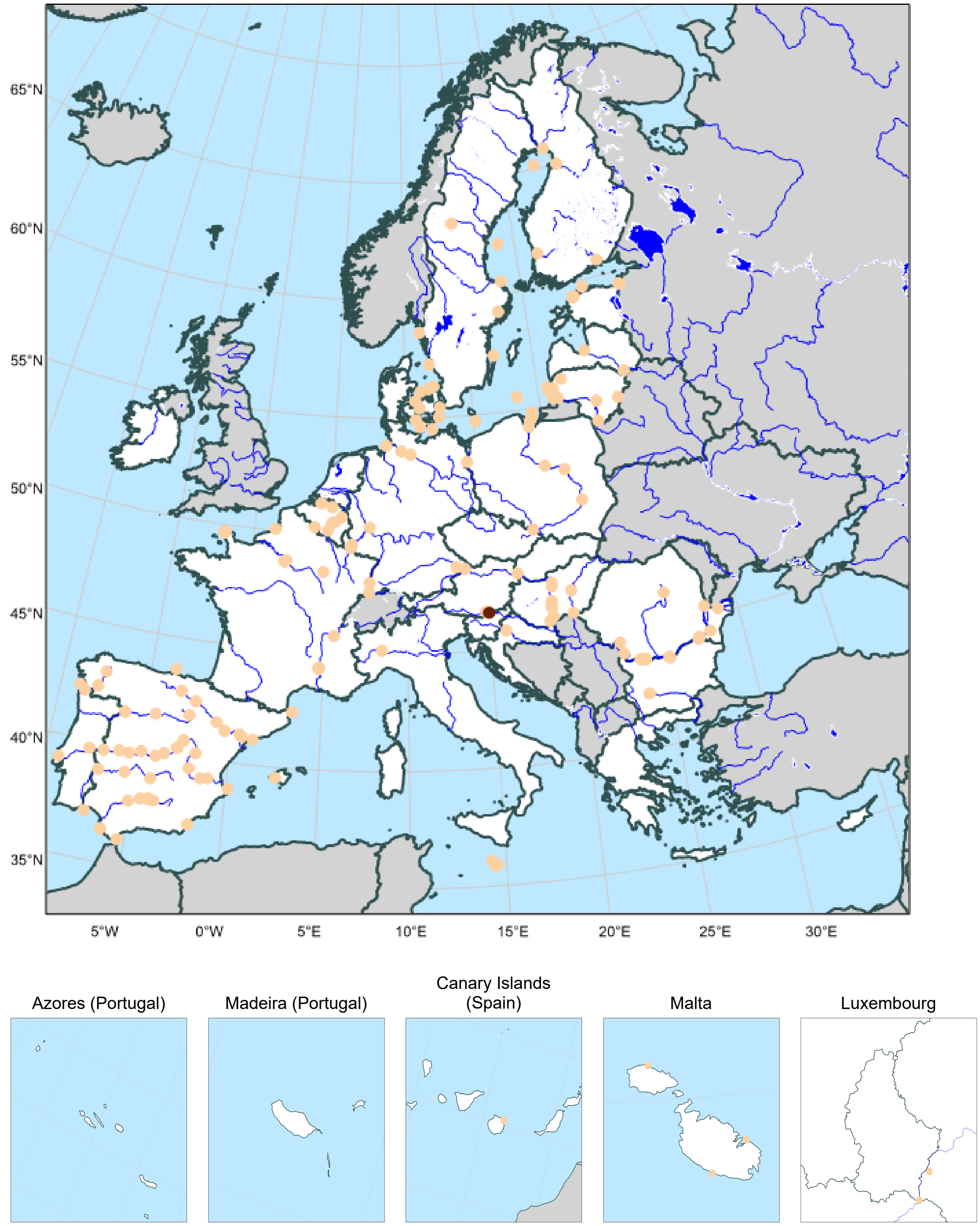

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Fig. S32: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l^{-1} (Bq per litre)

🟨 EU (only relevant constraint values above the reporting level reported)

⬜ Outside EU (in 2023)

🟧				annual avg.	<	0.6	Bq l^{-1}
🟧	0.6	Bq l^{-1}	<=	annual avg.	<	1.8	Bq l^{-1}
🟫	1.8	Bq l^{-1}	<=	annual avg.	<	6	Bq l^{-1}
🟫	6	Bq l^{-1}	<=	annual avg.			

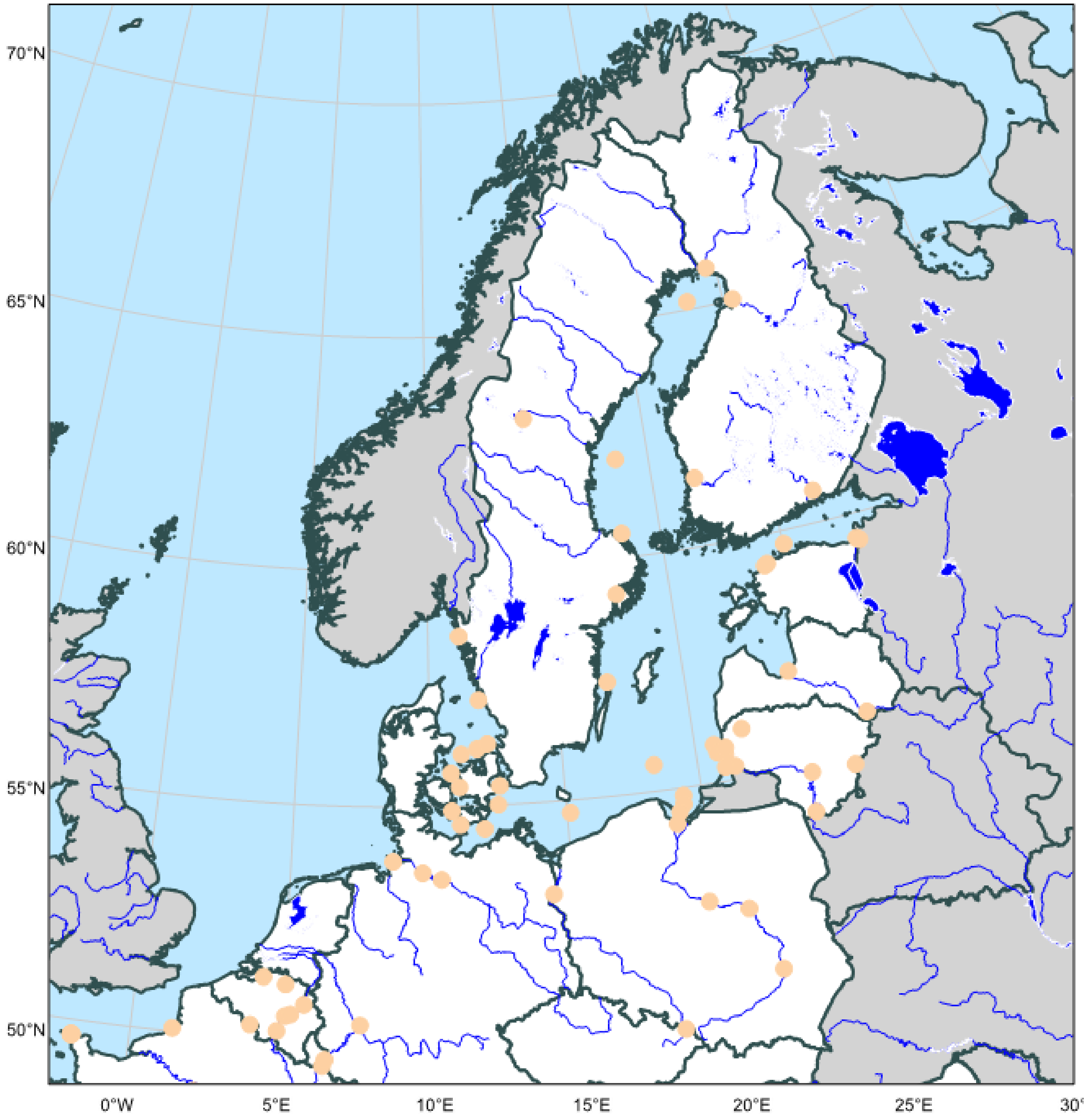


Fig. S33: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l $^{-1}$ (Bq per litre)

🟨	EU (only relevant constraint values above the reporting level reported)	🟧				annual avg.	<	0.6	Bq l $^{-1}$
		🟧	0.6	Bq l $^{-1}$	<=	annual avg.	<	1.8	Bq l $^{-1}$
		🟥	1.8	Bq l $^{-1}$	<=	annual avg.	<	6	Bq l $^{-1}$
⬜	Outside EU (in 2023)	🟫	6	Bq l $^{-1}$	<=	annual avg.			

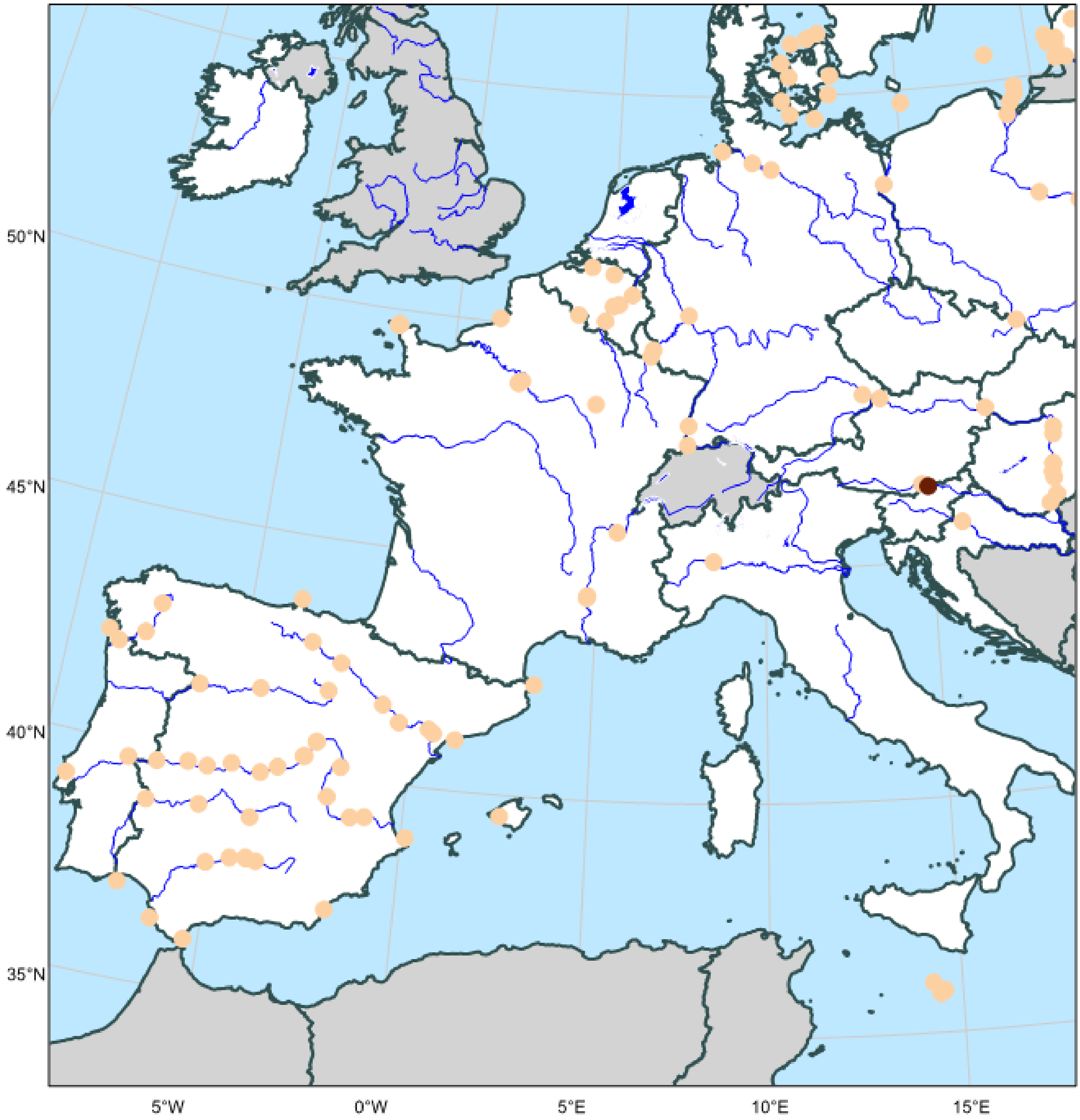


Fig. S34: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l^{-1} (Bq per litre)

□ EU (only relevant constraint values above the reporting level reported)

▨ Outside EU (in 2023)

■			annual avg.	<	0.6	Bq l^{-1}
■	0.6 Bq l^{-1}	<=	annual avg.	<	1.8	Bq l^{-1}
■	1.8 Bq l^{-1}	<=	annual avg.	<	6	Bq l^{-1}
■	6 Bq l^{-1}	<=	annual avg.			

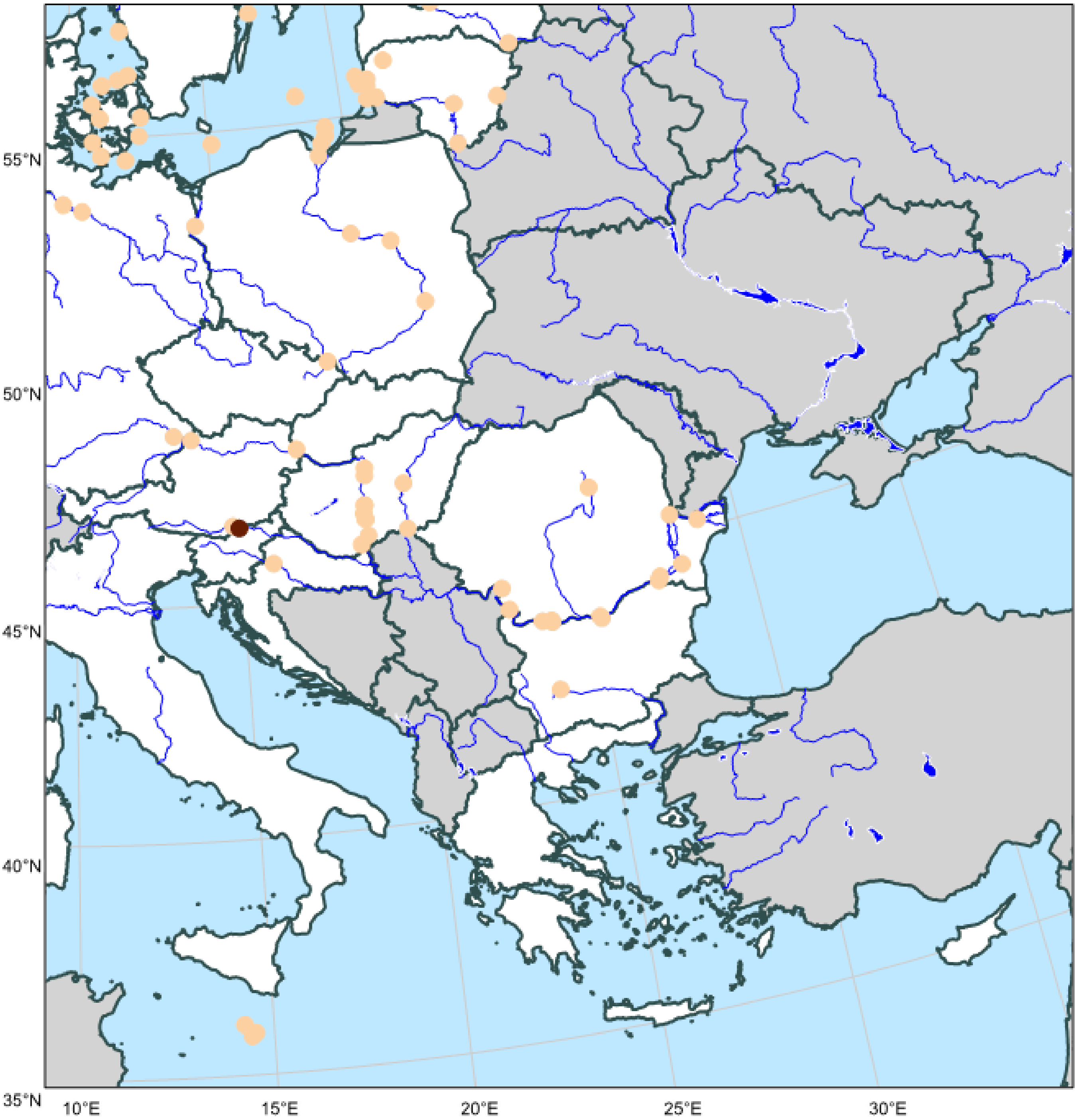


Table S6: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Indalsaelven	**1**	**Oestersund-Storsjoen**	**SE**	2	< RL			< RL	< RL	< RL	3
Gulf Of Bothnia	**2**	**Forsmark (F135)**	**SE**	1			< RL		< RL	< RL	9
	3	**Bottenhavet (C14)**	**SE**	1				< RL	< RL	< RL	10
	4	**Bottenviken (A5)**	**SE**	1				< RL	< RL	< RL	10
Norrström	**5**	**Norsborg**	**SE**	2	< RL			< RL	< RL	< RL	11
Kemijoki	**6**	**Kemi**	**FI**	1				< RL	< RL	< RL	10
Oulujoki	**7**	**Oulu**	**FI**	1			< RL		< RL	< RL	9
Kokemaenjoki	**8**	**Pori**	**FI**	1			< RL		< RL	< RL	9
Kymijoki	**9**	**Kotka**	**FI**	1				< RL	< RL	< RL	10
Narva	**10**	**Narva**	**EE**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
Gulf Of Finland	**11**	**Gulf Of Finland, N8**	**EE**	1			< RL		< RL	< RL	7
	12	**Gulf Of Finland, EE17**	**EE**	1			< RL		< RL	< RL	7
	13	**Gulf Of Finland, PE**	**EE**	1			< RL		< RL	< RL	7
	14	**Gulf Of Finland, PW**	**EE**	1			< RL		< RL	< RL	7
Daugava	**15**	**Daugavpils**	**LV**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	16	**Riga**	**LV**	4	< RL	< RL	< RL	< RL	< RL	< RL	12
	17	**Drūkšiai Lake**	**LT**								
Neman	**18**	**Neman above Druskininkai**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	19	**Kauno Marios**	**LT**	6		< RL	< RL	< RL	< RL	< RL	8
	20	**Neris River Near Buivydžiai**	**LT**	12	< RL	< RL	< RL	< RL	< RL	< RL	12
	21	**Skirvytė River**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	8
	22	**Akmena-Danė River**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	8
	23	**Plateliai Lake**	**LT**	2		< RL	< RL		< RL	< RL	5
	24	**Šešupė River Transb (Russia)**	**LT**								
	25	**Šventoji River Mouth**	**LT**								
	26	**Curonian Lagoon LT10**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	5
Vistula	**27**	**Krakow Tyniec**	**PL**								
	28	**Annopol**	**PL**	4		< RL	< RL		< RL	< RL	4
	29	**Warsaw**	**PL**	4		< RL	< RL		< RL	< RL	6
	30	**Plock**	**PL**	4		< RL	< RL		< RL	< RL	5
	31	**Kiezmark**	**PL**	4		< RL	< RL		< RL	< RL	5
Baltic Sea	**32**	**Baltic Sea LT64**	**LT**	1			< RL		< RL	< RL	9
	33	**Baltic Sea LT 20**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	11
	34	**Baltic Sea LT6**	**LT**	4	< RL	< RL	< RL	< RL	< RL	< RL	8
	35	**Oskarshamn (S36)**	**SE**	1			< RL		< RL	< RL	9
	36	**Baltic Sea P-140**	**PL**	4		< RL	< RL		< RL	< RL	6
	37	**Baltic Sea P-1**	**PL**	4			< RL		< RL	< RL	7

RL: reporting level for ^{137}Cs In surface water, i.e. 1 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Table S7: Time averages

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Baltic Sea	**38**	**Baltic Sea P-39**	**PL**	4			< RL		< RL	< RL	7
	39	**Baltic Sea P-116**	**PL**	4			< RL		< RL	< RL	7
	40	**Baltic Sea P-110**	**PL**	4			< RL		< RL	< RL	8
	41	**Moen**	**DK**	1		< RL			< RL	< RL	6
	42	**Gedser Odde**	**DK**	1		< RL			< RL	< RL	6
	43	**Femern Baelt**	**DK**	1		< RL			< RL	< RL	6
	44	**Langeland Baelt**	**DK**	1		< RL			< RL	< RL	6
Oder	**45**	**Bohumin**	**CZ**								
	46	**Chalupki**	**PL**	4		< RL	< RL		< RL	< RL	9
	47	**Krajnik**	**PL**	4		< RL	< RL		< RL	< RL	9
The Great Belt	**48**	**Halskov Rev**	**DK**	1		< RL			< RL	< RL	6
	49	**Asnaes Rev**	**DK**	1		< RL			< RL	< RL	6
The Sound	**50**	**Hesseloe**	**DK**	1		< RL			< RL	< RL	6
	51	**The Sound S**	**DK**	1		< RL			< RL	< RL	6
	52	**Kullen**	**DK**	1		< RL			< RL	< RL	6
Kattegat	**53**	**Kattegat-413**	**DK**	1		< RL			< RL	< RL	6
	54	**Ringhals (35)**	**SE**	2		< RL		< RL	< RL	< RL	4
Skagerrak	**55**	**Fjaellbacka**	**SE**	2	< RL		< RL		< RL	< RL	9
Elbe	**56**	**Hrensko**	**CZ**								
	57	**Geesthacht**	**DE**	10	< RL	< RL	< RL	< RL	< RL	< RL	10
	58	**Wedel**	**DE**	11	< RL	< RL	< RL	< RL	< RL	< RL	10
	59	**Cuxhaven**	**DE**	6	< RL		< RL	< RL	< RL	< RL	7
Váh	**60**	**Sereď**	**SK**								
Rhine	**61**	**Weil am Rhein**	**DE**	11	< RL	< RL	< RL	< RL	< RL	< RL	8
	62	**Breisach am Rhein**	**DE**	9	< RL	< RL	< RL	< RL	< RL	< RL	9
	63	**Koblenz**	**DE**	22	< RL	< RL	< RL	< RL	< RL	< RL	10
	64	**Trebur**	**DE**								
	65	**Lobith**	**NL**								
Moselle	**66**	**Schengen**	**LU**	50	< RL	< RL	< RL	< RL	< RL	< RL	7
	67	**Wincheringen**	**DE**	10	< RL	< RL	< RL	< RL	< RL	< RL	11
Meuse	**68**	**Heer-Agimont**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	7
	69	**Andenne**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	7
	70	**Huy**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	7
	71	**Lixhe**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	2
	72	**Eijsden**	**NL**								
	73	**La Flamenne En Aval De La Somanu**	**FR**	2		< RL		< RL	< RL	< RL	5

RL: reporting level for ^{137}Cs In surface water, i.e. 1 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Table S8: Time averages

YEAR	:	2023
SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l $^{-1}$ (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Molse Nete	**74**	**Geel**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	6
Scheldt	**75**	**Schaar van Ouden Doel**	**NL**								
	76	**Doel**	**BE**	27	< RL	< RL	< RL	< RL	< RL	< RL	5
North Sea	**77**	**Noordwijk, 2 km from coast**	**NL**								
	78	**Noordwijk, 70 km from coast**	**NL**								
	79	**Terschelling 235 km from coast**	**NL**								
Seine	**80**	**Aqueduc Des Mineurs**	**FR**	2		< RL	< RL		< RL	< RL	5
	81	**Etang Neuf**	**FR**	1		< RL			< RL	< RL	5
	82	**Etang Colbert**	**FR**	2		< RL	< RL		< RL	< RL	5
	83	**Etang Vieux**	**FR**	2		< RL	< RL		< RL	< RL	5
	84	**Les Noues D'Amance Aval Csa**	**FR**	2	< RL			< RL	< RL	< RL	10
Channel	**85**	**Les Moulinets Le Batardeau**	**FR**	4	< RL	< RL	< RL	< RL	< RL	< RL	9
	86	**Ruisseau Sainte-Hélène**	**FR**	4	< RL	< RL	< RL	< RL	< RL	< RL	9
	87	**Les Moulinets Source Recboc**	**FR**	4	< RL	< RL	< RL	< RL	< RL	< RL	9
	88	**Ruisseau Des Landes-R14**	**FR**	2		< RL		< RL	< RL	< RL	11
	89	**Ruisseau Des Combes**	**FR**	2		< RL		< RL	< RL	< RL	6
	90	**Ruisseau Le Grand Bel**	**FR**	2		< RL		< RL	< RL	< RL	6
	91	**Manche Le Tréport**	**FR**	1	< RL				< RL	< RL	2
Atlantic Ocean	**92**	**Cabo Ajo**	**ES**	8	< RL	< RL	< RL	< RL	< RL	< RL	6
	93	**Cabo Silleiro**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	94	**Isla Cristina**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	11
	95	**Puerto de Cadiz**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	96	**Estrecho de Gibraltar**	**ES**	8	< RL	< RL	< RL	< RL	< RL	< RL	7
	97	**Puerto De Las Palmas**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	11
Mino	**98**	**Lugo**	**ES**	3		< RL	< RL	< RL	< RL	< RL	6
	99	**Orense**	**ES**	3		< RL	< RL	< RL	< RL	< RL	10
	100	**Caldelas De Tuy**	**ES**	3		< RL	< RL	< RL	< RL	< RL	10
Duero	**101**	**Garray**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	7
	102	**Quintanilla**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	4
	103	**Villalcampo**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	1
Tagus	**104**	**Trillo Arriba**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	6
	105	**Trillo Abajo**	**ES**	13	< RL	< RL	< RL	< RL	< RL	< RL	2
	106	**Zorita Arriba**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	4
	107	**Zorita Abajo**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	108	**Aranjuez**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	6
	109	**Toledo**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	9
	110	**Talavera**	**ES**	4	< RL	< RL	< RL	< RL	< RL	< RL	3
	111	**Valdecanas**	**ES**	12	< RL	< RL	< RL	< RL	< RL	< RL	1

RL: reporting level for ^{137}Cs In surface water, i.e. 1 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Table S9: Time averages

YEAR	:	**2023**
SAMPLE TYPE	:	**surface water**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Tagus	**112**	**Embalse de Torrejon**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*3*
	113	**Embalse de Alcantara**	**ES**	*16*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
	114	**Vila Velha de Ródão**	**PT**	*11*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*10*
	115	**Valada Do Ribatejo**	**PT**	*10*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*11*
Guadiana	**116**	**Balbuena**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*3*
	117	**Orellana**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*9*
	118	**Puente Palmas**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*12*
Guadalquivir	**119**	**Posadas**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	120	**El Carpio**	**ES**	*3*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
	121	**Andujar Abajo**	**ES**	*11*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*2*
	122	**Andujar Arriba**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	123	**Mengibar**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*7*
Jucar	**124**	**Venta De Juan Romero**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	125	**Embalse De Alarcon**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	126	**Alcala Del Jucar**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	127	**Cofrentes Abajo**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
Ebro	**128**	**Embalse de Sobrón**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	129	**Mendavia**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	130	**Zaragoza-Rio**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*10*
	131	**Sastago**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*1*
	132	**Ribarroja**	**ES**	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	133	**Asco Abajo**	**ES**	*27*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*7*
Rhone	**134**	**Gaffière Amont Tricastin**	**FR**	*2*		*< RL*		*< RL*	*< RL*	< RL	*4*
	135	**Lauzon Aval Tricastin**	**FR**	*2*		*< RL*		*< RL*	*< RL*	< RL	*4*
	136	**Gaffière Aval Tricastin**	**FR**	*2*		*< RL*		*< RL*	*< RL*	< RL	*4*
	137	**Tout Amont Rhône**	**FR**	*1*		*< RL*			*< RL*	< RL	*5*
Po	**138**	**Casale Monferrato**	**IT**	*6*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
Mediterranean Sea	**139**	**Garrucha**	**ES**	*4*	*< RL*	*< RL*		*< RL*	*< RL*	< RL	*3*
	140	**Cabo de San Antonio**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
	141	**Puerto de Palma**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*3*
	142	**Puerto de Tarragona**	**ES**	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*7*
	143	**Cabo de Creus**	**ES**	*8*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	< RL	*5*
	144	**Rotondella**	**IT**								
	145	**Xwejni**	**MT**	*4*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*
	146	**Lapsi**	**MT**	*4*		*< RL*	*< RL*	*< RL*	*< RL*	< RL	*4*

RL: reporting level for ^{137}Cs In surface water, i.e. 1 Bq l $^{-1}$ (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Table S10: Time averages

DENSE

YEAR : 2023
SAMPLE TYPE : surface water
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

Catchment		Locality		N	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual avg.	Monthly max	M
Mediterranean Sea	**147**	**Wied Ghammieq**	**MT**	4		< RL	< RL	< RL	< RL	< RL	9
	148	**Limassol**	**CY**								
	149	**Asprokremmos Dam**	**CY**								
	150	**Tersefanou Water Treatment**	**CY**								
Maritsa	**151**	**Kostenec**	**BG**	1		< RL	< RL		< RL	< RL	6
Drau	**152**	**Schwabegg**	**AT**	25	< RL	< RL	< RL	< RL	< RL	< RL	6
	153	**Dravograd**	**SI**	2	4.6E+01		< RL		2.3E+01	4.6E+01	3
Sava	**154**	**Krsko**	**SI**								
	155	**Zagreb**	**HR**	6	< RL	< RL	< RL	< RL	< RL	< RL	12
Tisza	**156**	**Szolnok**	**HU**	1	< RL				< RL	< RL	1
	157	**Tiszasziget I**	**HU**	6		< RL		< RL	< RL	< RL	10
Danube	**158**	**Kozloduy**	**BG**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	159	**Vilshofen**	**DE**	11	< RL	< RL	< RL	< RL	< RL	< RL	5
	160	**Jochenstein**	**AT**	16	< RL	< RL	< RL	< RL	< RL	< RL	3
	161	**Wolfsthal**	**AT**	12	< RL	< RL	< RL	< RL	< RL	< RL	11
	162	**Budapest - North I**	**HU**	4	< RL	< RL	< RL		< RL	< RL	4
	163	**Budapest - Budafok**	**HU**	4	< RL	< RL	< RL		< RL	< RL	7
	164	**Dunaujvaros**	**HU**								
	165	**Dunafoldvar II**	**HU**	5	< RL	< RL	< RL	< RL	< RL	< RL	8
	166	**Dunafoldvar I**	**HU**	3	< RL	< RL	< RL	< RL	< RL	< RL	3
	167	**Paks**	**HU**	7	< RL	< RL	< RL	< RL	< RL	< RL	10
	168	**Kalocsa**	**HU**	3	< RL	< RL	< RL	< RL	< RL	< RL	3
	169	**Baja**	**HU**	2		< RL		< RL	< RL	< RL	6
	170	**Mohacs**	**HU**	6	< RL	< RL	< RL	< RL	< RL	< RL	4
	171	**Drobeta Turnu Severin**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	9
	172	**Novo Selo**	**BG**	2		< RL	< RL		< RL	< RL	4
	173	**Bechet**	**RO**	11	< RL	< RL	< RL	< RL	< RL	< RL	1
	174	**Oriahovo**	**BG**	4	< RL	< RL	< RL	< RL	< RL	< RL	10
	175	**Zimnicea**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	3
	176	**Svishtov**	**BG**	1	< RL				< RL	< RL	1
	177	**Silistra**	**BG**	1				< RL	< RL	< RL	12
	178	**Calarasi**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	2
	179	**Cernavoda***	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	2
	180	**Tulcea**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	12
	181	**Sfantu Gheorge Tulcea**	**RO**								
	182	**Galati**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	7
Olt	**183**	**Miercurea Ciuc**	**RO**	12	< RL	< RL	< RL	< RL	< RL	< RL	2

RL: reporting level for ^{137}Cs In surface water, i.e. 1 Bq l^{-1} (see Appendix B)
*: sampling location downstream of a nuclear power plant
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. W1: Geographical and time averages

YEAR	:	**2023**
SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**tritium (^{3}H)**
MEASUREMENT UNIT	:	**Bq l^{-1}** (Bq per litre)

⬜ **EU (no relevant data reported)**

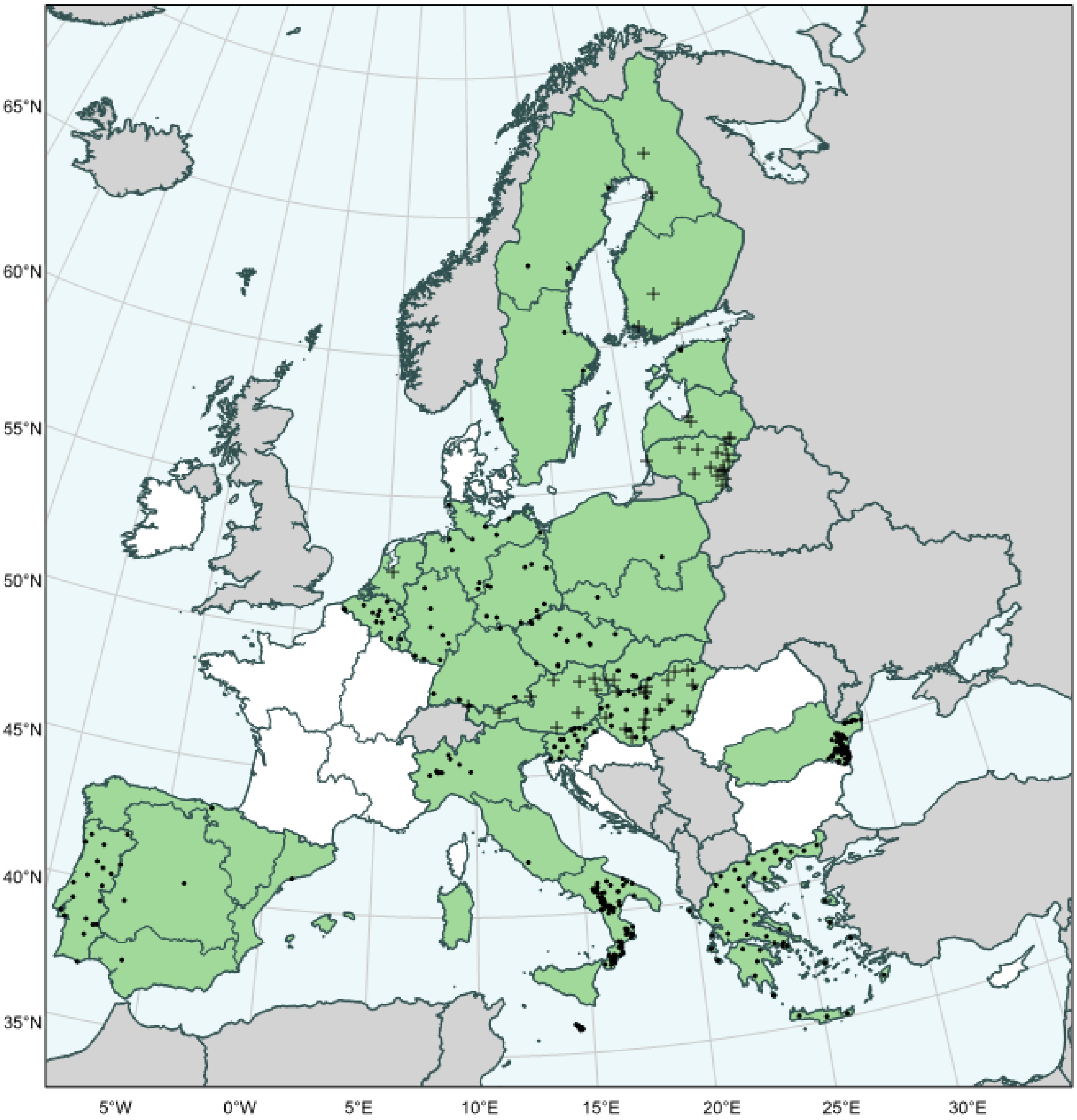
🟨 **EU (only relevant constraint values above the reporting level reported)**

▨ **Outside EU (in 2023)**

🟩				**annual avg.**	**<**	**100 Bq l^{-1}**
🟩	**100 Bq l^{-1}**	**<=**		**annual avg.**	**<**	**300 Bq l^{-1}**
🟩	**300 Bq l^{-1}**	**<=**		**annual avg.**	**<**	**1000 Bq l^{-1}**
🟩	**1000 Bq l^{-1}**	**<=**		**annual avg.**		

. **sample location (Coordinate Accuracy = Precise or Not Specified)**

\+ **regional average (Coordinate Accuracy = Reference Point of Region)**



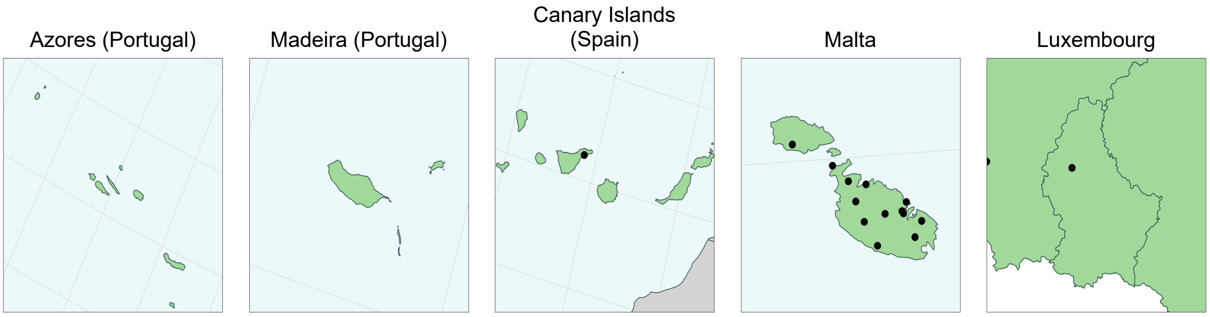


Table W1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : drinking water
NUCLIDE CATEGORY : tritium (^{3}H)
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	108	9	< RL	< RL	< RL	< RL	< RL	< RL	11
BE	48	12	< RL	< RL	< RL	< RL	< RL	< RL	10
BG									
CY									
CZ	120	30	< RL	< RL	< RL	< RL	< RL	< RL	2
DE-N	24	10	< RL	< RL	< RL	< RL	< RL	< RL	4
DE-C	19	8	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-S	16	7	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-E	26	10	< RL	< RL	< RL	< RL	< RL	< RL	3
DE	85	35	< RL	< RL	< RL	< RL	< RL	< RL	5
DK									
EE	6	3	< RL	< RL		< RL	< RL	< RL	3
ES-N	12	1	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-C	24	2	< RL	< RL	< RL	< RL	< RL	< RL	5
ES-S	24	2	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-E	24	1	< RL	< RL	< RL	< RL	< RL	< RL	9
ES	84	6	< RL	< RL	< RL	< RL	< RL	< RL	9
FI-N	2	2		< RL			< RL	< RL	4
FI-S	3	3		< RL			< RL	< RL	5
FI	5	5		< RL			< RL	< RL	5
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR	48	48	< RL	< RL	< RL	< RL	< RL	< RL	5
HR-A									
HR-C									
HR									
HU	99	40	< RL	< RL	< RL	< RL	< RL	< RL	6
IE									
IT-N	54	11	< RL	< RL	< RL	< RL	< RL	< RL	4
IT-C	3	1		< RL		< RL	< RL	< RL	11
IT-S	114	77	< RL	< RL	< RL	< RL	< RL	< RL	11
IT	171	89	< RL	< RL	< RL	< RL	< RL	< RL	11
LT	272	15	< RL	< RL	< RL	< RL	< RL	< RL	12
LU	12	1	< RL	< RL	< RL	< RL	< RL	< RL	3
LV	16	4	< RL	< RL	< RL	< RL	< RL	< RL	6
MT	13	13	< RL	< RL	< RL	< RL	< RL	< RL	1
NL	12	1	< RL	< RL	< RL	< RL	< RL	< RL	1
PL-N	2	1		< RL			< RL	< RL	4
PL-S	2	1		< RL			< RL	< RL	5
PL	4	2		< RL			< RL	< RL	5
PT	35	20	< RL	< RL	< RL	< RL	< RL	< RL	12
RO-N									
RO-S	226	91	< RL	< RL	< RL	< RL	< RL	< RL	8
RO	226	91	< RL	< RL	< RL	< RL	< RL	< RL	8
SE-N	6	3	< RL			< RL	< RL	< RL	10
SE-S	6	3	< RL	< RL		< RL	< RL	< RL	4
SE	12	6	< RL	< RL		< RL	< RL	< RL	4
SI	18	15	< RL	< RL	< RL	< RL	< RL	< RL	2
SK	7	5	< RL				< RL	< RL	1

RL: reporting level for ^{3}H In drinking water, i.e. 100 Bq l^{-1} (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Fig. W2: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : drinking water
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

☐ **EU (no relevant data reported)**
🟨 **EU (only relevant constraint values above the reporting level reported)**
▨ **Outside EU (in 2023)**

🟧 **annual avg. < 0.06 Bq l^{-1}**
🟥 **0.06 Bq l^{-1} <= annual avg. < 0.18 Bq l^{-1}**
🟥 **0.18 Bq l^{-1} <= annual avg. < 0.6 Bq l^{-1}**
⬛ **0.6 Bq l^{-1} <= annual avg.**

. **sample location (Coordinate Accuracy = Precise or Not Specified)**
\+ **regional average (Coordinate Accuracy = Reference Point of Region)**

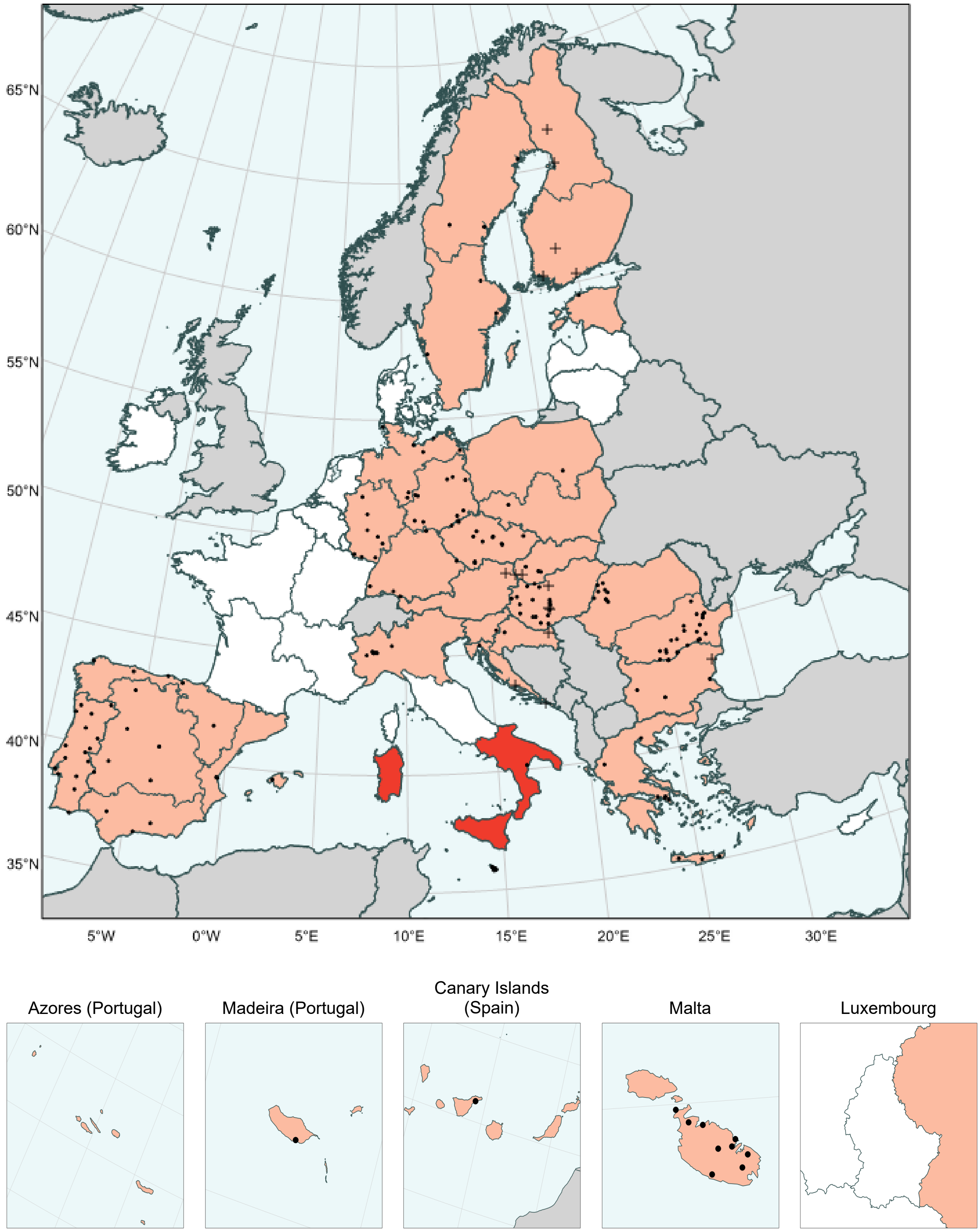


Table W2: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : drinking water
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	4	1	< RL	< RL	< RL	< RL	< RL	< RL	10
BE									
BG	18	4	1.1E-01	< RL	< RL	< RL	< RL	2.0E-01	1
CY									
CZ	70	26	< RL	< RL	< RL	< RL	< RL	< RL	10
DE-N	15	7	< RL	< RL	< RL	< RL	< RL	< RL	8
DE-C	14	8	< RL	< RL	< RL	< RL	< RL	< RL	10
DE-S	14	5	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-E	23	9	< RL	< RL	< RL	< RL	< RL	< RL	3
DE	66	29	< RL	< RL	< RL	< RL	< RL	< RL	5
DK									
EE	2	1	< RL			< RL	< RL	< RL	3
ES-N	28	5	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-C	44	7	< RL	< RL	< RL	< RL	< RL	< RL	6
ES-S	32	4	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-E	12	3	< RL	< RL	< RL	< RL	< RL	< RL	1
ES	116	19	< RL	< RL	< RL	< RL	< RL	< RL	10
FI-N	2	2		< RL			< RL	< RL	4
FI-S	3	3		< RL			< RL	< RL	4
FI	5	5		< RL			< RL	< RL	4
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR	9	9	< RL	< RL	< RL	< RL	< RL	< RL	3
HR-A	3	3		< RL			< RL	< RL	6
HR-C	5	2	< RL	< RL	< RL	< RL	< RL	< RL	10
HR	8	5	< RL	< RL	< RL	< RL	< RL	< RL	6
HU	38	20	< RL	< RL	< RL	< RL	< RL	< RL	1
IE									
IT-N	29	8	< RL	< RL	< RL	< RL	< RL	< RL	10
IT-C									
IT-S	1	1	1.0E-01				1.0E-01	1.0E-01	1
IT	30	9	< RL	< RL	< RL	< RL	< RL	< RL	1
LT									
LU									
LV									
MT	9	9	< RL	< RL	< RL	< RL	< RL	< RL	5
NL									
PL-N	2	1		< RL			< RL	< RL	4
PL-S	2	1		< RL			< RL	< RL	5
PL	4	2		< RL			< RL	< RL	5
PT	28	17	< RL	< RL	< RL	< RL	< RL	< RL	9
RO-N	13	12	< RL	< RL	< RL	< RL	< RL	< RL	1
RO-S	31	25	< RL	< RL	< RL	< RL	< RL	< RL	3
RO	44	37	< RL	< RL	< RL	< RL	< RL	< RL	3
SE-N	6	3	< RL			< RL	< RL	< RL	3
SE-S	6	3	< RL	< RL		< RL	< RL	< RL	3
SE	12	6	< RL	< RL		< RL	< RL	< RL	3
SI	4	1	< RL	< RL	< RL	< RL	< RL	< RL	5
SK	7	5	< RL				< RL	< RL	1

RL: reporting level for ^{90}Sr In drinking water, i.e. 0.06 Bq l^{-1} (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. W3: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : drinking water
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

⬜	EU (no relevant data reported)	▢	annual avg. < 0.1 Bq l $^{-1}$
🟨	EU (only relevant constraint values above the reporting level reported)	▢	0.1 Bq l $^{-1}$ <= annual avg. < 0.3 Bq l $^{-1}$
		▢	0.3 Bq l $^{-1}$ <= annual avg. < 1 Bq l $^{-1}$
▨	Outside EU (in 2023)	■	1 Bq l $^{-1}$ <= annual avg.

. sample location (Coordinate Accuracy = Precise or Not Specified)
+ regional average (Coordinate Accuracy = Reference Point of Region)

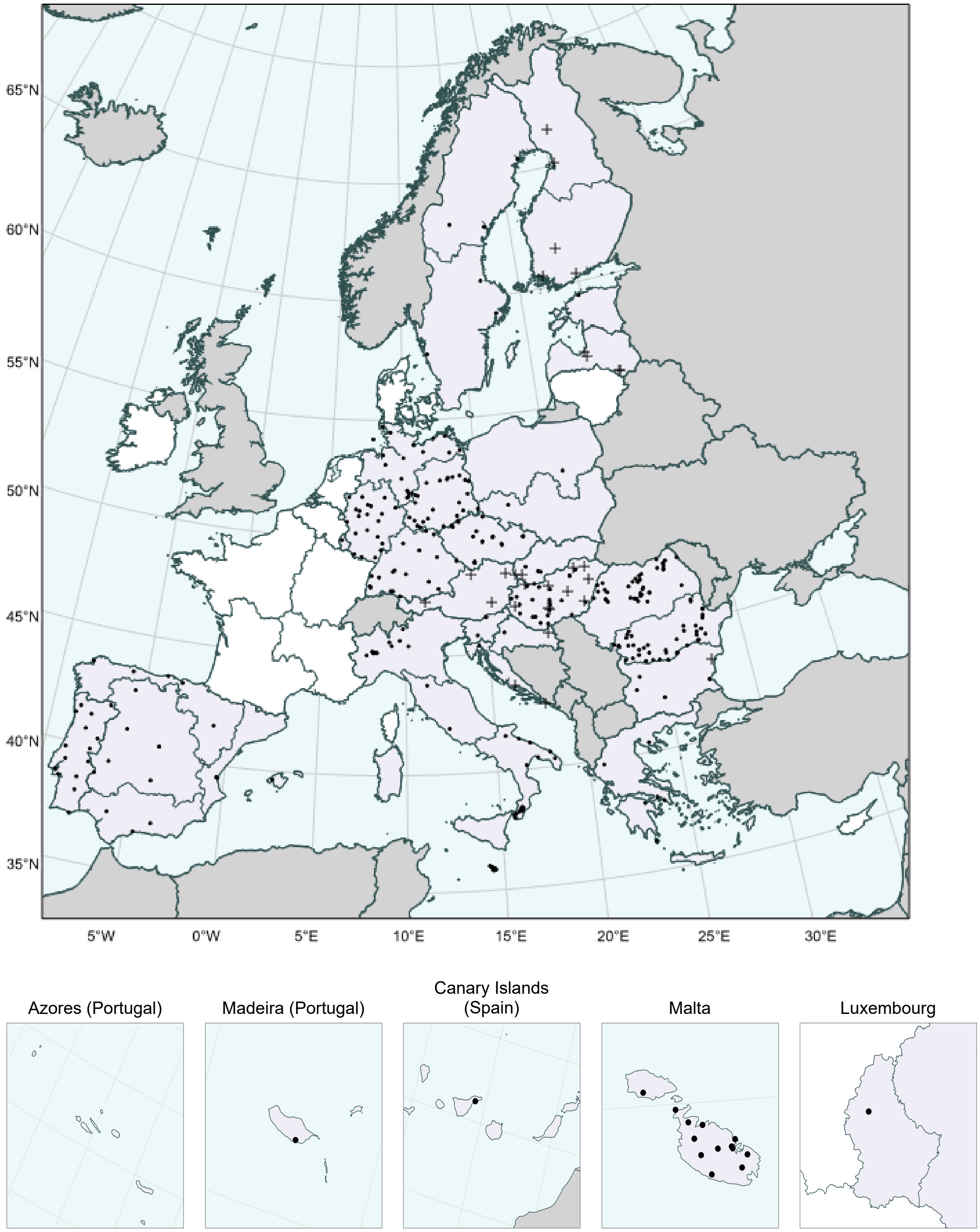


Table W3: Geographical and time averages

YEAR : **2023**
SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	48	4	< RL	< RL	< RL	< RL	< RL	< RL	12
BE									
BG	24	6	< RL	< RL	< RL	< RL	< RL	< RL	7
CY									
CZ	124	34	< RL	< RL	< RL	< RL	< RL	< RL	10
DE-N	61	18	< RL	< RL	< RL	< RL	< RL	< RL	10
DE-C	57	20	< RL	< RL	< RL	< RL	< RL	< RL	12
DE-S	57	20	< RL	< RL	< RL	< RL	< RL	< RL	7
DE-E	83	24	< RL	< RL	< RL	< RL	< RL	< RL	11
DE	258	82	< RL	< RL	< RL	< RL	< RL	< RL	12
DK									
EE	2	1	< RL			< RL	< RL	< RL	10
ES-N	60	5	< RL	< RL	< RL	< RL	< RL	< RL	2
ES-C	84	7	< RL	< RL	< RL	< RL	< RL	< RL	3
ES-S	48	4	< RL	< RL	< RL	< RL	< RL	< RL	10
ES-E	36	3	< RL	< RL	< RL	< RL	< RL	< RL	6
ES	228	19	< RL	< RL	< RL	< RL	< RL	< RL	3
FI-N	2	2		< RL			< RL	< RL	4
FI-S	3	3		< RL			< RL	< RL	4
FI	5	5		< RL			< RL	< RL	4
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR	6	6		< RL		< RL	< RL	< RL	12
HR-A	3	3		< RL			< RL	< RL	5
HR-C	5	2	< RL	< RL	< RL	< RL	< RL	< RL	5
HR	8	5	< RL	< RL	< RL	< RL	< RL	< RL	5
HU	87	35	< RL	< RL	< RL	< RL	< RL	< RL	4
IE									
IT-N	63	12	< RL	< RL	< RL	< RL	< RL	< RL	3
IT-C	15	2	< RL	< RL	< RL	< RL	< RL	< RL	11
IT-S	45	18	< RL	< RL	< RL	< RL	< RL	< RL	7
IT	123	32	< RL	< RL	< RL	< RL	< RL	< RL	3
LT									
LU	12	1	< RL	< RL	< RL	< RL	< RL	< RL	5
LV	16	4	< RL	< RL	< RL	< RL	< RL	< RL	3
MT	13	13	< RL	< RL	< RL	< RL	< RL	< RL	1
NL									
PL-N	2	1		< RL			< RL	< RL	4
PL-S	2	1		< RL			< RL	< RL	5
PL	4	2		< RL			< RL	< RL	5
PT	29	16	< RL	< RL	< RL	< RL	< RL	< RL	10
RO-N	60	44	< RL	< RL	< RL	< RL	< RL	< RL	1
RO-S	50	44	< RL	< RL	< RL	< RL	< RL	< RL	3
RO	110	88	< RL	< RL	< RL	< RL	< RL	< RL	9
SE-N	6	3	< RL			< RL	< RL	< RL	10
SE-S	6	3	< RL	< RL		< RL	< RL	< RL	4
SE	12	6	< RL	< RL		< RL	< RL	< RL	4
SI	2	2	< RL	< RL			< RL	< RL	4
SK	7	5	< RL				< RL	< RL	1

RL: reporting level for ^{137}Cs In drinking water, i.e. 0.1 Bq l $^{-1}$ (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. M1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : $\mathrm{Bq\ l^{-1}}$ (Bq per litre)

⬜	EU (no relevant data reported)	🟧	annual avg. < 0.2 $\mathrm{Bq\ l^{-1}}$
🟨	EU (only relevant constraint values above the reporting level reported)	🟥	0.2 $\mathrm{Bq\ l^{-1}}$ <= annual avg. < 0.6 $\mathrm{Bq\ l^{-1}}$
		🟥	0.6 $\mathrm{Bq\ l^{-1}}$ <= annual avg. < 2 $\mathrm{Bq\ l^{-1}}$
⬛	Outside EU (in 2023)	⬛	2 $\mathrm{Bq\ l^{-1}}$ <= annual avg.

. sample location (Coordinate Accuracy = Precise or Not Specified)
\+ regional average (Coordinate Accuracy = Reference Point of Region)

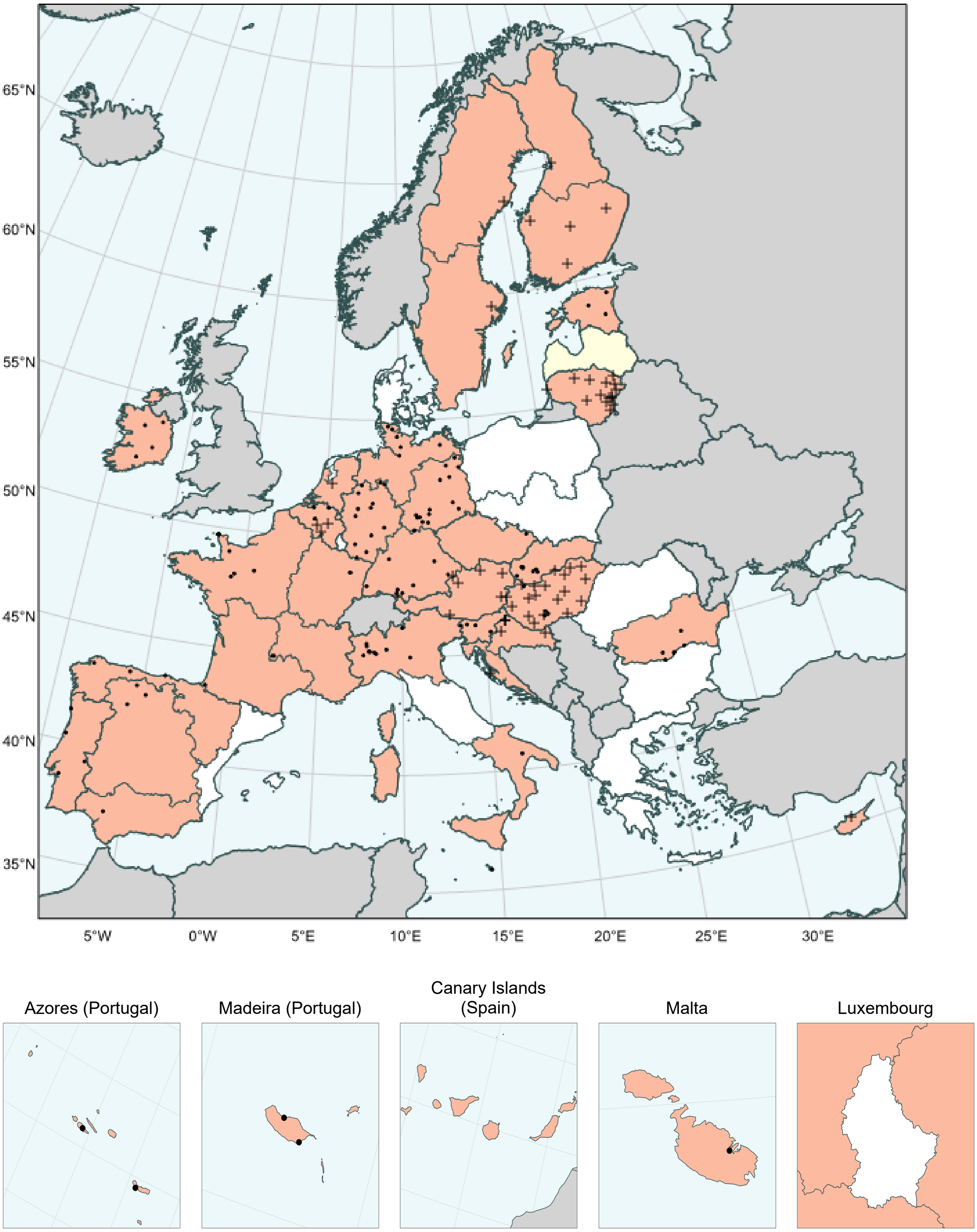


Table M1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	*19*	*7*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*12*
BE	*81*	*7*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*11*
BG									
CY	*6*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*7*
CZ	*8*	*2*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*1*
DE-N	*27*	*6*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*2*
DE-C	*40*	*13*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*8*
DE-S	*44*	*9*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*5*
DE-E	*67*	*14*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*12*
DE	*178*	*42*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*12*
DK									
EE	*12*	*3*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*3*
ES-N	*36*	*3*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*7*
ES-C	*12*	*3*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*8*
ES-S	*12*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*3*
ES-E									
ES	*60*	*7*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*3*
FI-N	*4*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*1*
FI-S	*16*	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*7*
FI	*20*	*5*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*7*
FR-NW	*11*	*9*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*7*
FR-NE	*2*	*2*		*< RL*		*< RL*	*< RL*	*< RL*	*6*
FR-SW	*1*	*1*			*< RL*		*< RL*	*< RL*	*8*
FR-SE	*2*	*2*		*< RL*		*< RL*	*< RL*	*< RL*	*6*
FR	*16*	*14*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*8*
GR									
HR-A	*6*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*5*
HR-C	*24*	*5*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*8*
HR	*30*	*6*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*8*
HU	*97*	*23*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*10*
IE	*16*	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*5*
IT-N	*41*	*11*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*5.5E-01*	*3*
IT-C									
IT-S	*3*	*1*	*< RL*	*< RL*	*< RL*		*< RL*	*< RL*	*1*
IT	*44*	*12*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*4.2E-01*	*3*
LT	*68*	*15*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*12*
LU									
LV							*Δ*		
MT	*3*	*1*	*< RL*	*< RL*	*< RL*		*< RL*	*< RL*	*3*
NL	*12*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*1*
PL-N									
PL-S									
PL									
PT	*34*	*8*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*1*
RO-N									
RO-S	*11*	*7*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*10*
RO	*11*	*7*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*10*
SE-N	*4*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*2*
SE-S	*4*	*1*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*4*
SE	*8*	*2*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*4*
SI	*30*	*4*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*< RL*	*12*
SK	*14*	*8*	*< RL*				*< RL*	*< RL*	*1*

RL: reporting level for ^{90}Sr In milk, i.e. 0.2 Bq l $^{-1}$ (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Fig. M2: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : milk
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l^{-1} (Bq per litre)

⬜ EU (no relevant data reported)
🟨 EU (only relevant constraint values above the reporting level reported)
▒ Outside EU (in 2023)

🟪 annual avg. < 0.5 Bq l^{-1}
🟪 0.5 Bq l^{-1} <= annual avg. < 1.5 Bq l^{-1}
🟪 1.5 Bq l^{-1} <= annual avg. < 5 Bq l^{-1}
🟪 5 Bq l^{-1} <= annual avg.

. sample location (Coordinate Accuracy = Precise or Not Specified)
+ regional average (Coordinate Accuracy = Reference Point of Region)

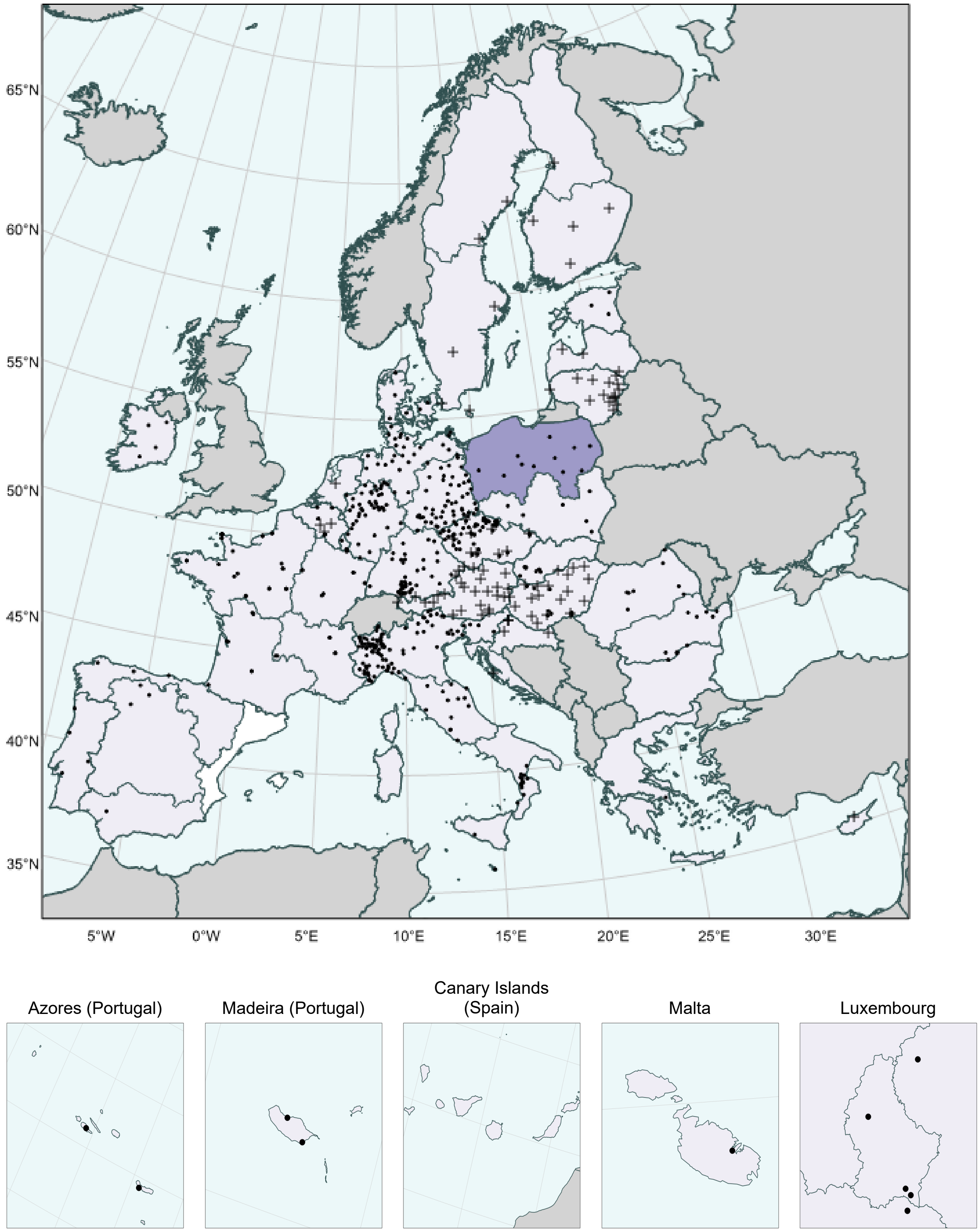


Table M2: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : milk
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : $\mathrm{Bq\ l^{-1}}$ (Bq per litre)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	169	28	< RL	< RL	< RL	< RL	< RL	< RL	7
BE	162	7	< RL	< RL	< RL	< RL	< RL	< RL	11
BG	3	1	< RL	< RL	< RL		< RL	< RL	3
CY	3	1	< RL	< RL			< RL	< RL	2
CZ	148	103	< RL	< RL	< RL	< RL	< RL	< RL	6
DE-N	156	26	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-C	205	43	< RL	< RL	< RL	< RL	< RL	< RL	5
DE-S	289	40	< RL	< RL	< RL	< RL	< RL	< RL	4
DE-E	274	48	< RL	< RL	< RL	< RL	< RL	< RL	3
DE	924	157	< RL	< RL	< RL	< RL	< RL	< RL	5
DK	42	7	< RL	< RL	< RL	< RL	< RL	< RL	4
EE	12	3	< RL	< RL	< RL	< RL	< RL	< RL	3
ES-N	36	3	< RL	< RL	< RL	< RL	< RL	< RL	6
ES-C	12	3	< RL	< RL	< RL	< RL	< RL	< RL	12
ES-S	12	1	< RL	< RL	< RL	< RL	< RL	< RL	6
ES-E									
ES	60	7	< RL	< RL	< RL	< RL	< RL	< RL	12
FI-N	12	1	< RL	< RL	< RL	< RL	< RL	< RL	4
FI-S	48	4	< RL	< RL	< RL	< RL	< RL	< RL	5
FI	60	5	< RL	< RL	< RL	< RL	< RL	< RL	4
FR-NW	29	26	< RL	< RL	< RL	< RL	< RL	< RL	3
FR-NE	18	12	< RL	< RL	< RL	< RL	< RL	< RL	6
FR-SW	7	7		< RL	< RL	< RL	< RL	< RL	8
FR-SE	6	6		< RL		< RL	< RL	< RL	11
FR	60	51	< RL	< RL	< RL	< RL	< RL	< RL	3
GR	29	1	< RL	< RL	< RL	< RL	< RL	< RL	9
HR-A	6	1	< RL	< RL	< RL	< RL	< RL	< RL	1
HR-C	24	5	< RL	< RL	< RL	< RL	< RL	< RL	3
HR	30	6	< RL	< RL	< RL	< RL	< RL	< RL	3
HU	155	28	< RL	< RL	< RL	< RL	< RL	< RL	1
IE	34	4	< RL	< RL	< RL	< RL	< RL	< RL	2
IT-N	345	96	< RL	< RL	< RL	< RL	< RL	< RL	8
IT-C	76	14	< RL	< RL	< RL	< RL	< RL	< RL	1
IT-S	45	14	< RL	< RL	< RL	< RL	< RL	< RL	1
IT	466	124	< RL	< RL	< RL	< RL	< RL	< RL	8
LT	68	15	< RL	< RL	< RL	< RL	< RL	< RL	12
LU	34	3	< RL	< RL	< RL	< RL	< RL	< RL	3
LV	7	3	< RL	< RL	< RL	< RL	< RL	< RL	2
MT	3	1	< RL	< RL	< RL		< RL	< RL	3
NL	12	1	< RL	< RL	< RL	< RL	< RL	< RL	1
PL-N	36	11	< RL	5.9E-01	8.5E-01	9.6E-01	7.1E-01	1.7E+00	9
PL-S	20	6	< RL	< RL	5.1E-01	< RL	< RL	5.8E-01	8
PL	56	17	< RL	< RL	7.3E-01	8.9E-01	6.4E-01	1.6E+00	12
PT	33	8	< RL	< RL	< RL	< RL	< RL	< RL	9
RO-N	16	8	< RL	< RL	< RL	< RL	< RL	< RL	12
RO-S	13	10	< RL	< RL	< RL	< RL	< RL	< RL	2
RO	29	18	< RL	< RL	< RL	< RL	< RL	< RL	2
SE-N	5	2	< RL	< RL	< RL	< RL	< RL	< RL	9
SE-S	12	3	< RL	< RL	< RL	< RL	< RL	< RL	4
SE	17	5	< RL	< RL	< RL	< RL	< RL	< RL	2
SI	30	4	< RL	< RL	< RL	< RL	< RL	< RL	6
SK	14	8	< RL				< RL	< RL	1

RL: reporting level for ^{137}Cs In milk, i.e. 0.5 $\mathrm{Bq\ l^{-1}}$ (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Fig. D1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : mixed diet
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : $\mathrm{Bq\ d^{-1}\ p^{-1}}$ (Bq per day per person)

⬜ EU (no relevant data reported)
🟨 EU (only relevant constraint values above the reporting level reported)
▨ Outside EU (in 2023)

🟧 annual avg. < 0.1 $\mathrm{Bq\ d^{-1}\ p^{-1}}$
🟥 0.1 $\mathrm{Bq\ d^{-1}\ p^{-1}}$ <= annual avg. < 0.3 $\mathrm{Bq\ d^{-1}\ p^{-1}}$
🟥 0.3 $\mathrm{Bq\ d^{-1}\ p^{-1}}$ <= annual avg. < 1 $\mathrm{Bq\ d^{-1}\ p^{-1}}$
⬛ 1 $\mathrm{Bq\ d^{-1}\ p^{-1}}$ <= annual avg.

. sample location (Coordinate Accuracy = Precise or Not Specified)
+ regional average (Coordinate Accuracy = Reference Point of Region)

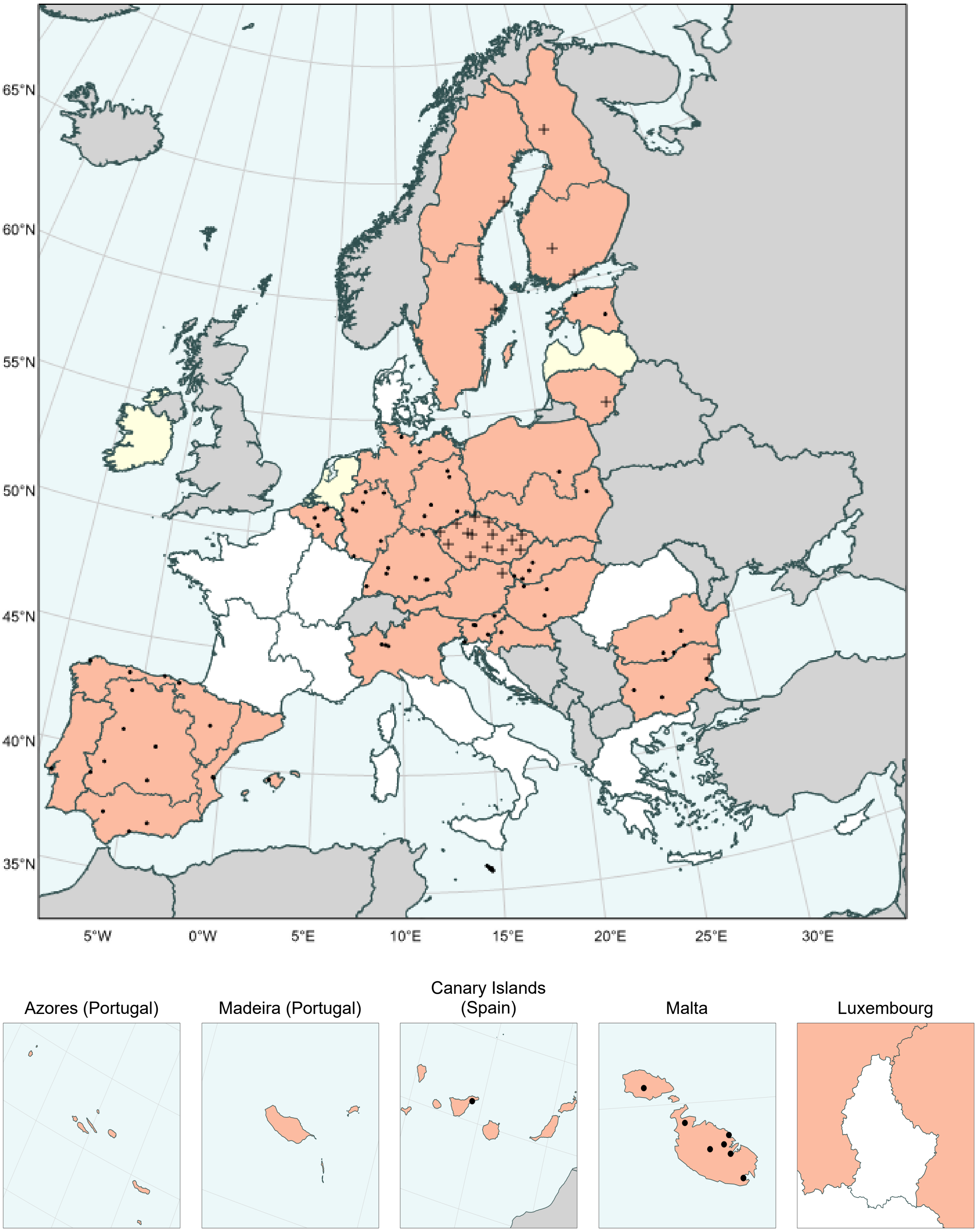


Table D1: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : mixed diet
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq d^{-1} p^{-1} (Bq per day per person)

Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	4	1	< RL	< RL	< RL	< RL	< RL	< RL	4
BE	12	4	< RL	< RL	< RL	< RL	< RL	< RL	5
BG	14	4	< RL	< RL	< RL	< RL	< RL	1.1E-01	12
CY									
CZ	20	14	< RL	< RL	< RL	< RL	< RL	< RL	4
DE-N	15	2	< RL	< RL	< RL	1.9E-01	< RL	1.9E-01	10
DE-C	29	8	< RL	< RL	< RL	< RL	< RL	< RL	1
DE-S	28	7	< RL	< RL	< RL	< RL	< RL	< RL	4
DE-E	32	5	< RL	< RL	< RL	< RL	< RL	< RL	6
DE	104	22	< RL	< RL	< RL	< RL	< RL	< RL	11
DK									
EE	4	2	< RL			< RL	< RL	< RL	3
ES-N	20	5	< RL	< RL	< RL	< RL	< RL	< RL	2
ES-C	28	7	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-S	16	4	< RL	< RL	< RL	< RL	< RL	< RL	4
ES-E	12	3	< RL	< RL	< RL	< RL	< RL	< RL	11
ES	76	19	< RL	< RL	< RL	< RL	< RL	< RL	1
FI-N	1	1				< RL	< RL	< RL	10
FI-S	2	2				< RL	< RL	< RL	10
FI	3	3				< RL	< RL	< RL	10
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR									
HR-A									
HR-C	5	1				< RL	< RL	< RL	11
HR	5	1				< RL	< RL	< RL	11
HU	10	3	< RL	< RL	< RL	< RL	< RL	< RL	5
IE							Δ		
IT-N	6	3	< RL	< RL	< RL		< RL	< RL	7
IT-C									
IT-S									
IT	6	3	< RL	< RL	< RL		< RL	< RL	7
LT	11	1	< RL	< RL	< RL	< RL	< RL	< RL	1
LU									
LV							Δ		
MT	8	8	< RL	< RL	< RL	< RL	< RL	< RL	2
NL							Δ		
PL-N	10	1				< RL	< RL	< RL	11
PL-S	10	1				< RL	< RL	< RL	11
PL	20	2				< RL	< RL	< RL	11
PT	4	1			< RL	< RL	< RL	< RL	12
RO-N									
RO-S	8	5	< RL	< RL	< RL	< RL	< RL	< RL	1
RO	8	5	< RL	< RL	< RL	< RL	< RL	< RL	1
SE-N	2	1		< RL		< RL	< RL	< RL	4
SE-S	4	2		< RL		< RL	< RL	< RL	4
SE	6	3		< RL		< RL	< RL	< RL	4
SI	5	5	< RL				< RL	< RL	2
SK	12	4		< RL	< RL	< RL	< RL	< RL	10

RL: reporting level for ^{90}Sr In mixed diet, i.e. 0.1 Bq d^{-1} p^{-1} (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

DENSE

Fig. D2: Geographical and time averages

YEAR : **2023**
SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

□	**EU (no relevant data reported)**	□			**annual avg.**	**< 0.2 Bq d^{-1} p^{-1}**
🟨	**EU (only relevant constraint values above the reporting level reported)**	🟪	**0.2 Bq d^{-1} p^{-1}**	**<=**	**annual avg.**	**< 0.6 Bq d^{-1} p^{-1}**
		🟪	**0.6 Bq d^{-1} p^{-1}**	**<=**	**annual avg.**	**< 2 Bq d^{-1} p^{-1}**
■	**Outside EU (in 2023)**	■	**2 Bq d^{-1} p^{-1}**	**<=**	**annual avg.**	

. **sample location (Coordinate Accuracy = Precise or Not Specified)**
+ **regional average (Coordinate Accuracy = Reference Point of Region)**

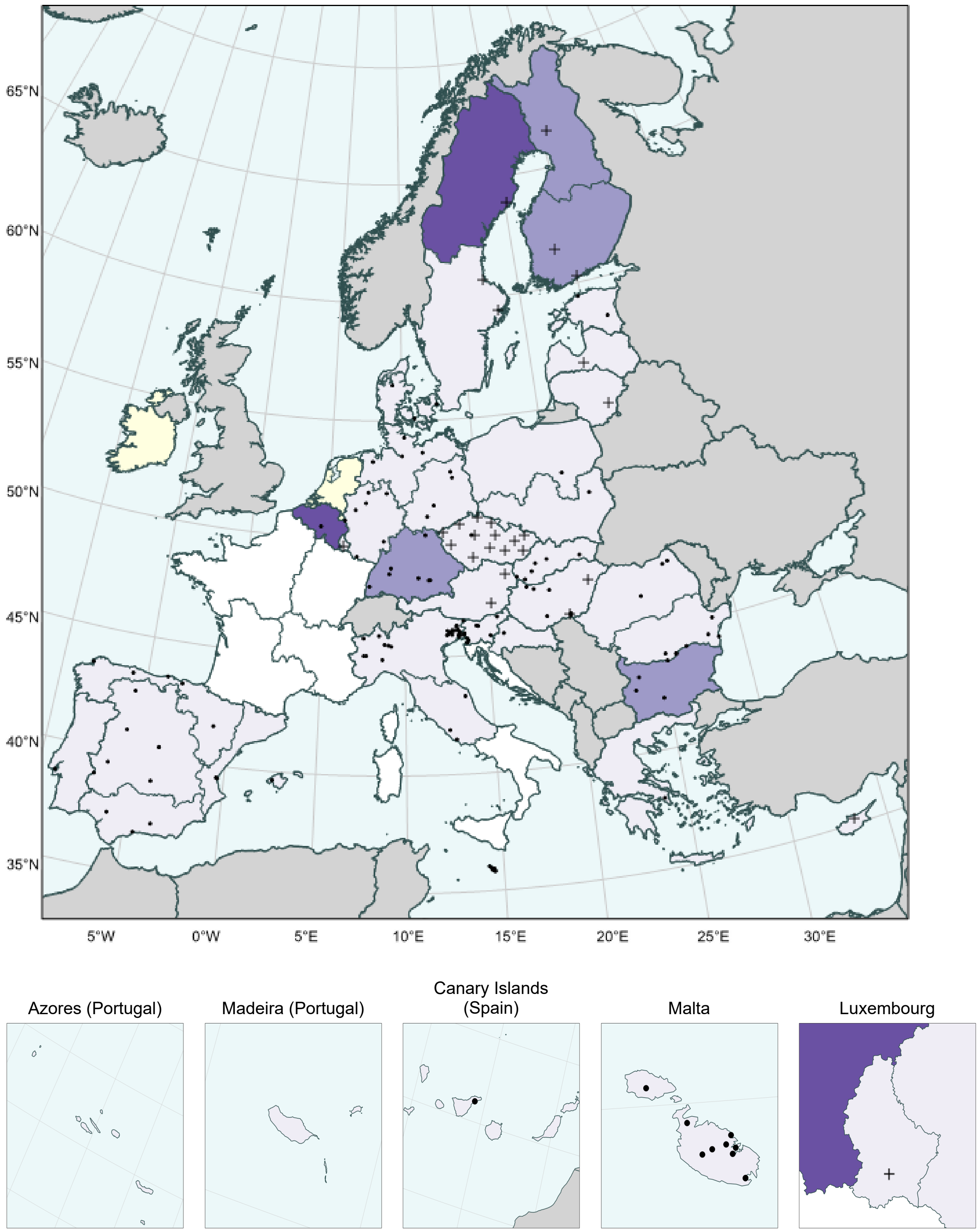


Table D2: Geographical and time averages

YEAR : 2023
SAMPLE TYPE : mixed diet
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq d^{-1} p^{-1} (Bq per day per person)

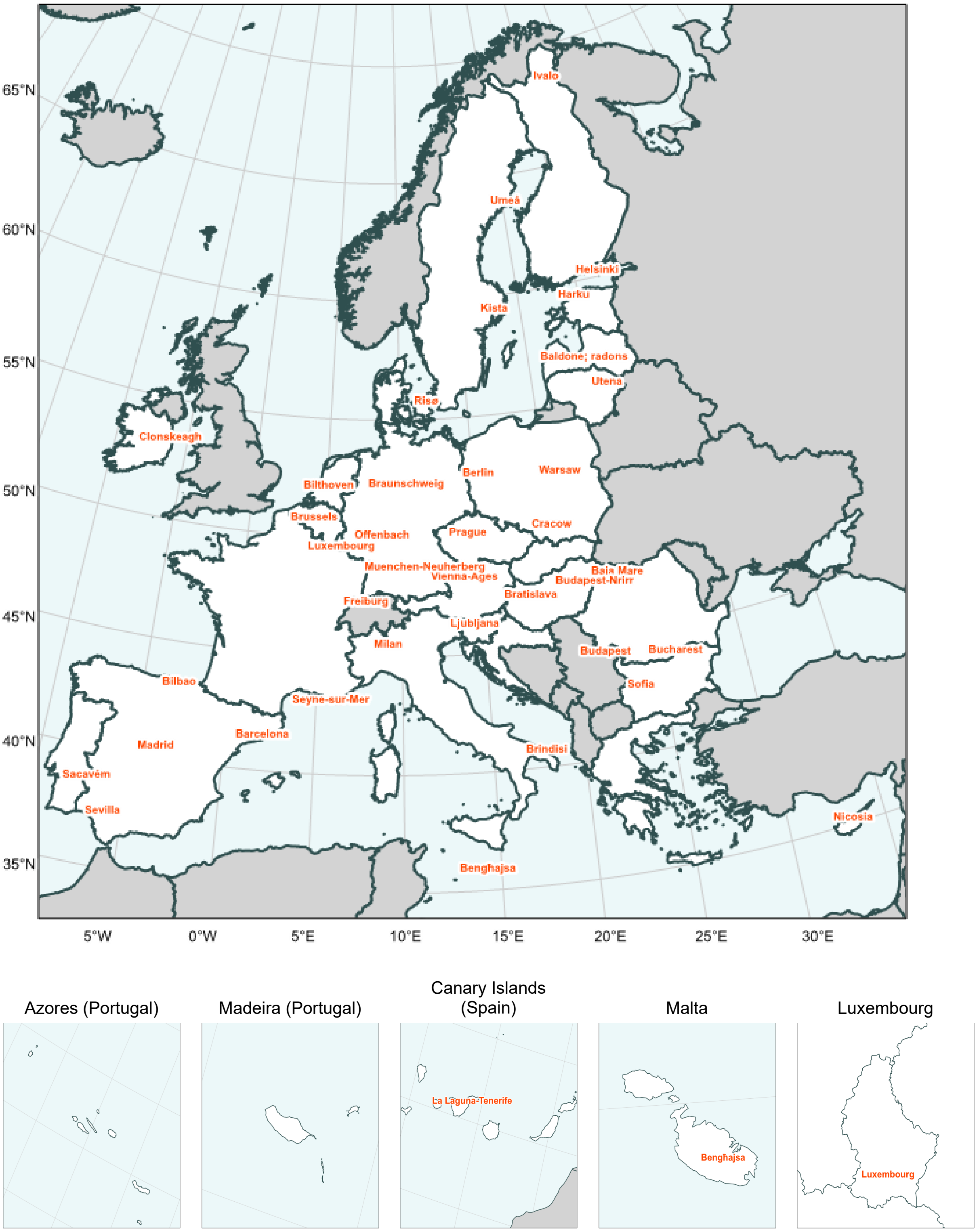
Country	N	L	1st quarter	2nd quarter	3rd quarter	4th quarter	Annual average	Monthly max	M
AT	21	2	< RL	< RL	< RL	< RL	< RL	< RL	12
BE	3	1		1.2E+00	8.3E-01	8.3E-01	9.5E-01	1.2E+00	6
BG	14	4	< RL	5.7E-01	4.9E-01	< RL	3.3E-01	9.3E-01	6
CY	15	1		< RL	< RL	< RL	< RL	< RL	7
CZ	19	14	< RL	< RL	< RL	< RL	< RL	< RL	3
DE-N	53	4	< RL	< RL	< RL	< RL	< RL	< RL	2
DE-C	99	7	2.7E-01	< RL	< RL	< RL	< RL	4.2E-01	1
DE-S	128	7	4.3E-01	< RL	< RL	3.5E-01	2.5E-01	9.7E-01	2
DE-E	30	4	< RL	< RL	< RL	< RL	< RL	3.5E-01	6
DE	310	22	2.9E-01	< RL	< RL	2.2E-01	< RL	5.5E-01	2
DK	3	3		< RL	< RL		< RL	< RL	6
EE	4	2	< RL			< RL	< RL	< RL	3
ES-N	20	5	< RL	< RL	< RL	< RL	< RL	< RL	6
ES-C	28	7	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-S	15	4	< RL	< RL	< RL	< RL	< RL	< RL	1
ES-E	12	3	< RL	< RL	< RL	< RL	< RL	< RL	10
ES	75	19	< RL	< RL	< RL	< RL	< RL	< RL	1
FI-N	7	1				5.1E-01	5.1E-01	5.1E-01	10
FI-S	14	2				4.0E-01	4.0E-01	4.0E-01	10
FI	21	3				4.4E-01	4.4E-01	4.4E-01	10
FR-NW									
FR-NE									
FR-SW									
FR-SE									
FR									
GR	6	1	< RL	< RL		< RL	< RL	< RL	10
HR-A									
HR-C	5	1				< RL	< RL	< RL	11
HR	5	1				< RL	< RL	< RL	11
HU	20	8	< RL	< RL	< RL	< RL	< RL	< RL	5
IE							Δ		
IT-N	79	31	< RL	< RL	< RL	< RL	< RL	< RL	10
IT-C	6	3	< RL	< RL	< RL	< RL	< RL	< RL	7
IT-S									
IT	85	34	< RL	< RL	< RL	< RL	< RL	< RL	10
LT	11	1	< RL	< RL	< RL	< RL	< RL	< RL	12
LU	12	1	< RL	< RL	< RL	< RL	< RL	< RL	10
LV	4	1		< RL	< RL		< RL	< RL	5
MT	12	10	< RL	< RL	< RL	< RL	< RL	< RL	1
NL							Δ		
PL-N	10	1				< RL	< RL	< RL	11
PL-S	10	1				< RL	< RL	< RL	11
PL	20	2				< RL	< RL	< RL	11
PT	10	1	< RL	< RL	< RL	2.1E-01	< RL	4.8E-01	10
RO-N	13	3	< RL	< RL	< RL	< RL	< RL	< RL	1
RO-S	24	7	< RL	< RL	< RL	< RL	< RL	< RL	2
RO	37	10	< RL	< RL	< RL	< RL	< RL	< RL	8
SE-N	3	1		< RL		2.0E+00	1.0E+00	2.9E+00	11
SE-S	5	2		< RL		2.3E-01	< RL	2.3E-01	11
SE	8	3		< RL		1.4E+00	7.7E-01	2.9E+00	12
SI	5	5	< RL				< RL	< RL	2
SK	20	6		< RL	< RL	< RL	< RL	< RL	11

RL: reporting level for ^{137}Cs In mixed diet, i.e. 0.2 Bq d^{-1} p^{-1} (see Appendix B)
Δ: only constraint (<) values above the reporting level were reported

N: Number of measurements considered in calculating the annual concentration.
L: Number of sampling locations considered in calculating the annual concentration.
Monthly max: Maximum monthly average in the year.
M: Month during which the maximum occurred.

Fig. A3

Sampling locations for ^{7}Be and ^{137}Cs in airborne particulates considered in Figures A4 – A31



Activity trends

SAMPLE TYPE : airborne particulates
NUCLIDE CATEGORY : beryllium-7 (^{7}Be)
MEASUREMENT UNIT : Bq m^{-3} (Bq per cubic metre)

Fig. A4

Activity trends for ^{7}Be in airborne particulates (Helsinki and Ivalo)

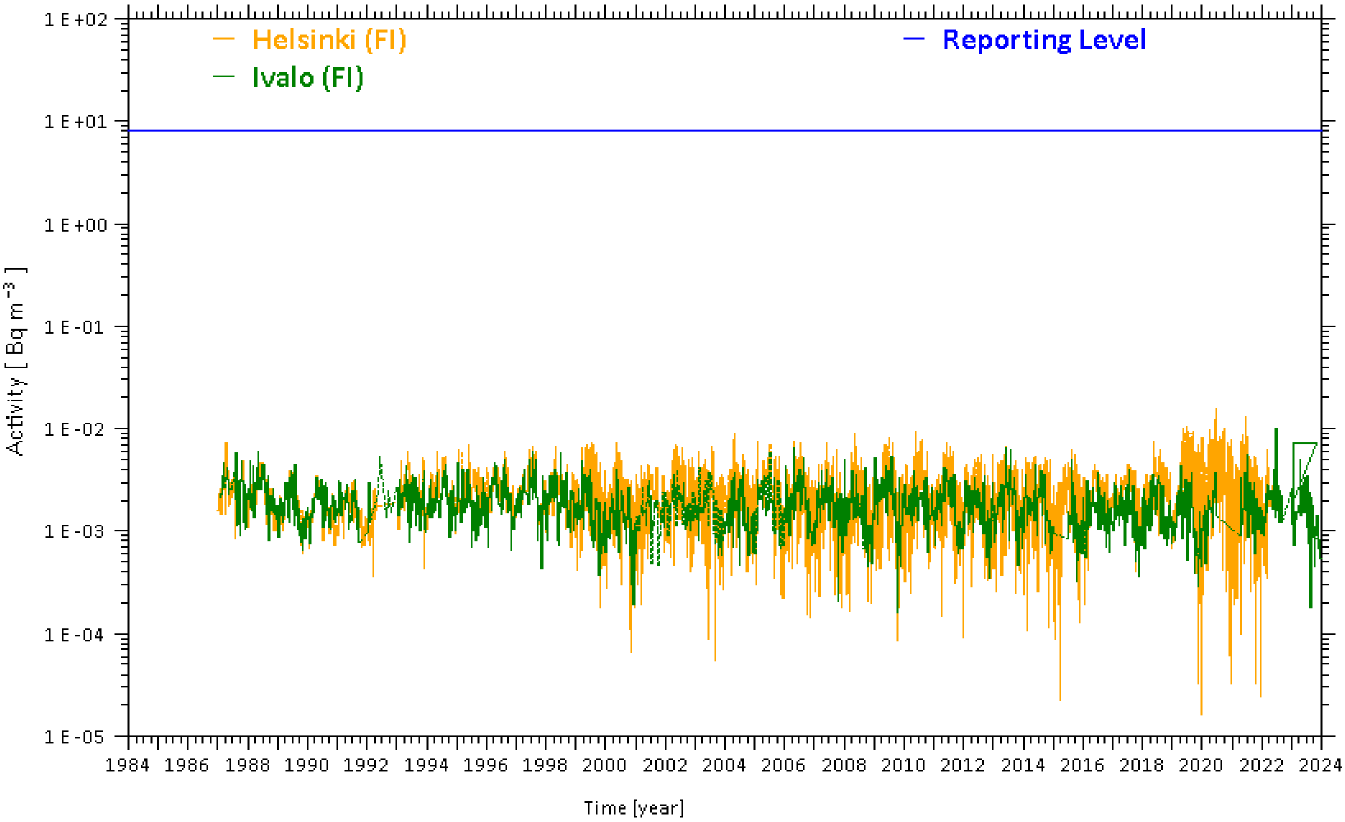
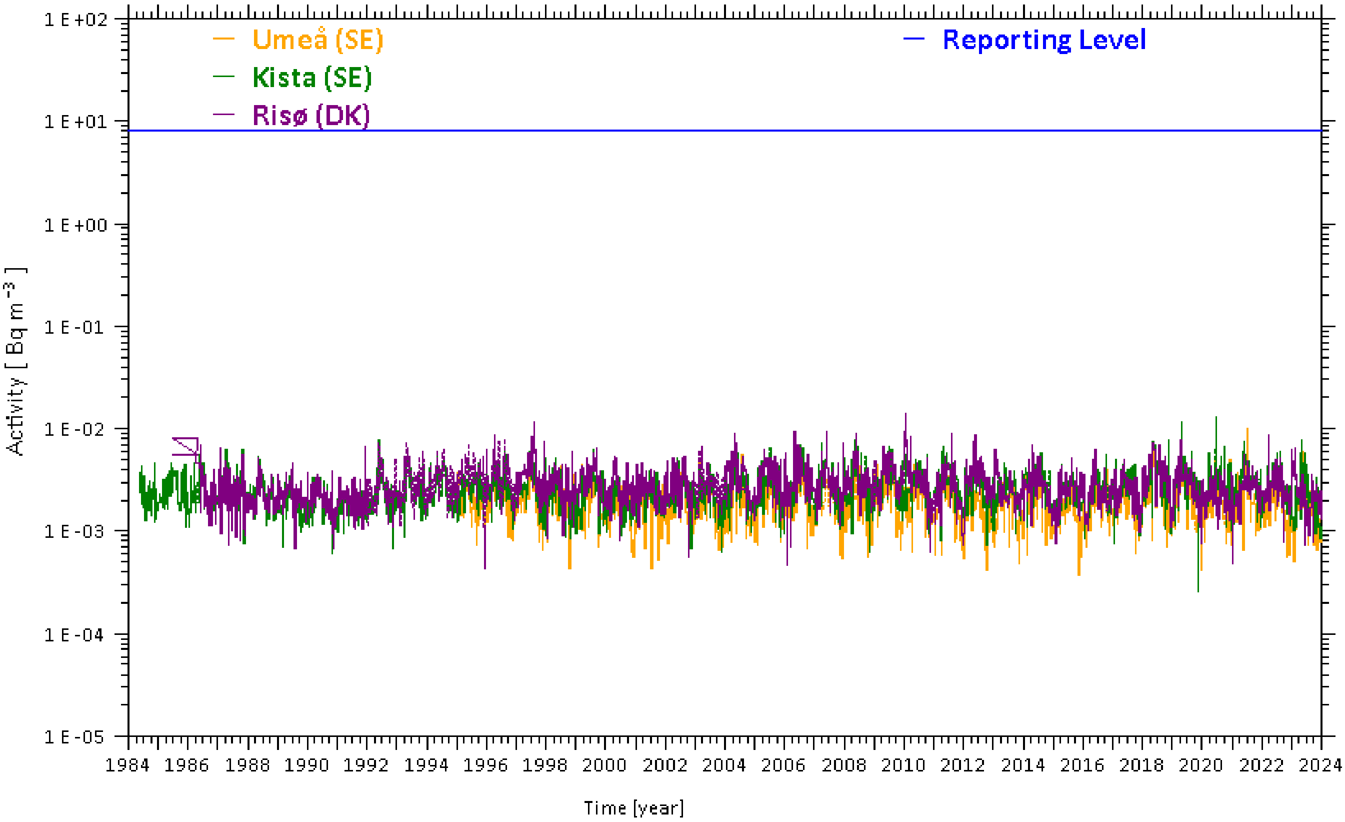


Fig. A5

Activity trends for ^{7}Be in airborne particulates (Umeå, Kista and Risø)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **beryllium-7 (^{7}Be)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A6

Activity trends for ^{7}Be in airborne particulates (Harku and Utena)

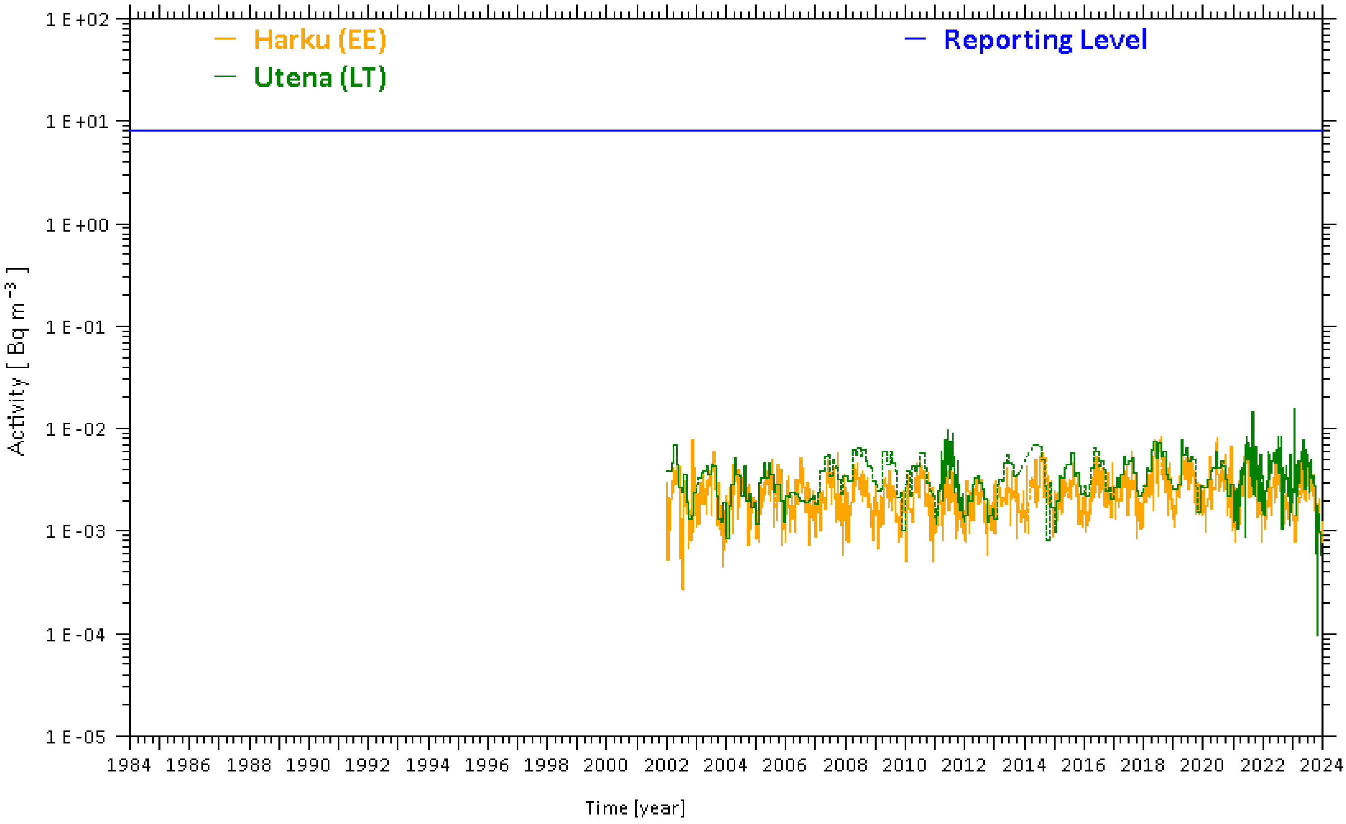
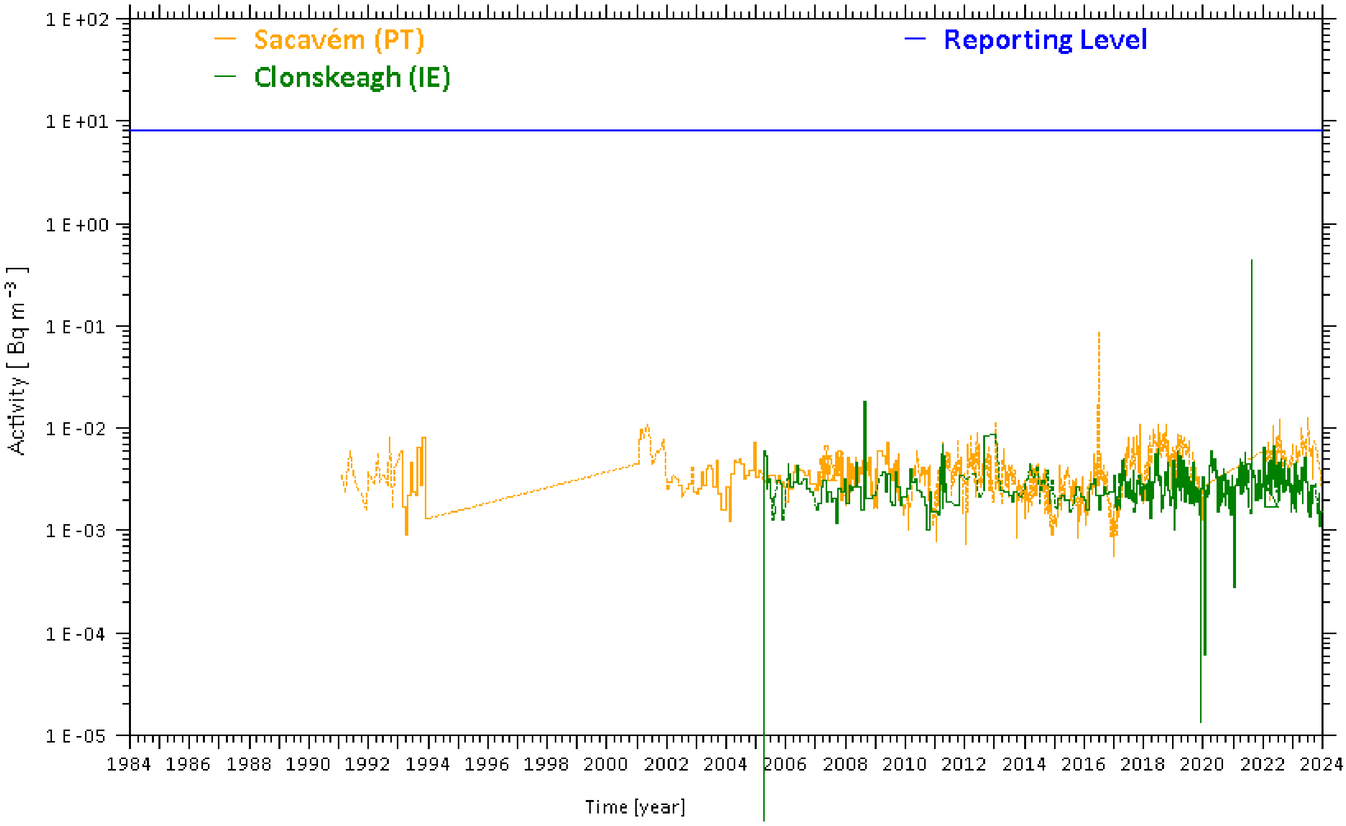


Fig. A7

Activity trends for ^{7}Be in airborne particulates (Sacavém and Clonskeagh)



Activity trends

SAMPLE TYPE : **airborne particulates**

NUCLIDE CATEGORY : **beryllium-7 (^{7}Be)**

MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A8

Activity trends for ^{7}Be in airborne particulates (Braunschweig, Offenbach and Berlin)

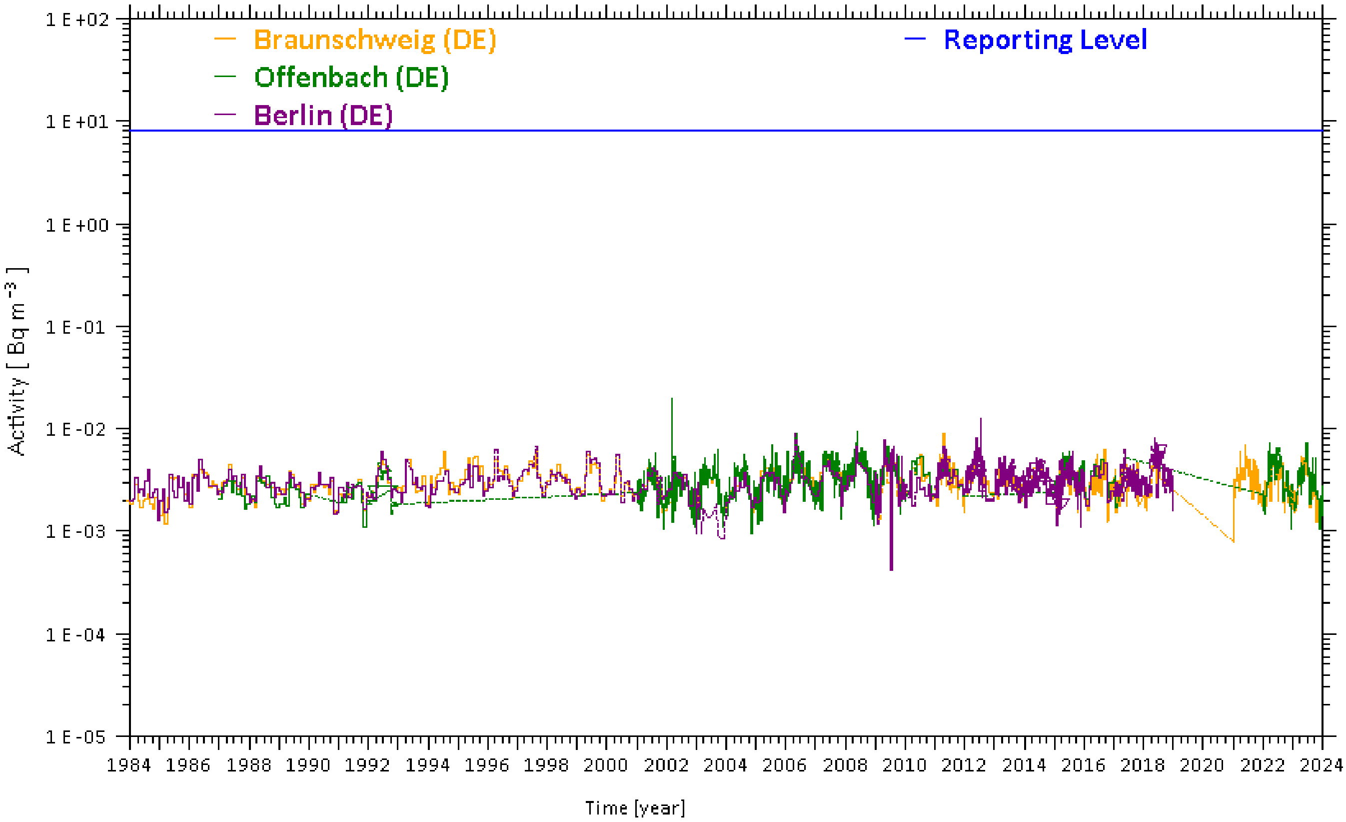
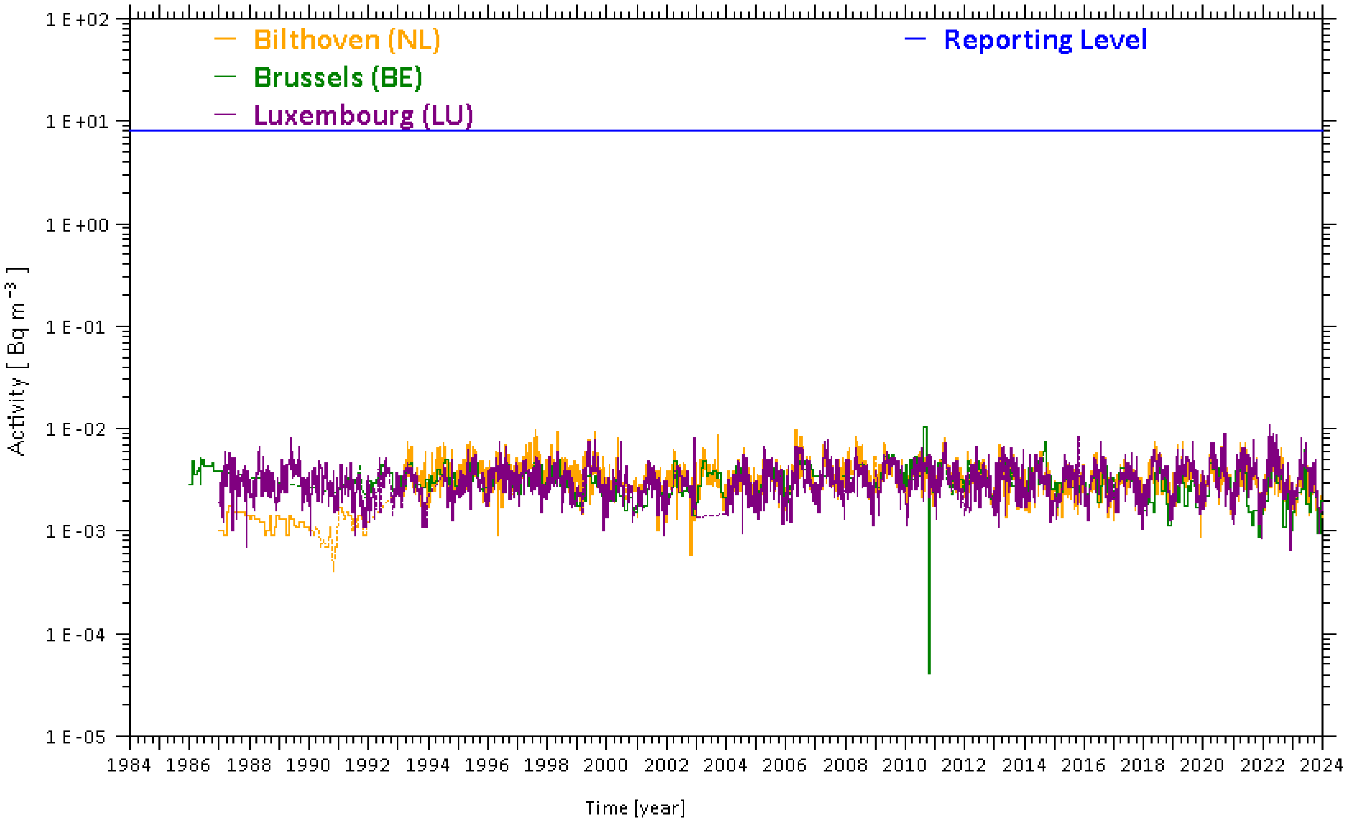


Fig. A9

Activity trends for ^{7}Be in airborne particulates (Bilthoven, Brussels and Luxembourg)



* The 7Be results for Bilthoven between 1987 and 1992 are underestimates due to a different sampling procedure and sample treatment

Activity trends

SAMPLE TYPE : **airborne particulates**

NUCLIDE CATEGORY : **beryllium-7 (^{7}Be)**

MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A10

Activity trends for ^{7}Be in airborne particulates (Warsaw, Cracow and Prague)

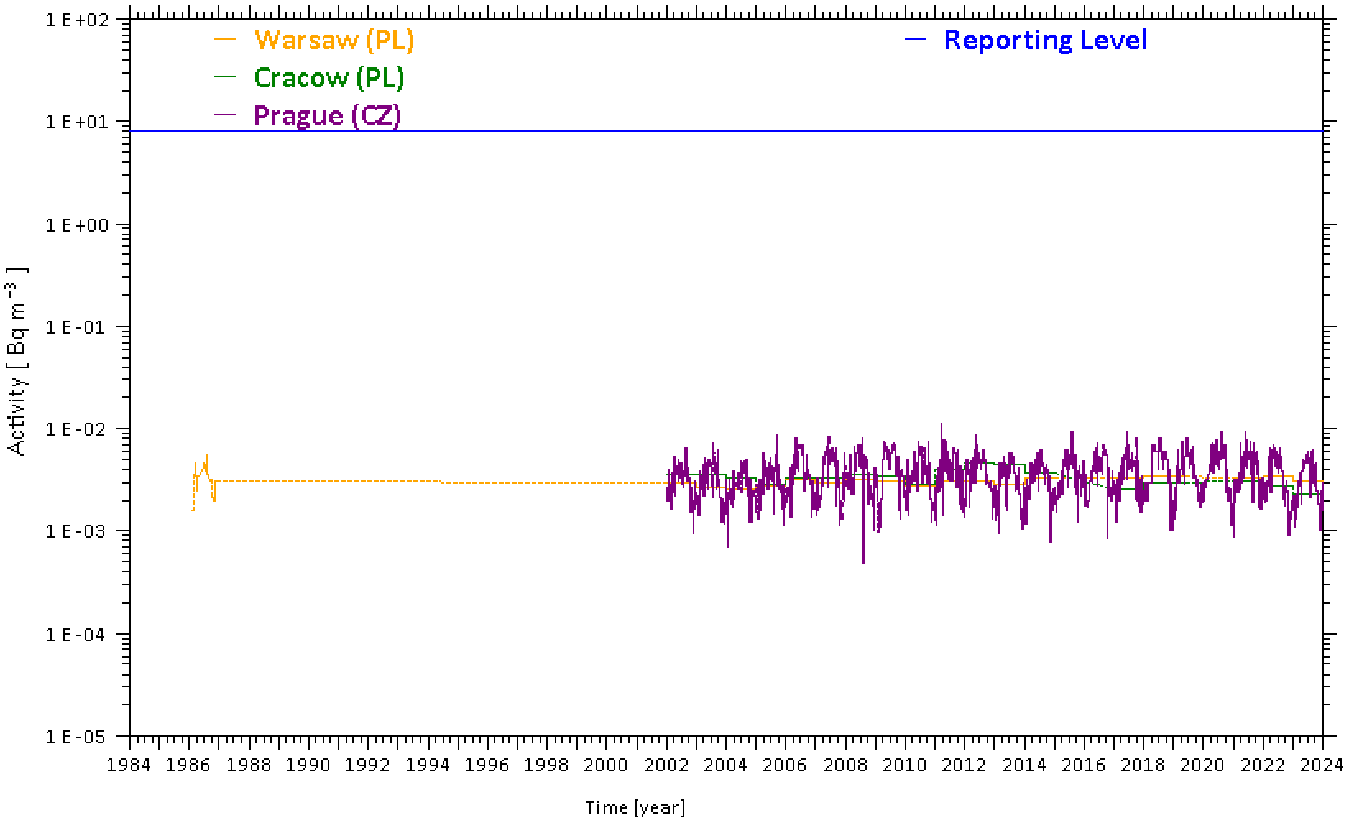
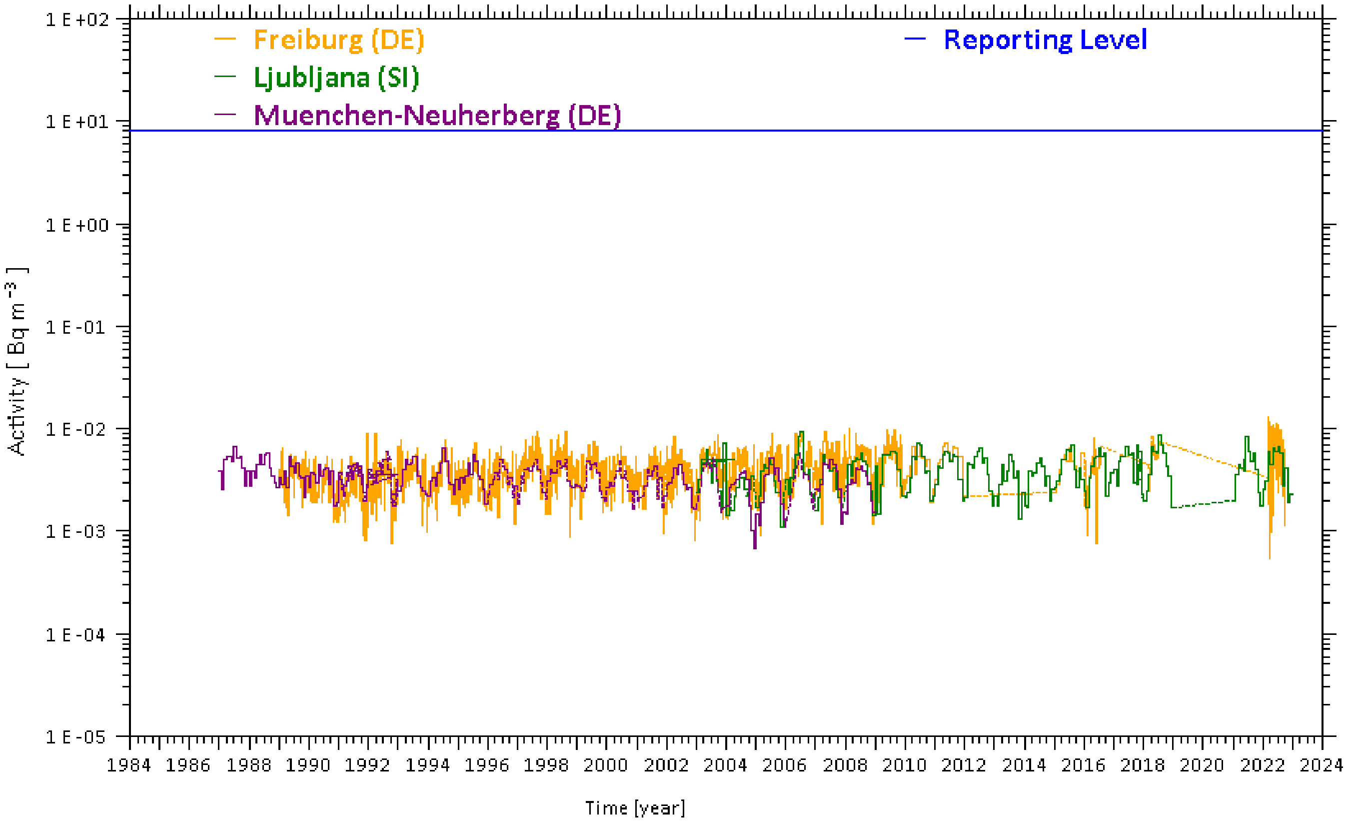


Fig. A11

Activity trends for ^{7}Be in airborne particulates (Freiburg, Ljubljana and Muenchen-Neuherberg)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **beryllium-7 (^{7}Be)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A12

Activity trends for ^{7}Be in airborne particulates (Vienna-Ages, Bratislava and Budapest)

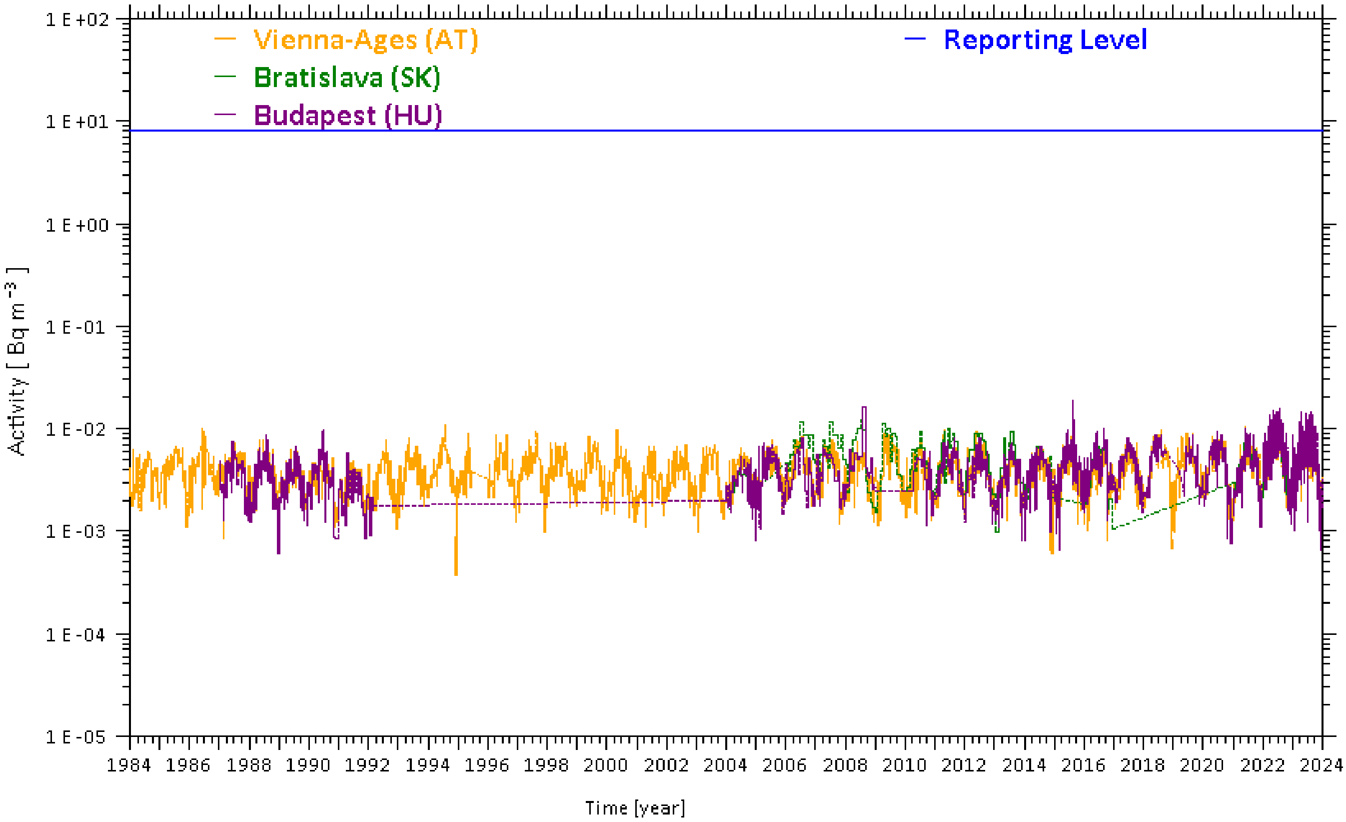
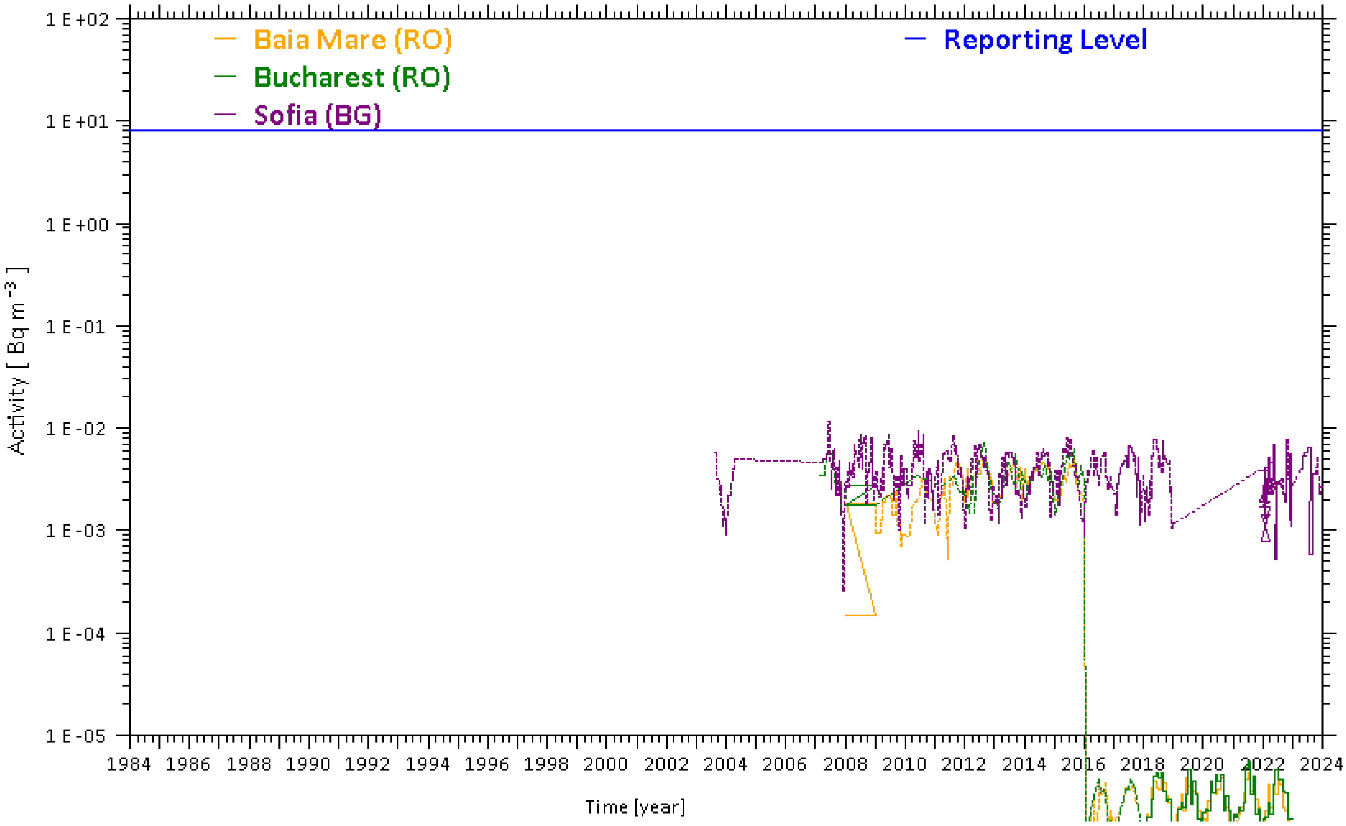


Fig. A13

Activity trends for ^{7}Be in airborne particulates (Baia Mare, Bucharest and Sofia)



SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **beryllium-7 (^{7}Be)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A14

Activity trends for ^{7}Be in airborne particulates (Barcelona, Bilbao and Madrid)

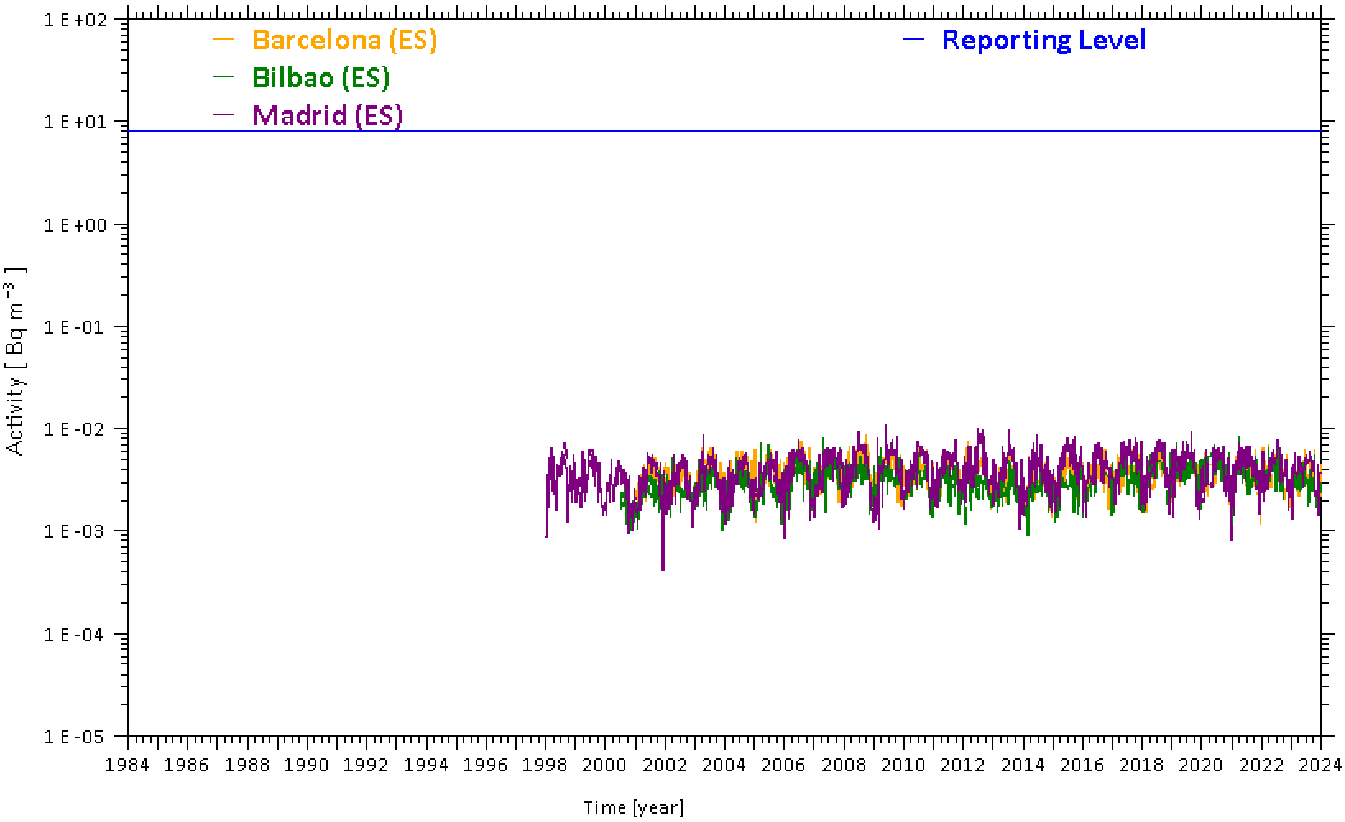
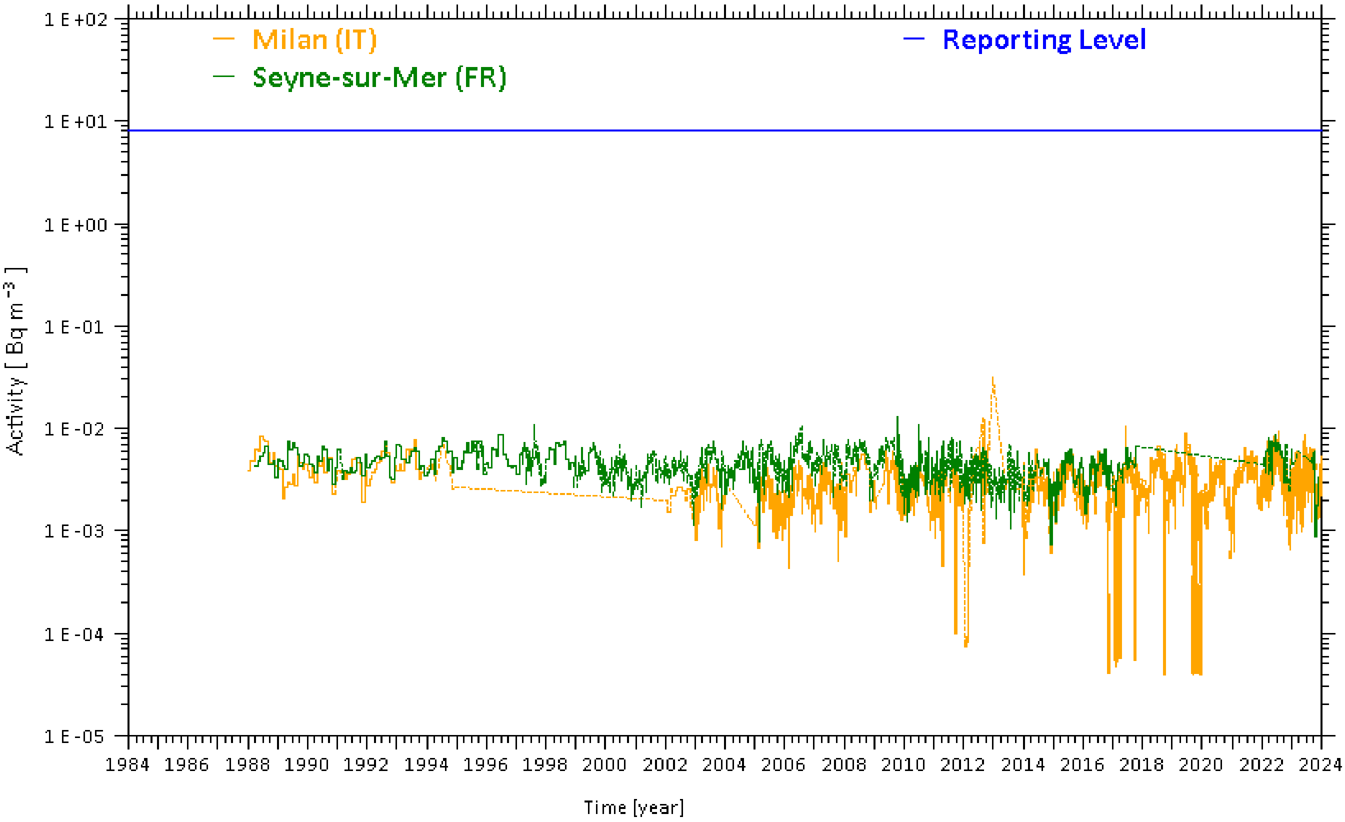


Fig. A15

Activity trends for ^{7}Be in airborne particulates (Milan and Seyne-sur-Mer)



SPARSE

Activity trends

SAMPLE TYPE	:	**airborne particulates**
NUCLIDE CATEGORY	:	**beryllium-7 (^{7}Be)**
MEASUREMENT UNIT	:	**Bq m^{-3}** (Bq per cubic metre)

Fig. A16

Activity trends for ^{7}Be in airborne particulates (La Laguna-Tenerife and Sevilla)

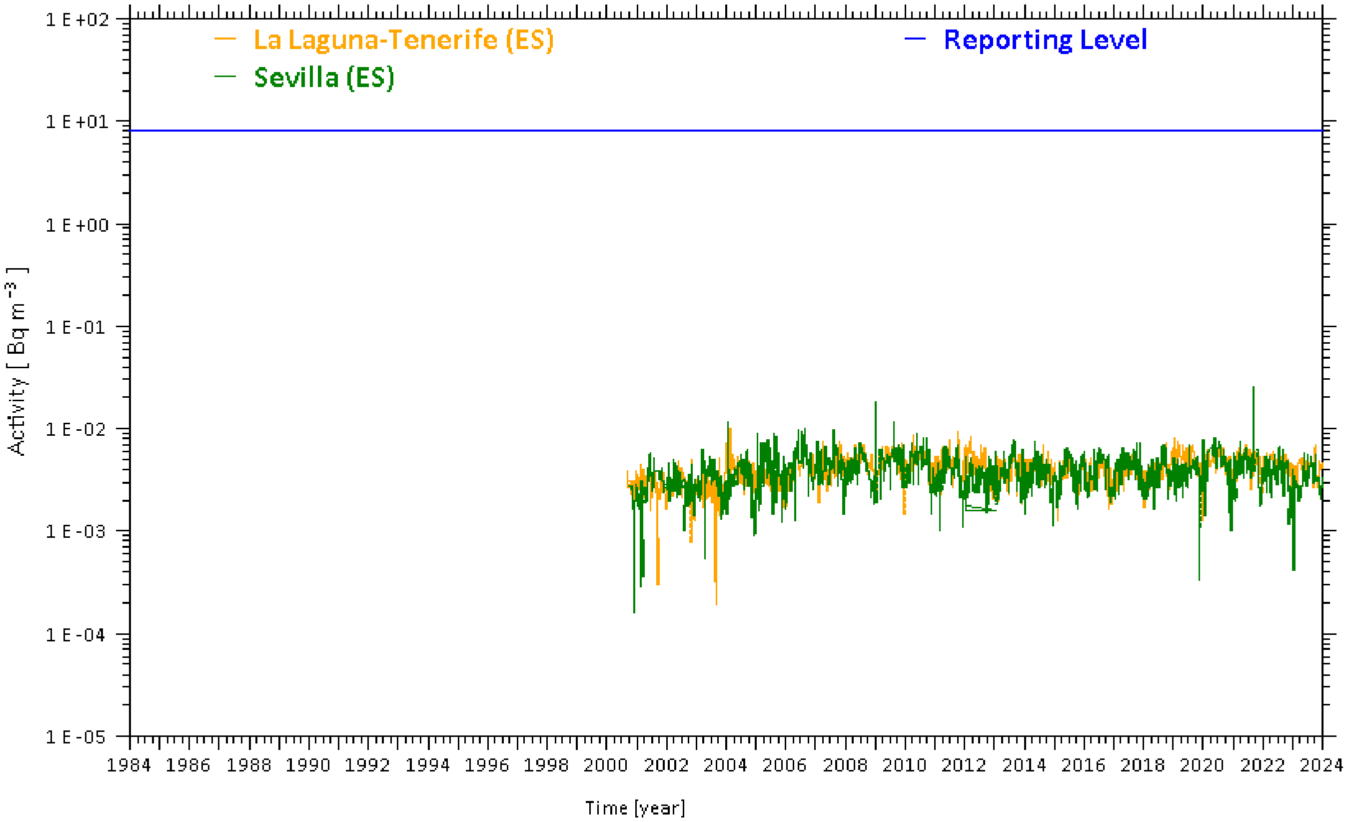
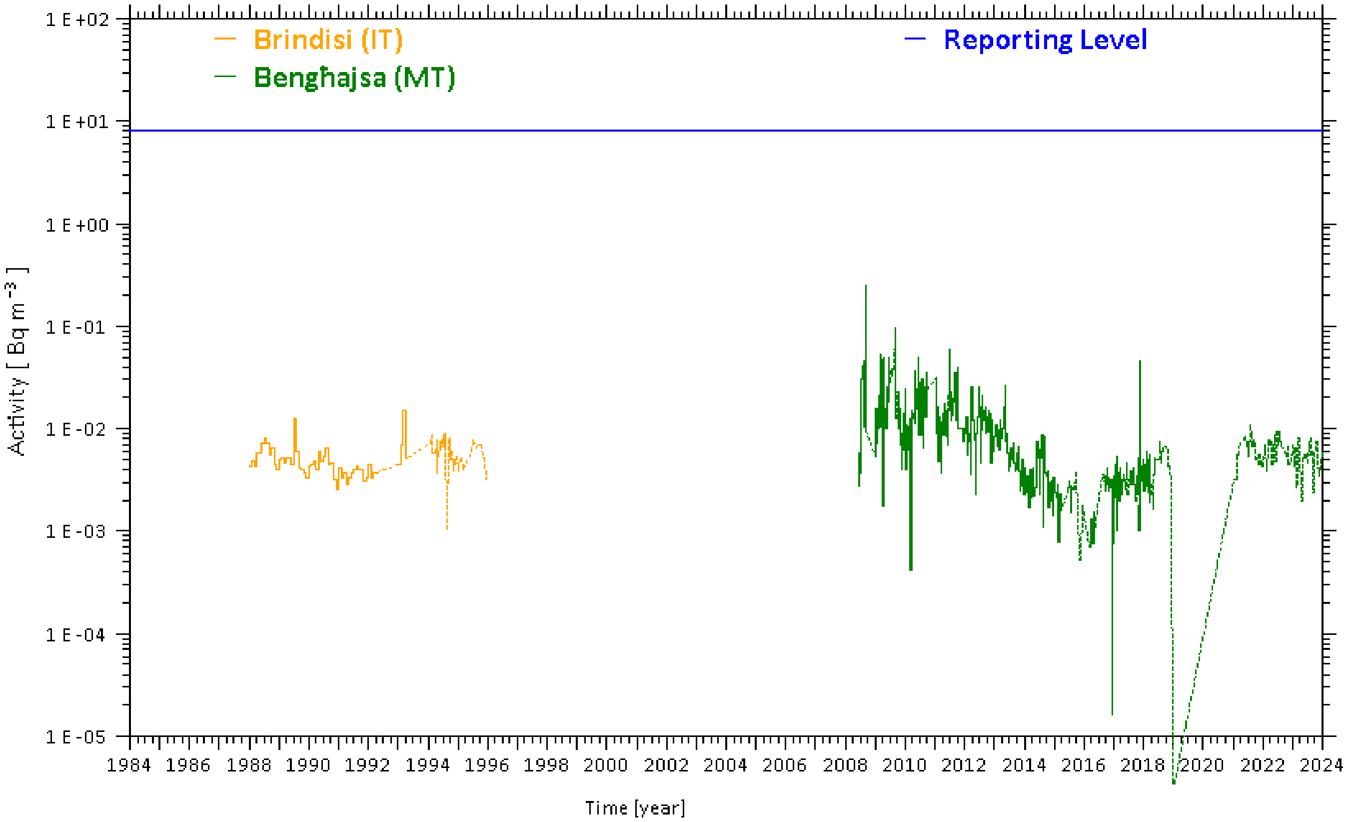


Fig. A17

Activity trends for ^{7}Be in airborne particulates (Brindisi and Bengħajsa)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

SPARSE

Fig. A18

Activity trends for ^{137}Cs in airborne particulates (Helsinki and Ivalo)

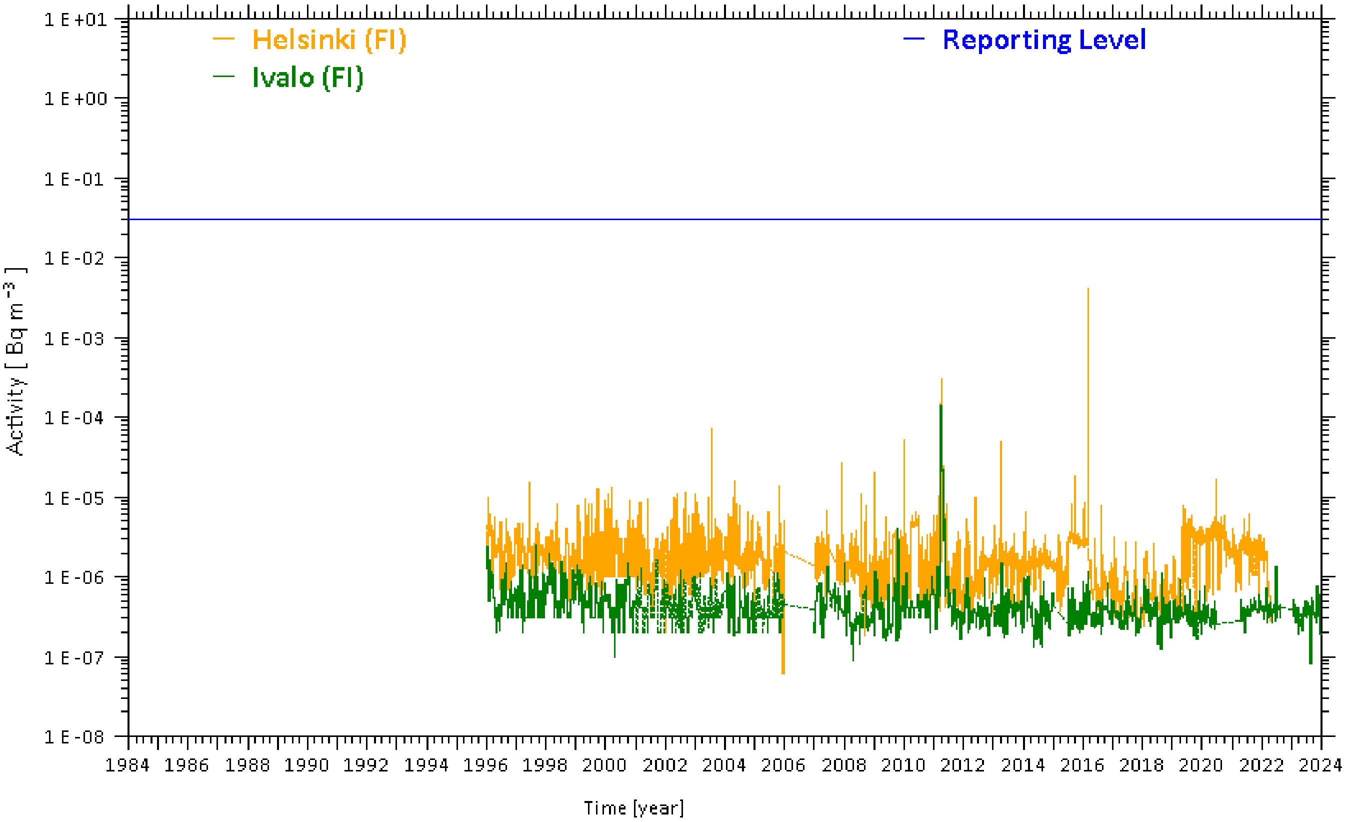
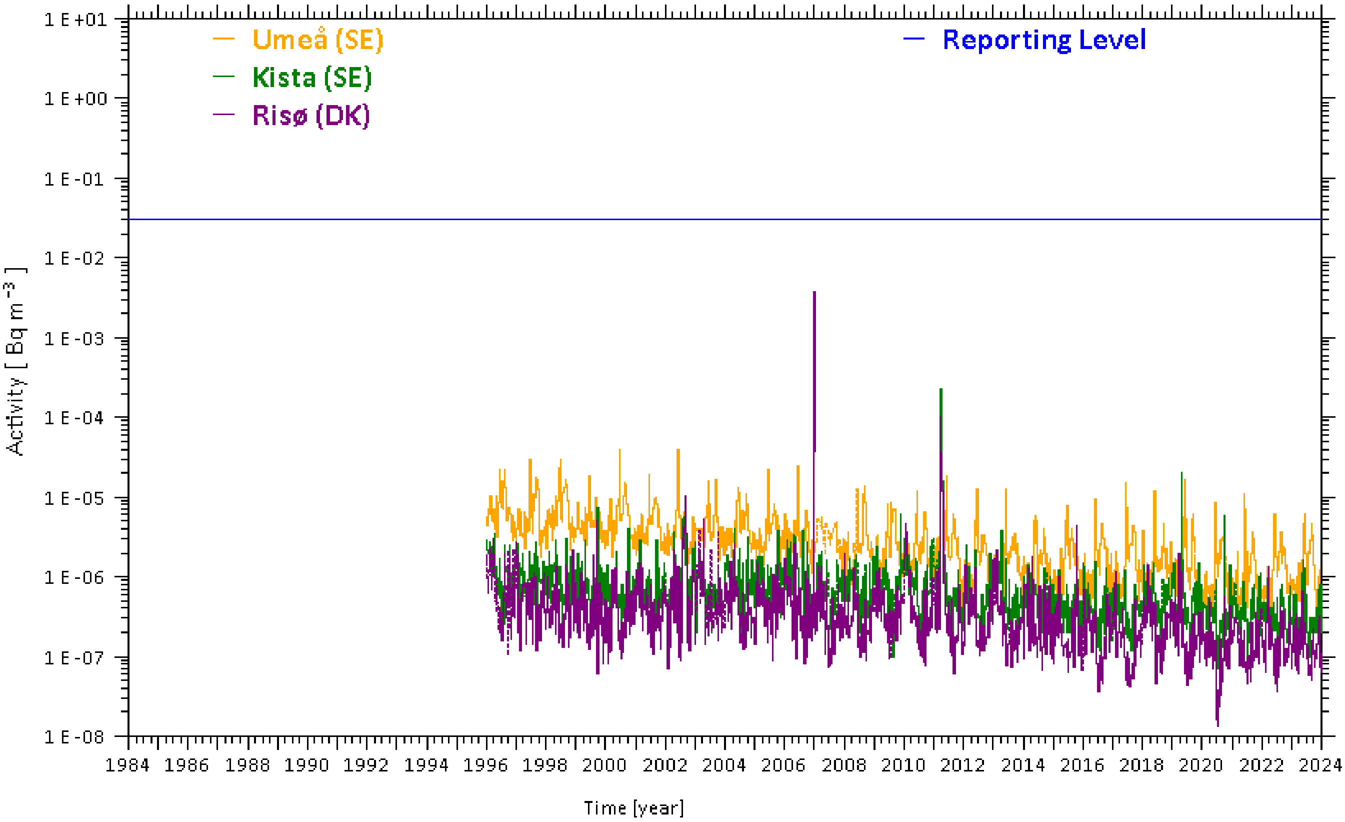


Fig. A19

Activity trends for ^{137}Cs in airborne particulates (Umeå, Kista and Risø)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A20

Activity trends for ^{137}Cs in airborne particulates (Harku, Utena and Baldone; radons)

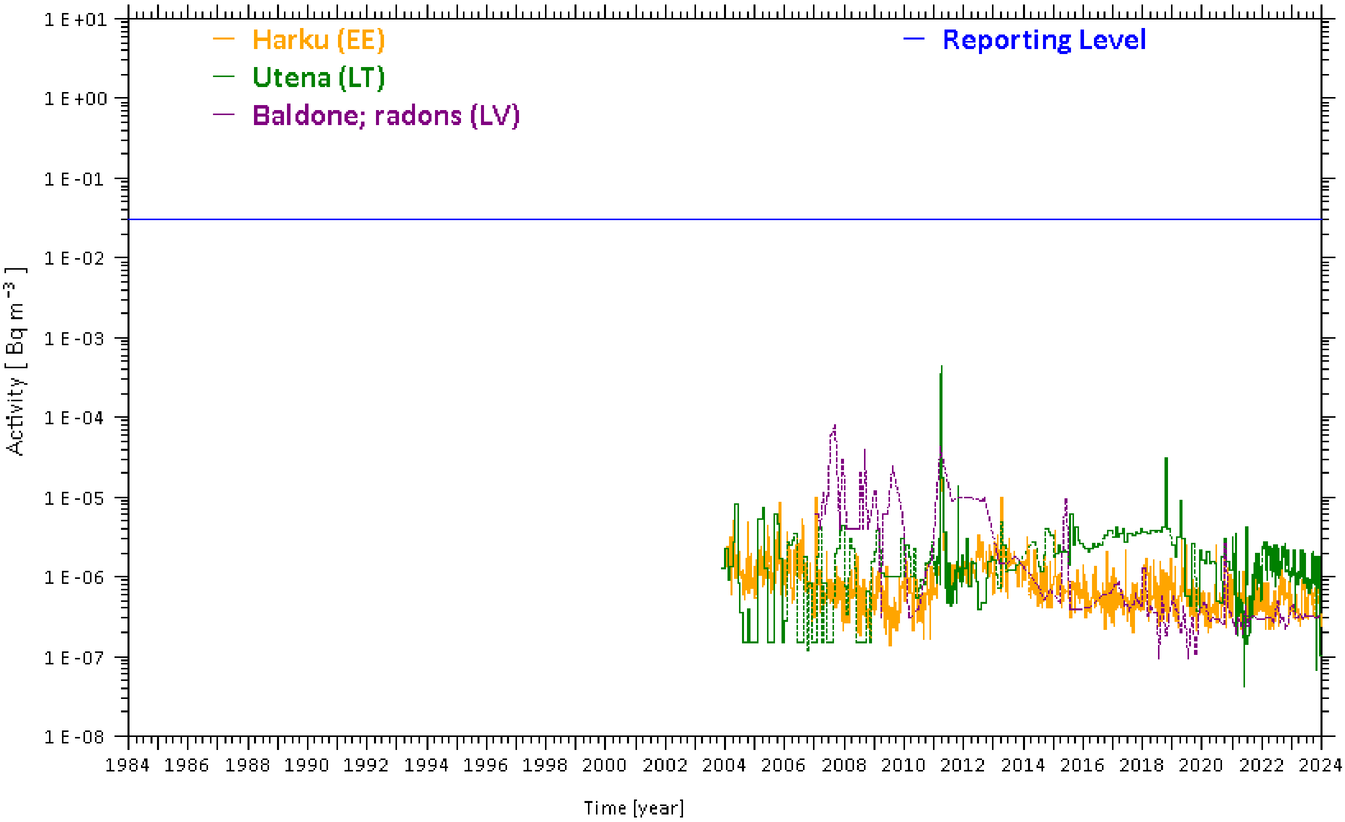
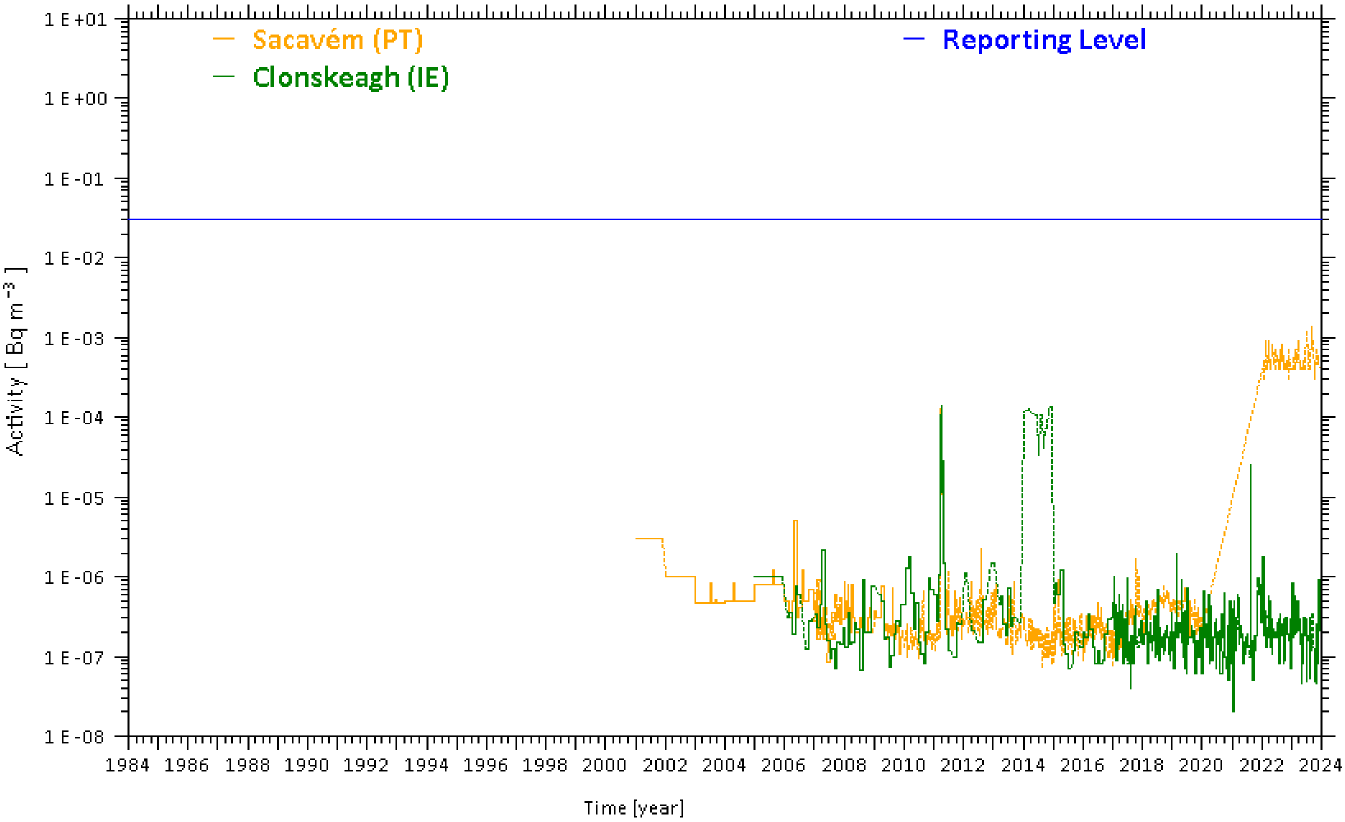


Fig. A21

Activity trends for ^{137}Cs in airborne particulates (Sacavém and Clonskeagh)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A22

Activity trends for ^{137}Cs in airborne particulates (Bilthoven, Brussels and Luxembourg)

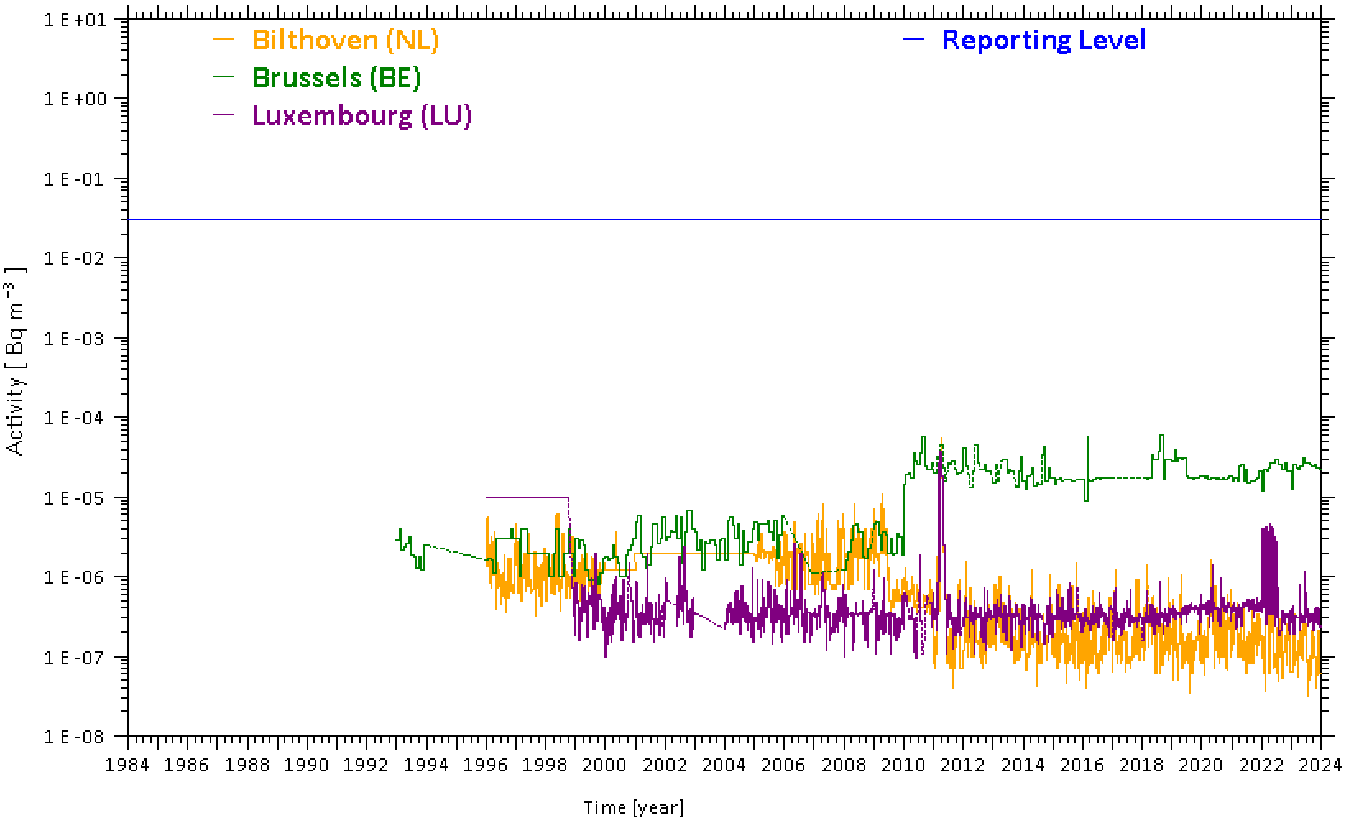
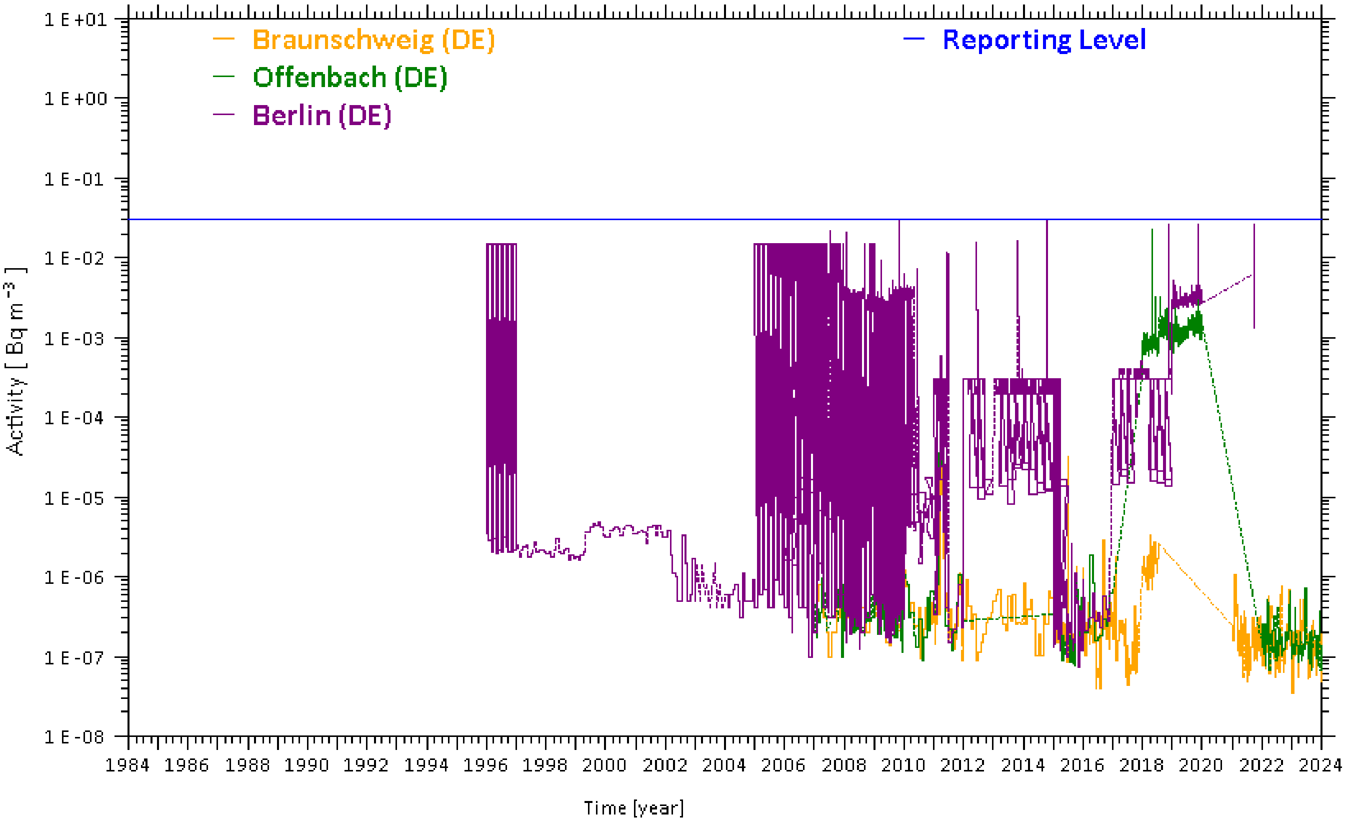


Fig. A23

Activity trends for ^{137}Cs in airborne particulates (Braunschweig, Offenbach and Berlin)



Activity trends

SAMPLE TYPE : **airborne particulates**

NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**

MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

Fig. A24

Activity trends for ^{137}Cs in airborne particulates (Warsaw, Cracow and Prague)

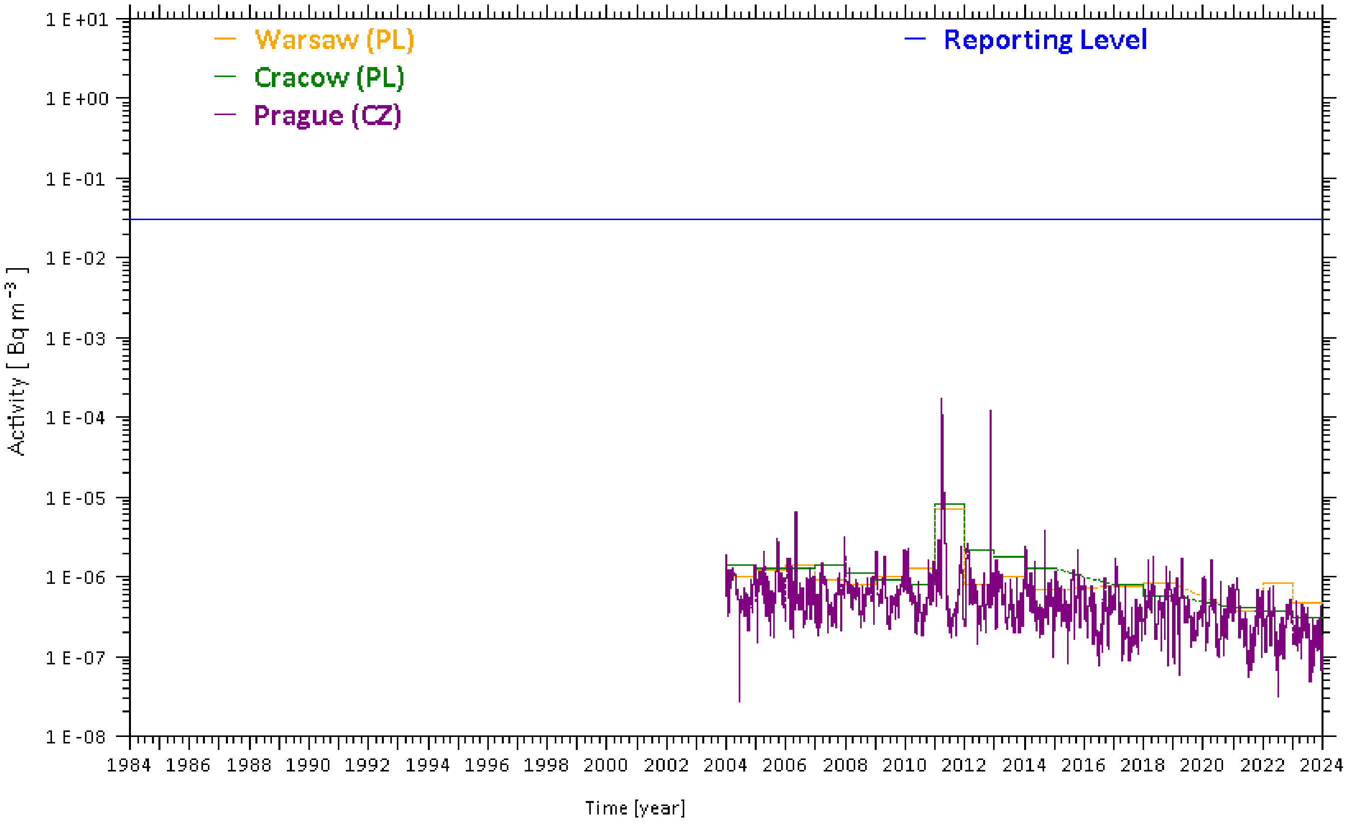
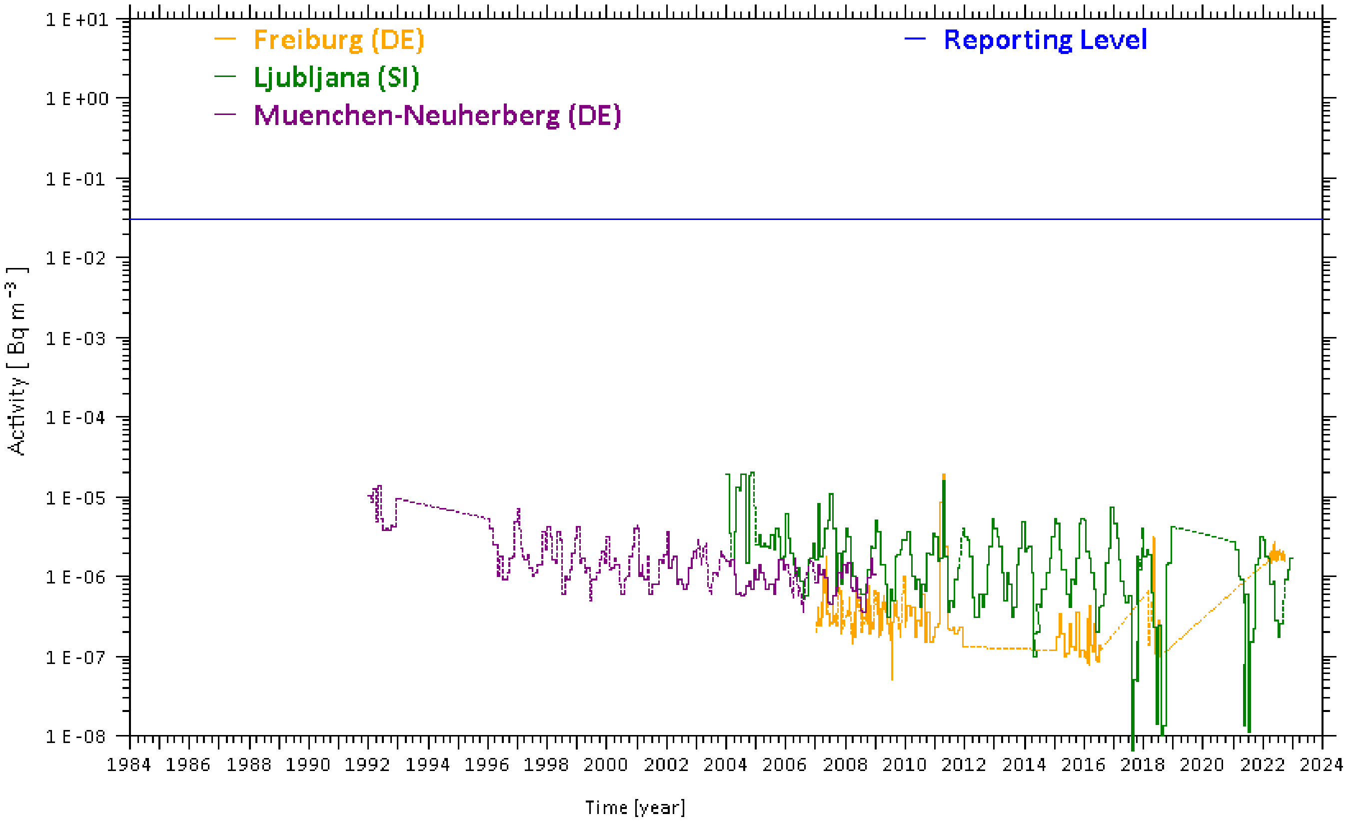


Fig. A25

Activity trends for ^{137}Cs in airborne particulates (Freiburg, Ljubljana and Muenchen-Neuherberg)



SAMPLE TYPE : airborne particulates
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq m^{-3} (Bq per cubic metre)

Fig. A26

Activity trends for ^{137}Cs in airborne particulates (Vienna-Ages, Bratislava and Budapest-Nrirr)

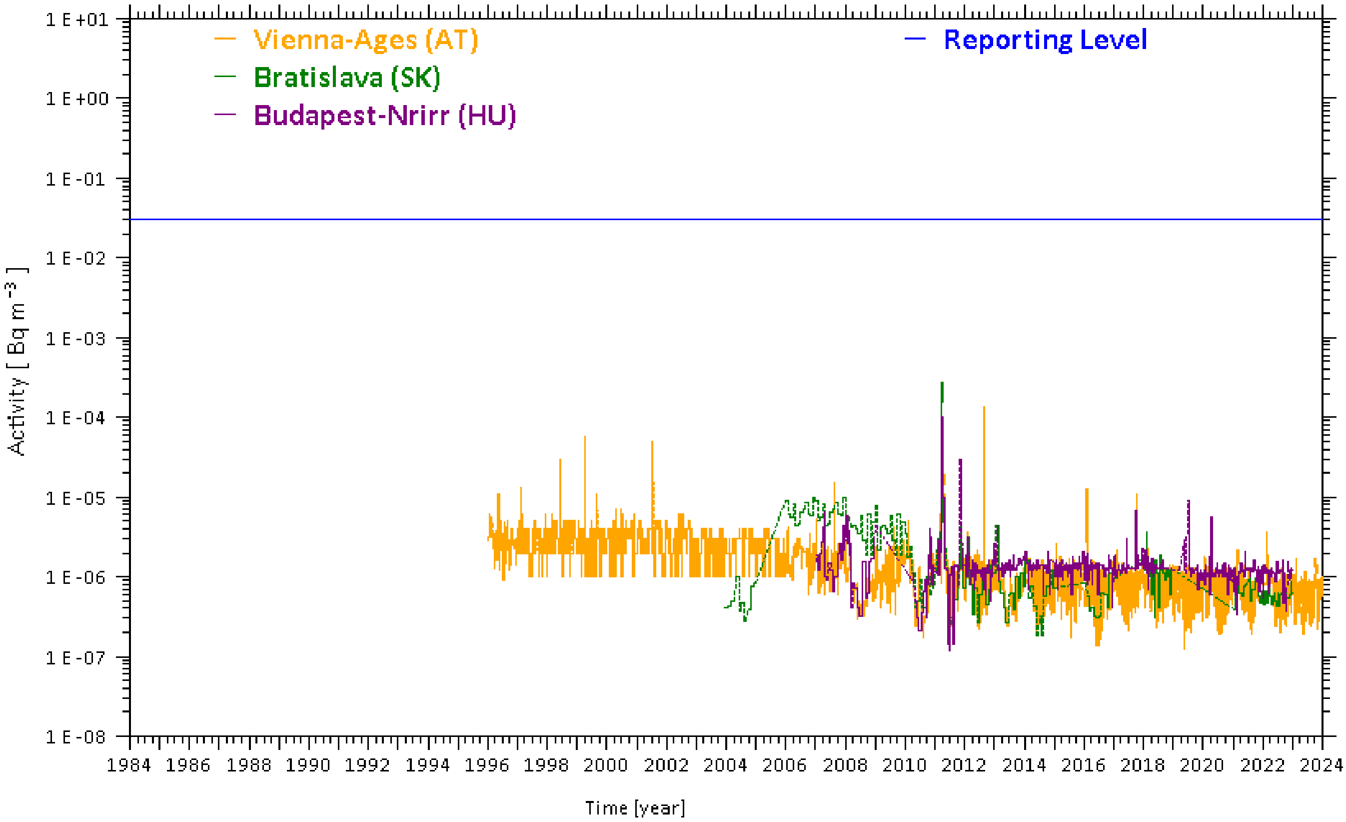
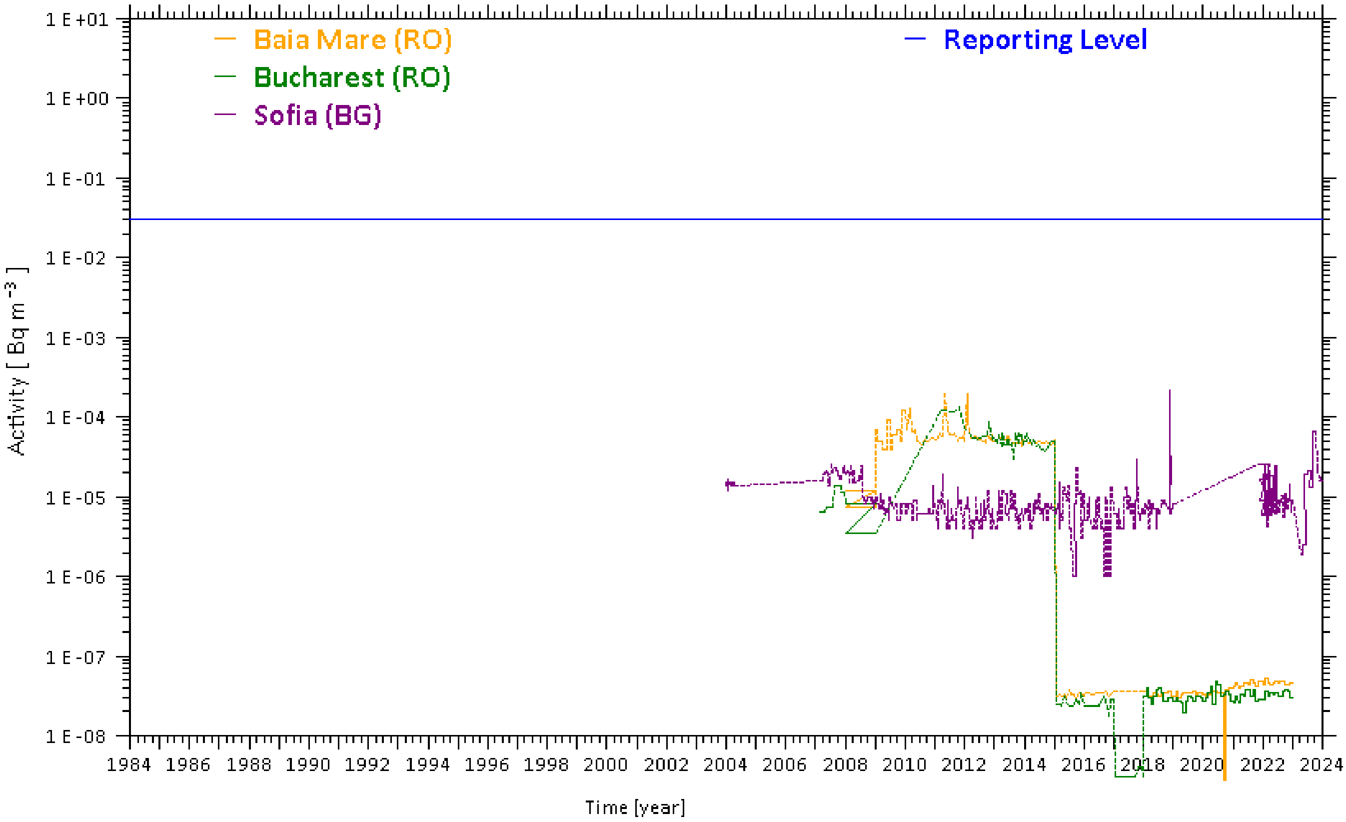


Fig. A27

Activity trends for ^{137}Cs in airborne particulates (Baia Mare, Bucharest and Sofia)



Activity trends

SAMPLE TYPE	:	**airborne particulates**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq m^{-3}** (Bq per cubic metre)

Fig. A28

Activity trends for ^{137}Cs in airborne particulates (Barcelona, Bilbao and Madrid)

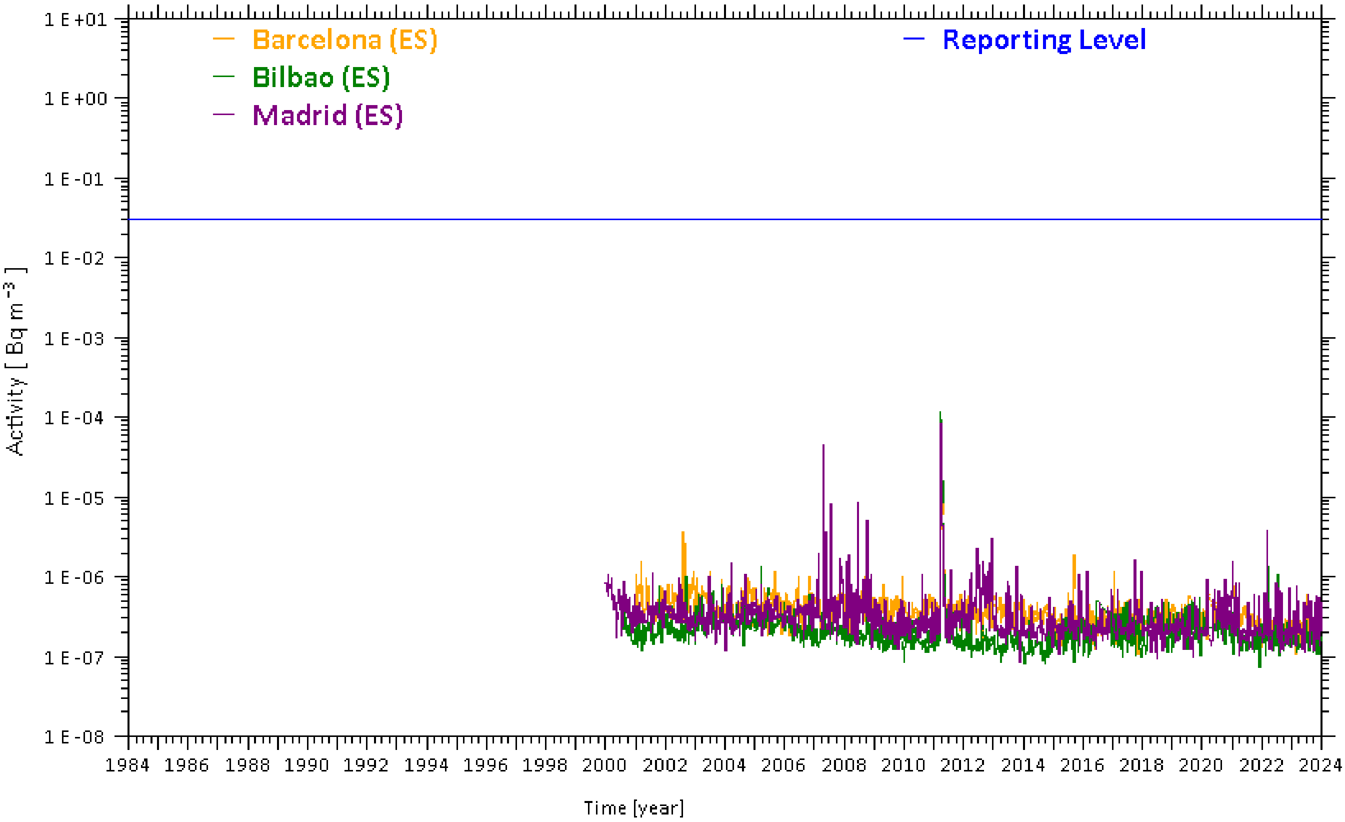
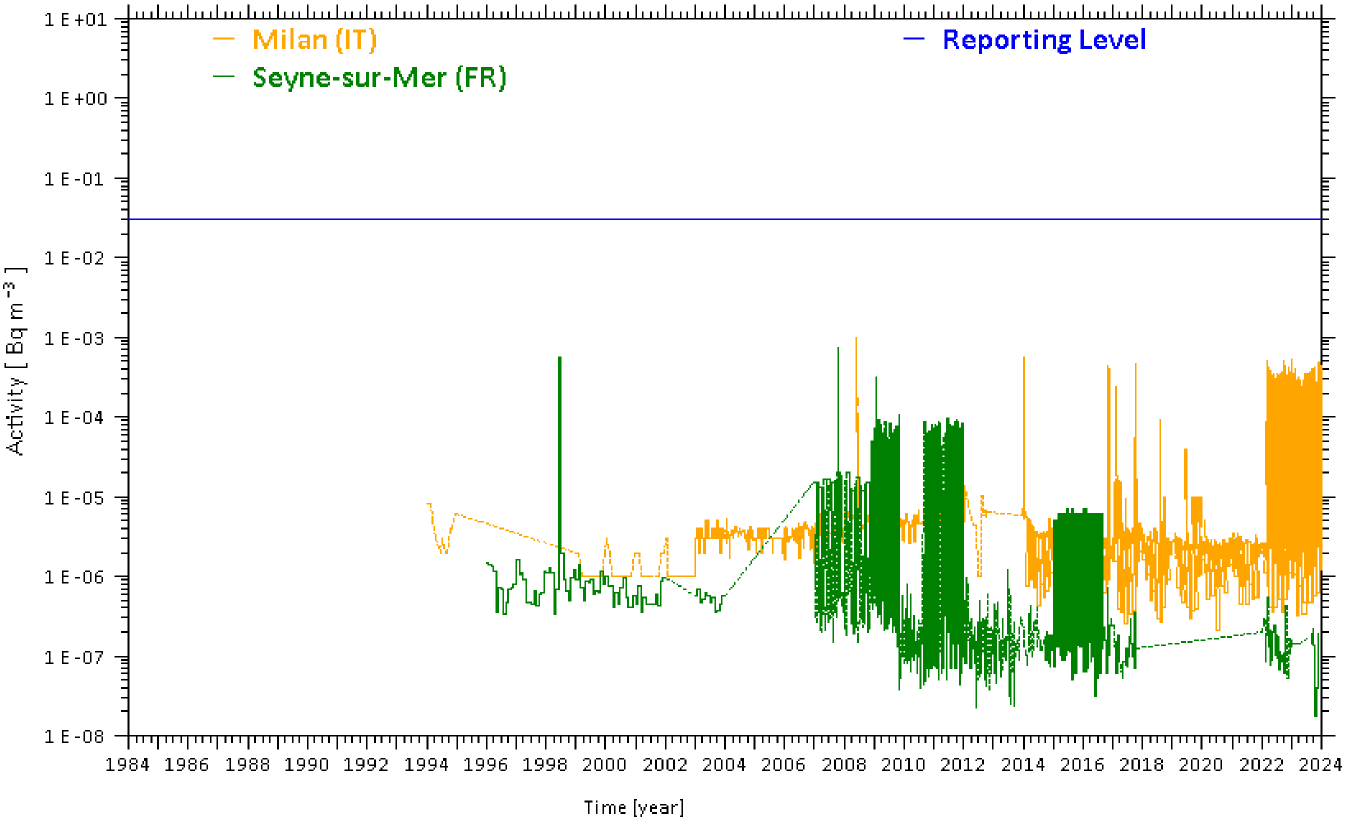


Fig. A29

Activity trends for ^{137}Cs in airborne particulates (Milan and Seyne-sur-Mer)



Activity trends

SAMPLE TYPE : **airborne particulates**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq m^{-3}** (Bq per cubic metre)

SPARSE

Fig. A30

Activity trends for ^{137}Cs in airborne particulates (La Laguna-Tenerife and Sevilla)

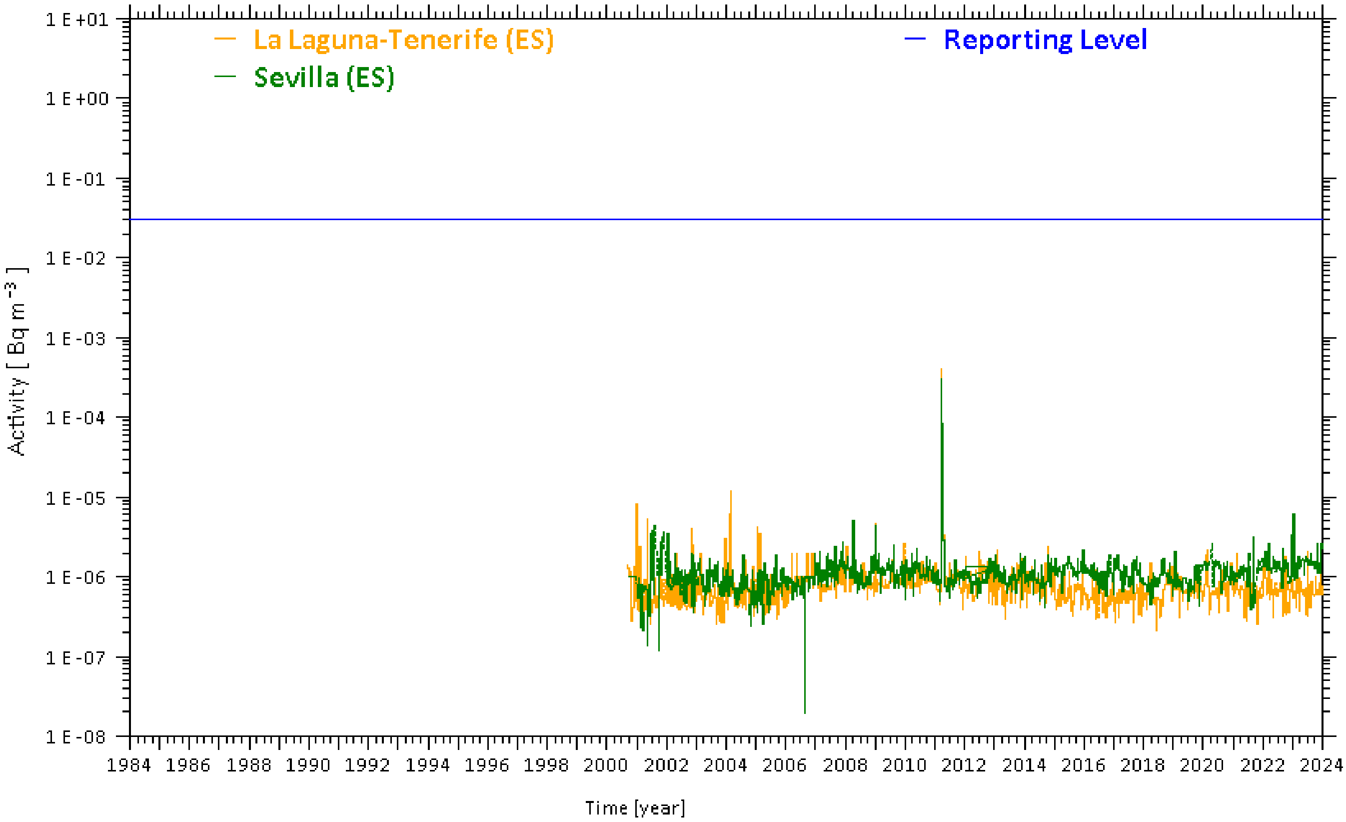


Fig. A31

Activity trends for ^{137}Cs in airborne particulates (Bengħajsa and Nicosia)

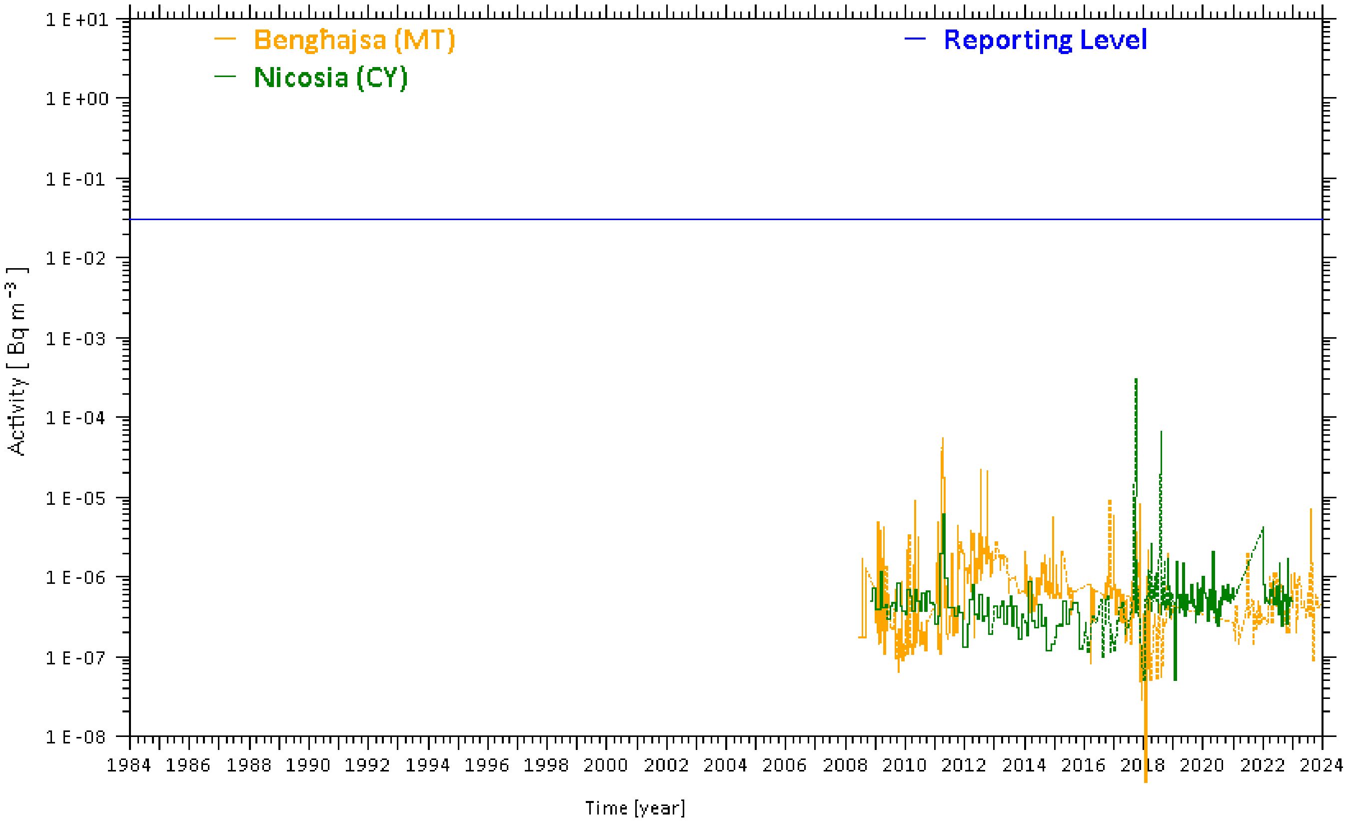
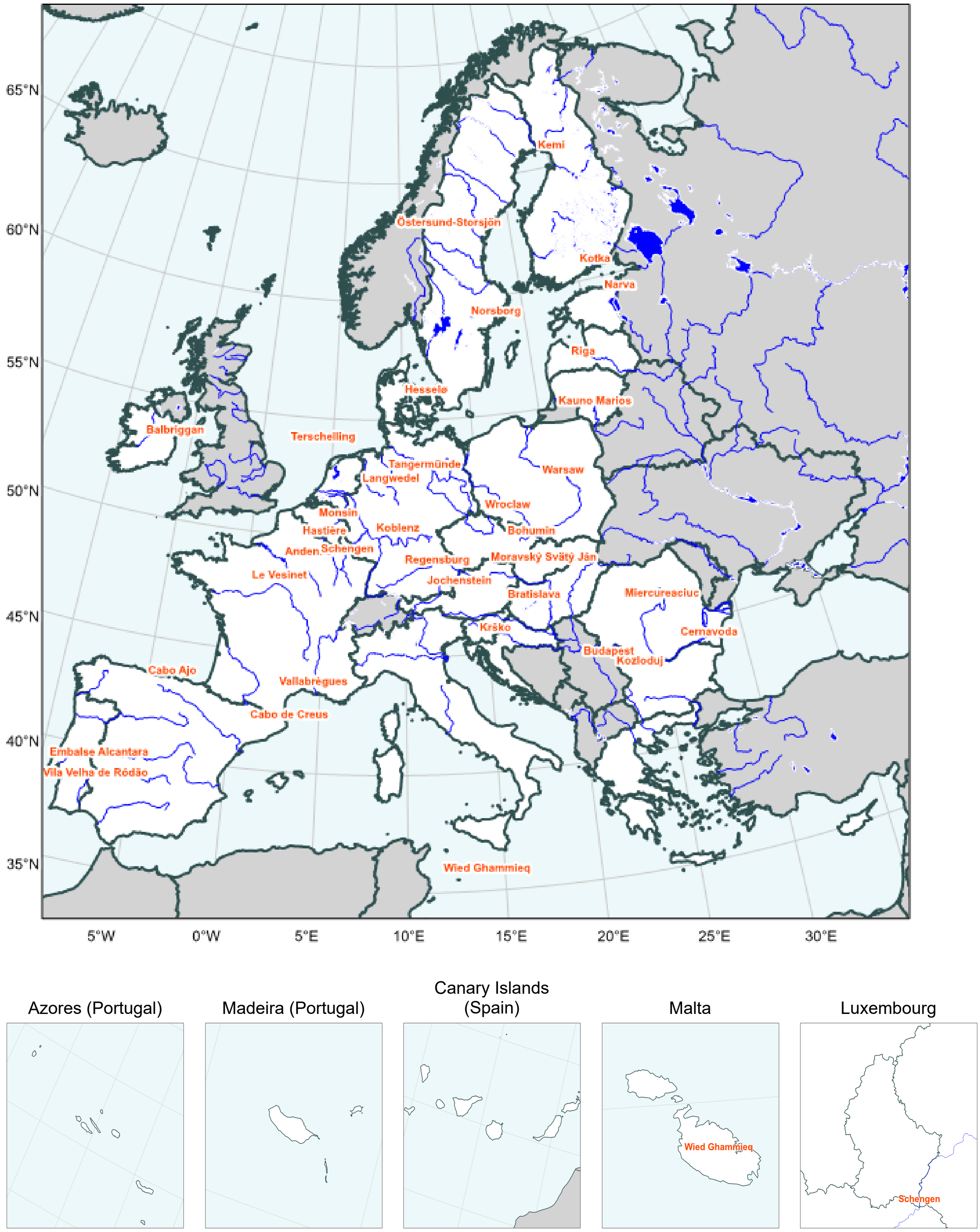


Fig. S35

Sampling locations for ^{137}Cs in surface water considered in Figures S36 – S49



Activity trends

SAMPLE TYPE : **surface water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. S36

Activity trends for ^{137}Cs in surface water (Norsborg and Östersund-Storsjön)

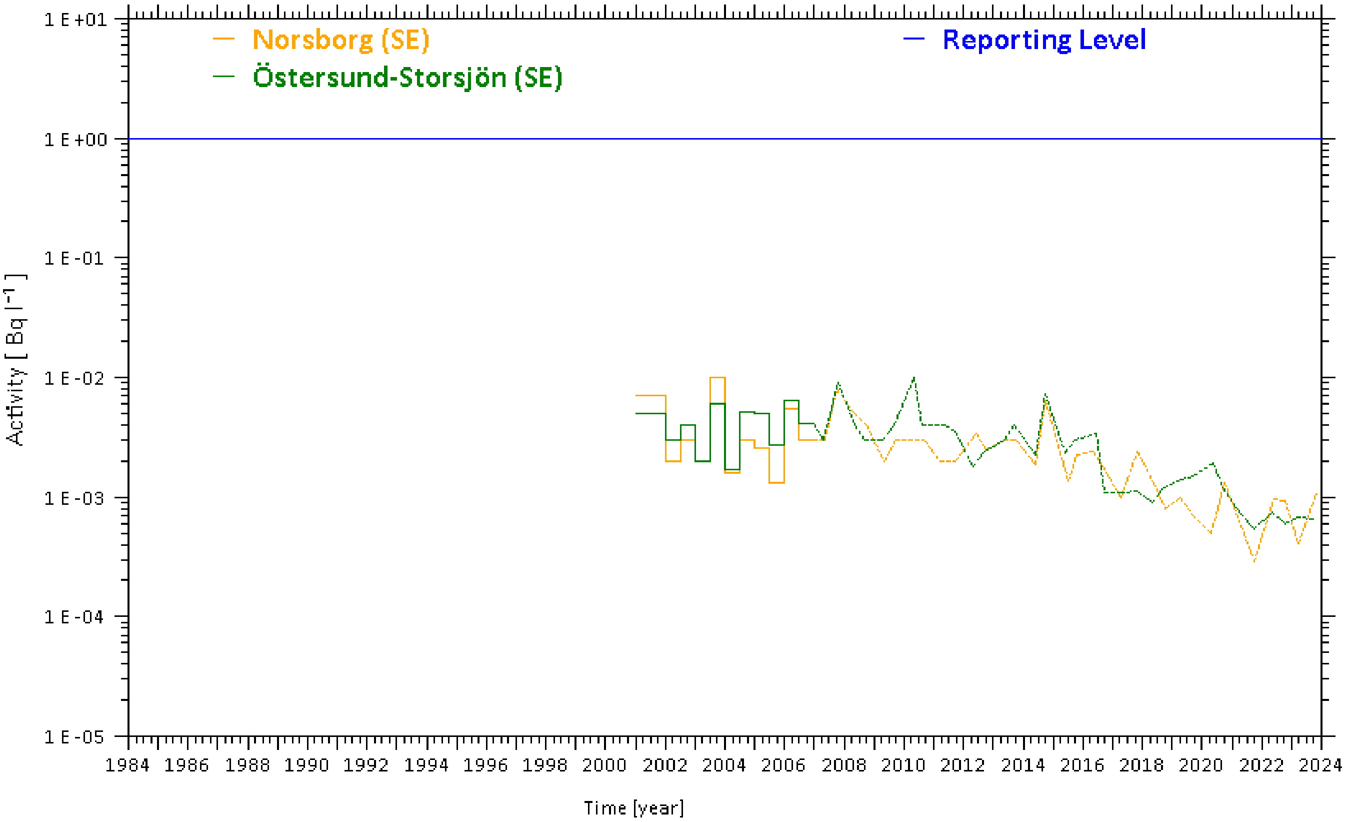
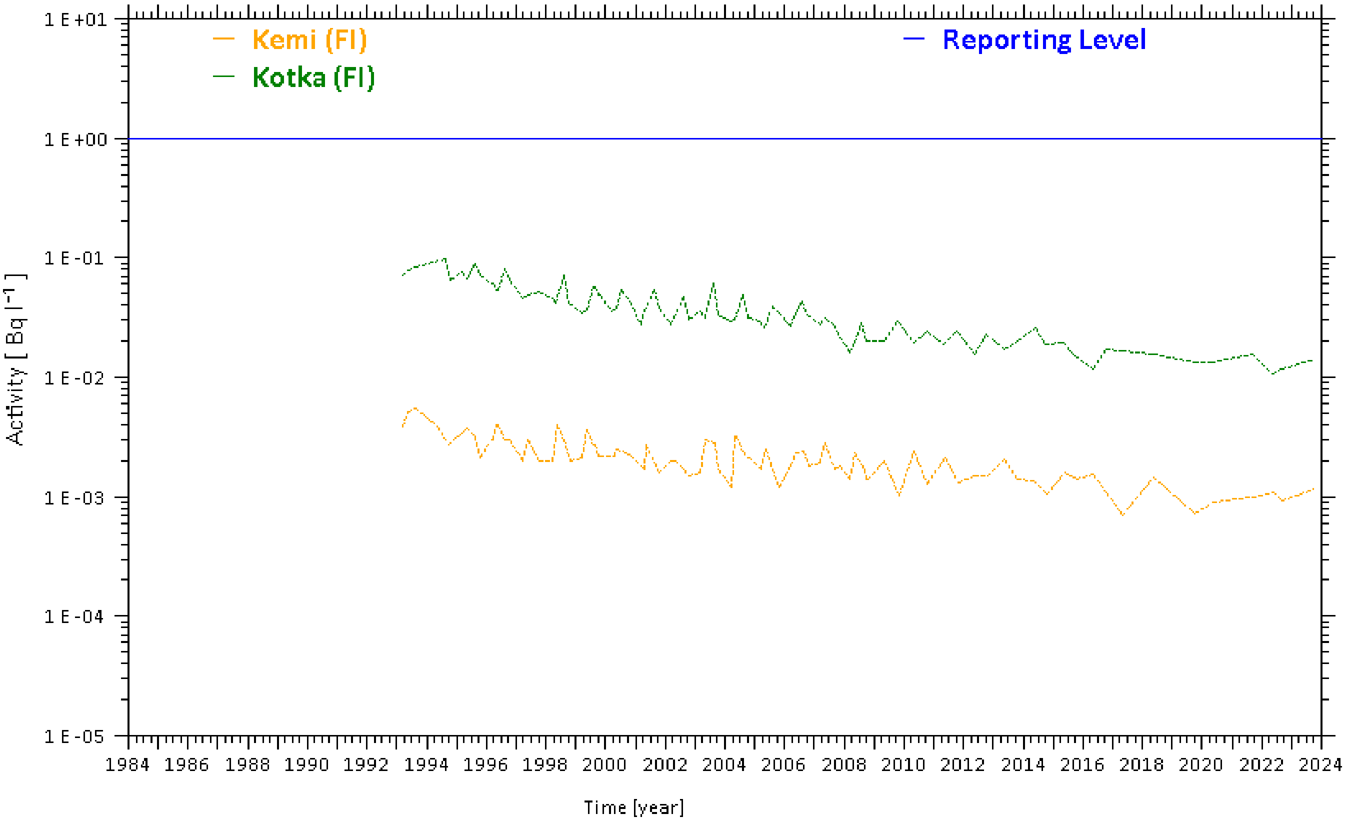


Fig. S37

Activity trends for ^{137}Cs in surface water (Kemi and Kotka)



Activity trends

SAMPLE TYPE : **surface water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

SPARSE

Fig. S38

Activity trends for ^{137}Cs in surface water (Narva, Riga and Kauno Marios)

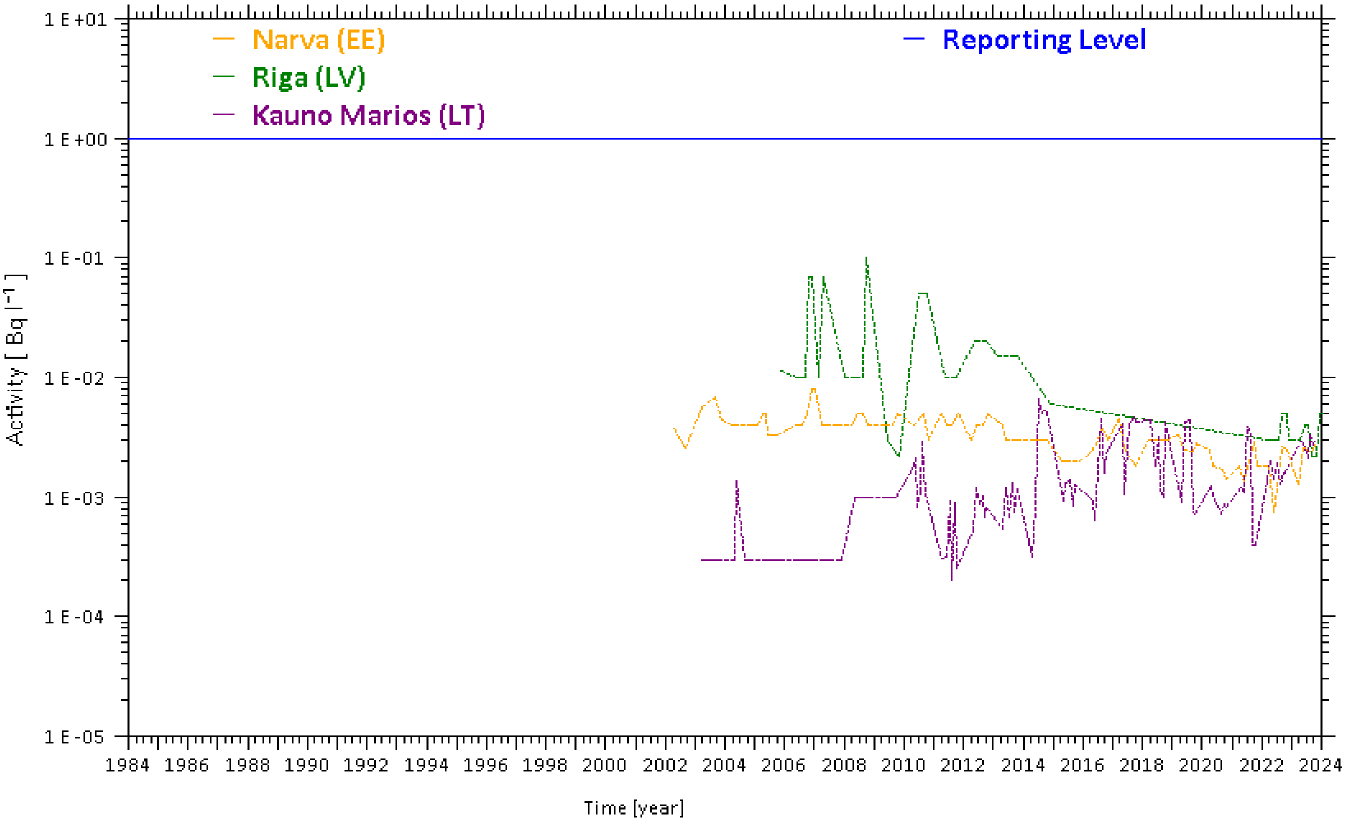
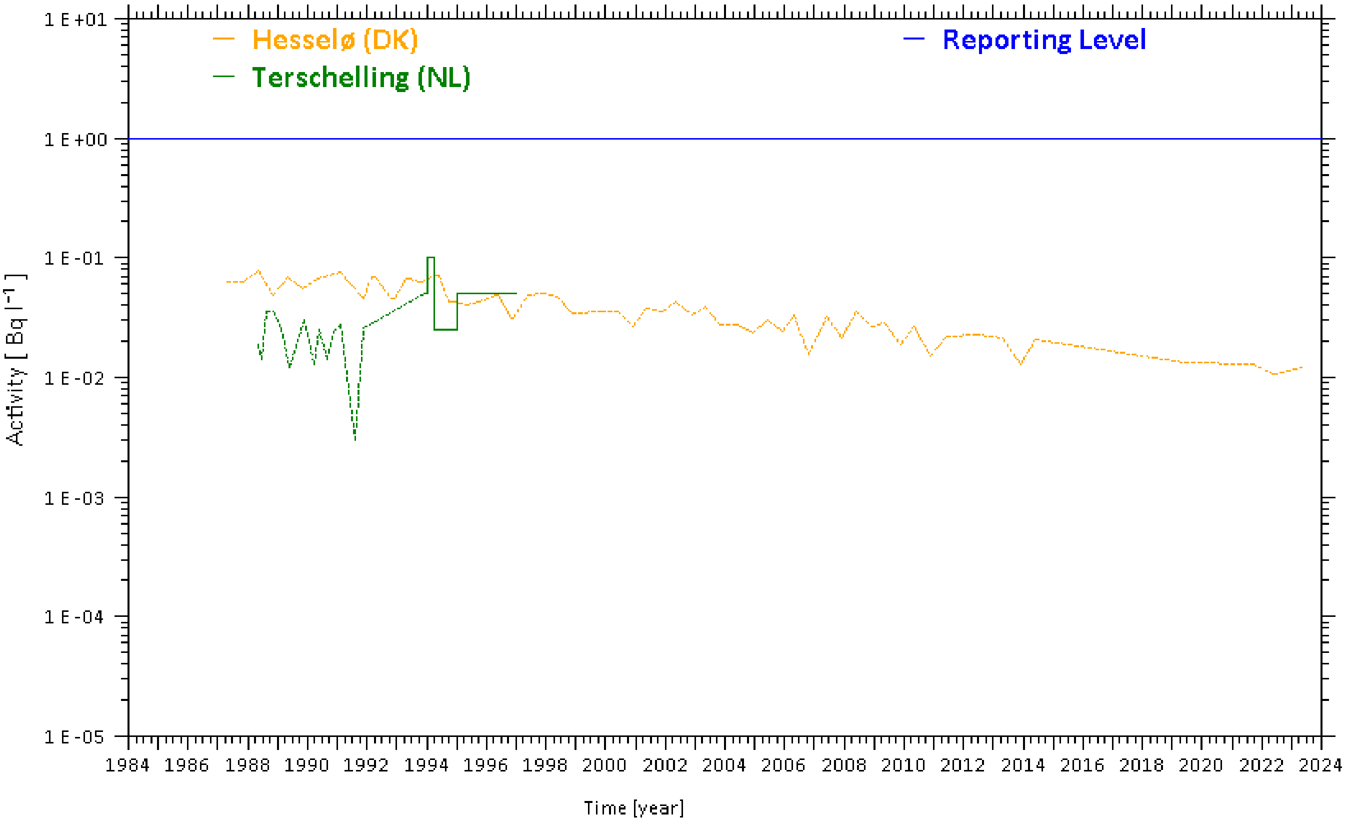


Fig. S39

Activity trends for ^{137}Cs in surface water (Hesselø and Terschelling)



Activity trends

SAMPLE TYPE : **surface water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. S40

Activity trends for ^{137}Cs in surface water (Langwedel, Koblenz and Tangermünde)

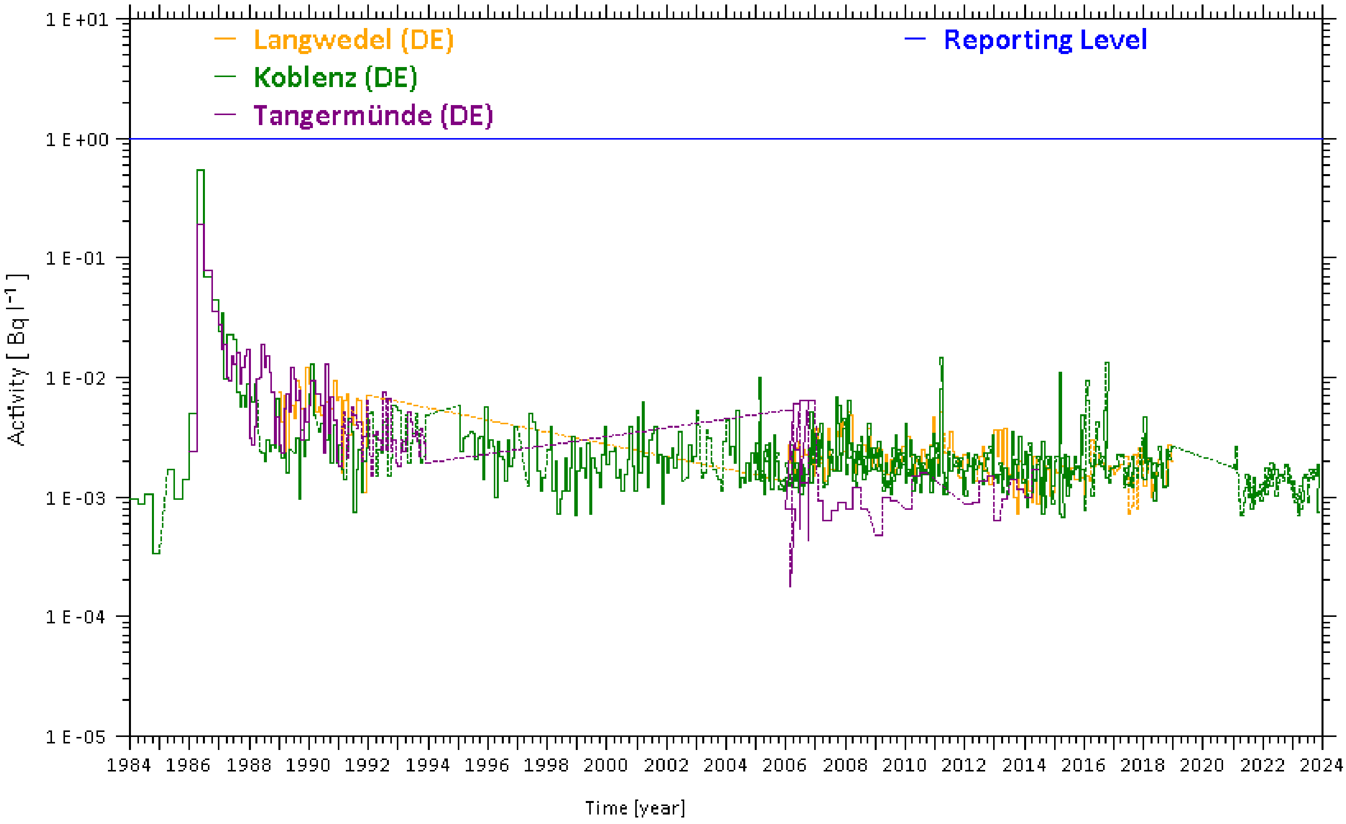
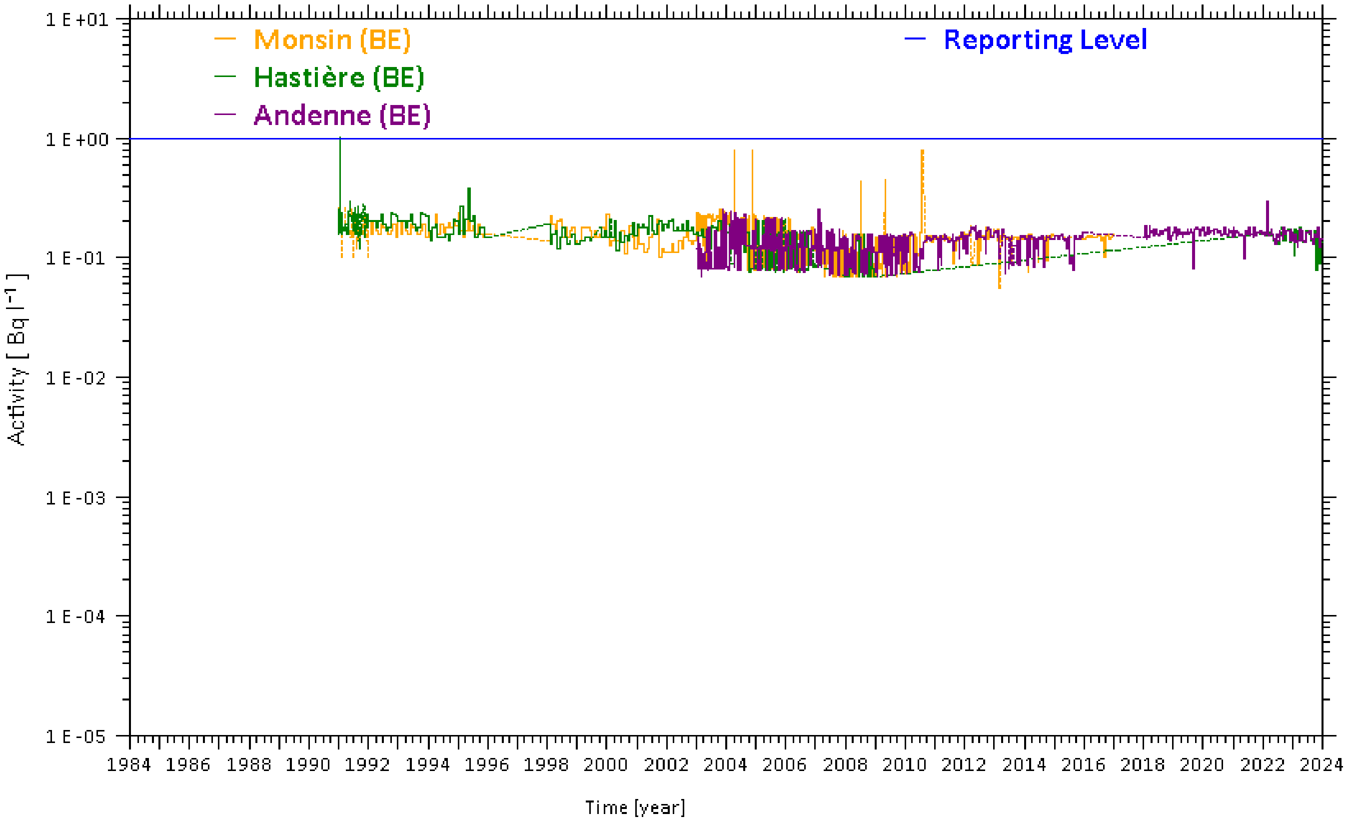


Fig. S41

Activity trends for ^{137}Cs in surface water (Monsin, Hastière and Andenne)



SAMPLE TYPE : **surface water**

NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**

MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. S42

Activity trends for ^{137}Cs in surface water (Warsaw, Wroclaw and Bohumin)

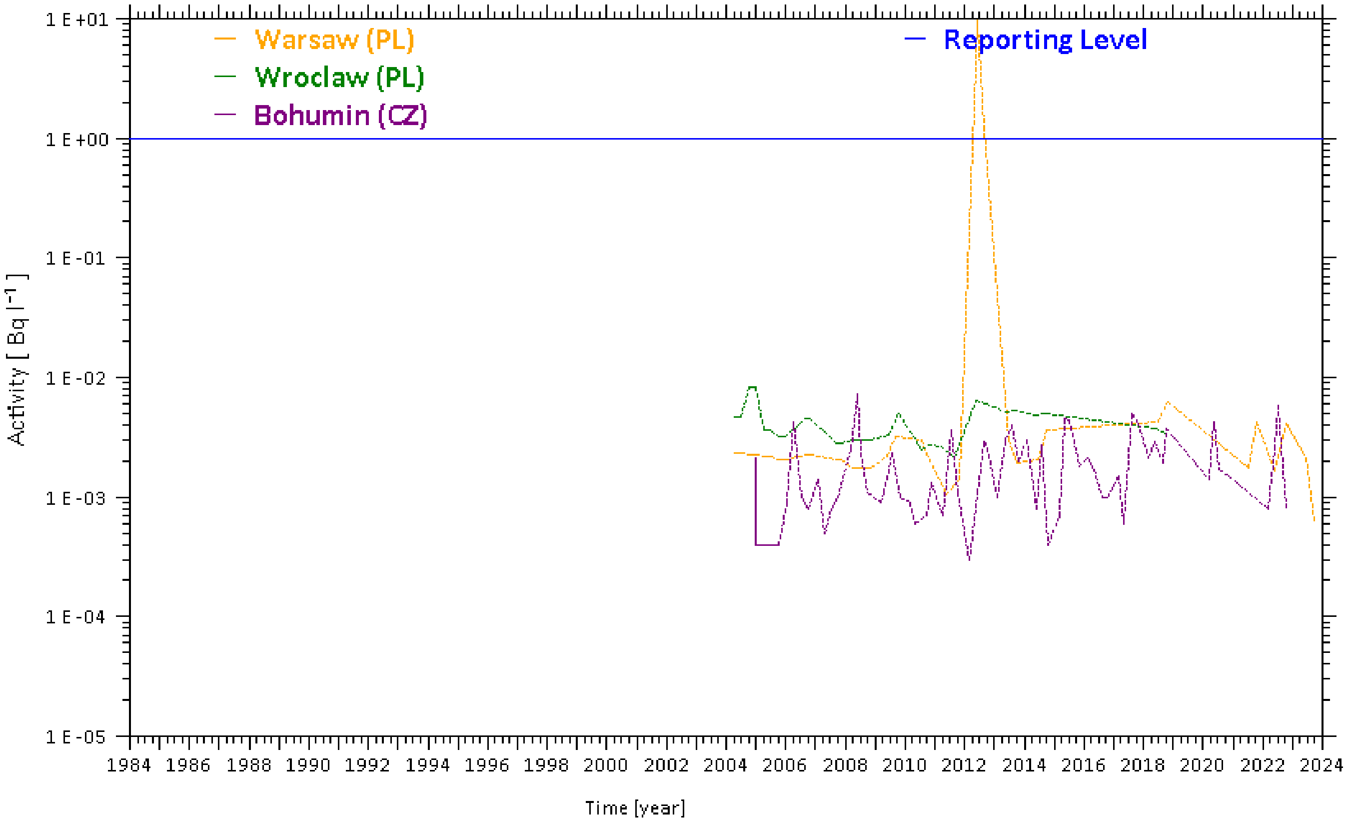
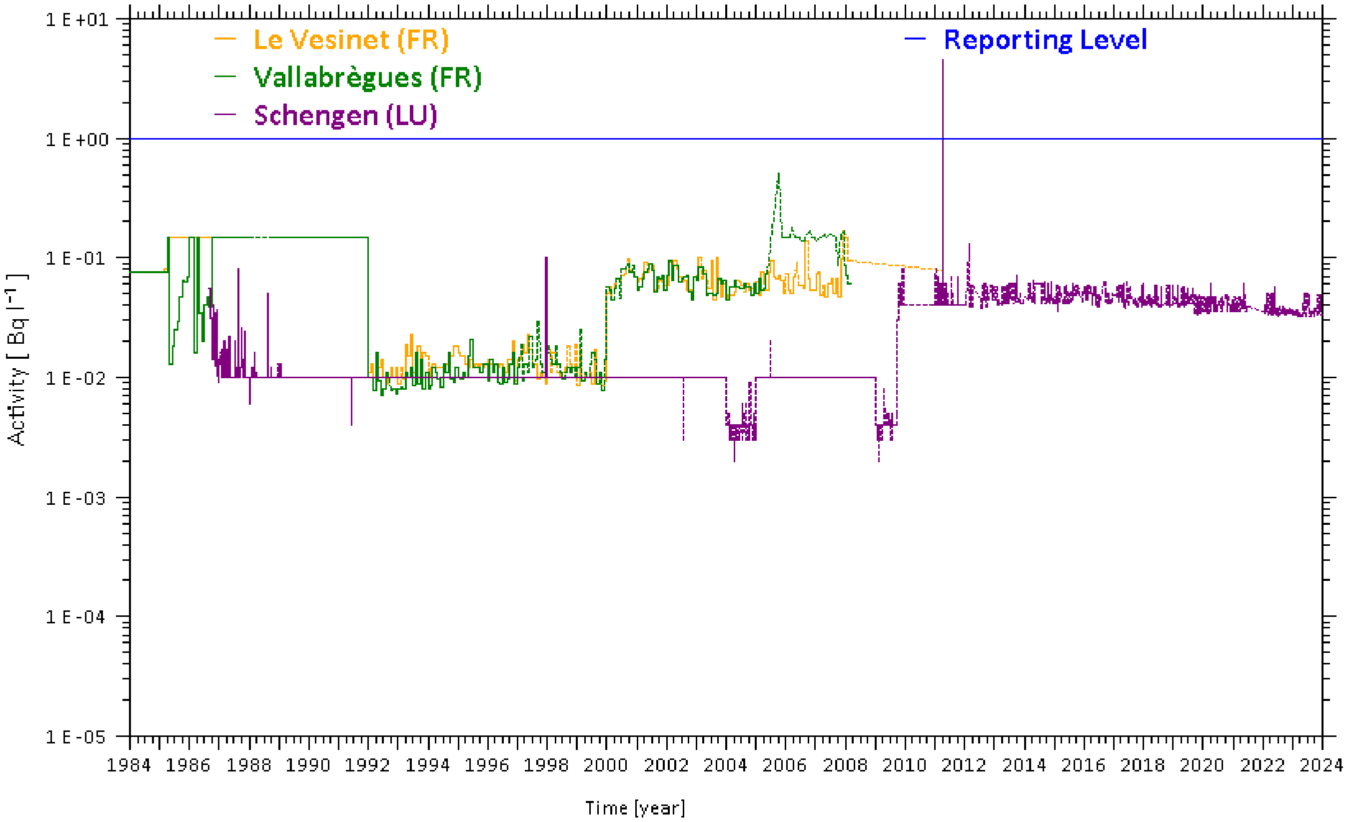


Fig. S43

Activity trends for ^{137}Cs in surface water (Le Vesinet, Vallabrègues and Schengen)



Activity trends

SAMPLE TYPE	:	surface water
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l $^{-1}$ (Bq per litre)

Fig. S44

Activity trends for ^{137}Cs in surface water (Balbriggan and Vila Velha de Ródão)

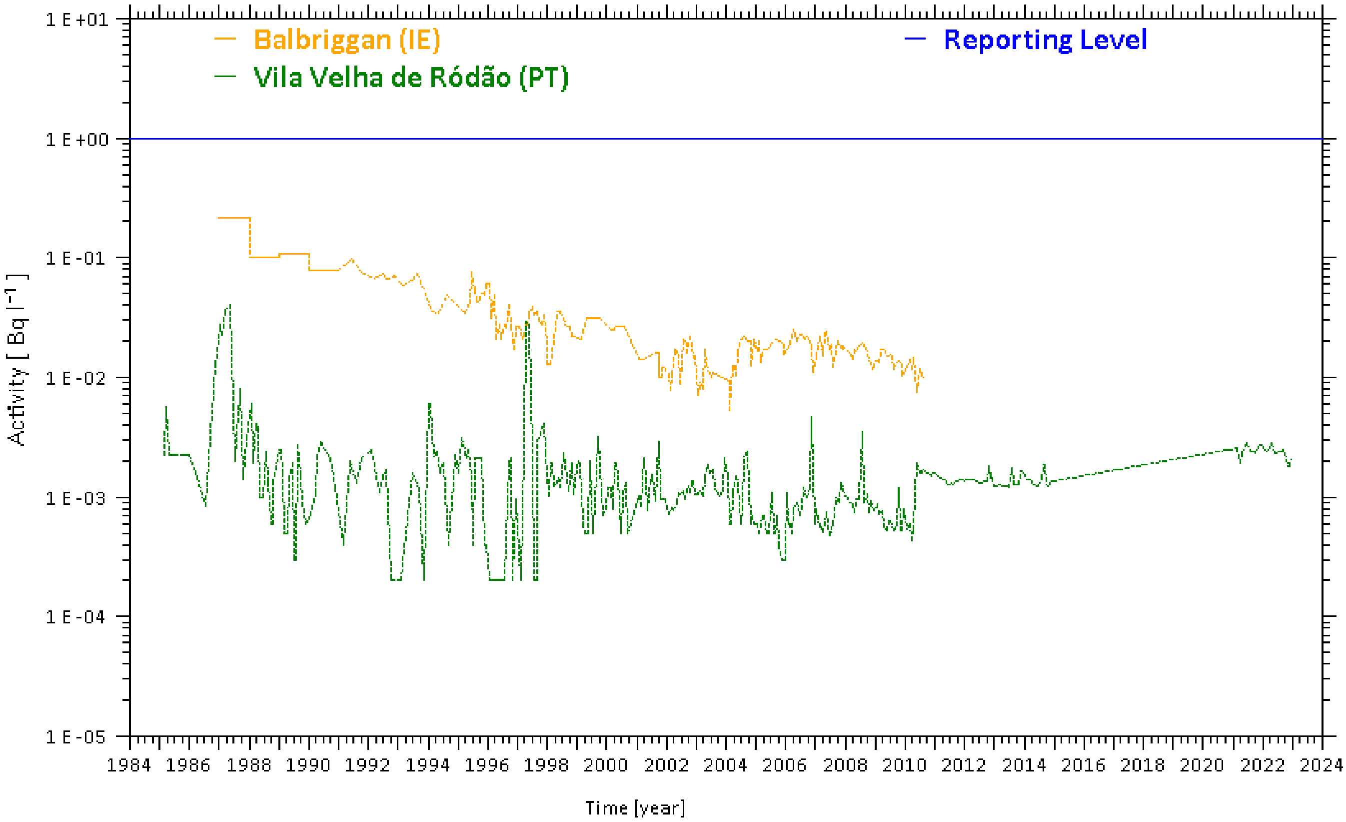
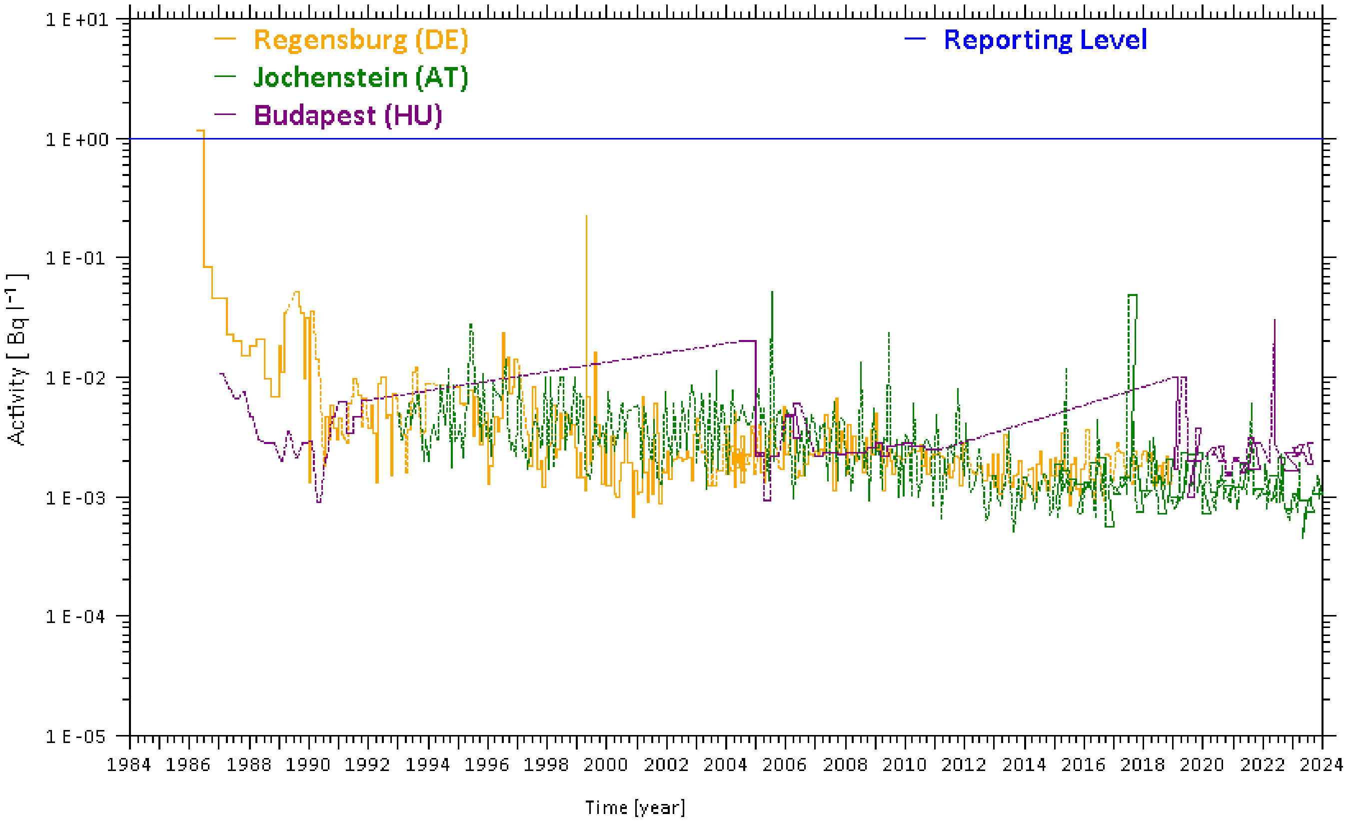


Fig. S45

Activity trends for ^{137}Cs in surface water (Regensburg, Jochenstein and Budapest)



SAMPLE TYPE : surface water

NUCLIDE CATEGORY : caesium-137 (^{137}Cs)

MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. S46

Activity trends for ^{137}Cs in surface water (Bratislava and Moravský Svätý Ján)

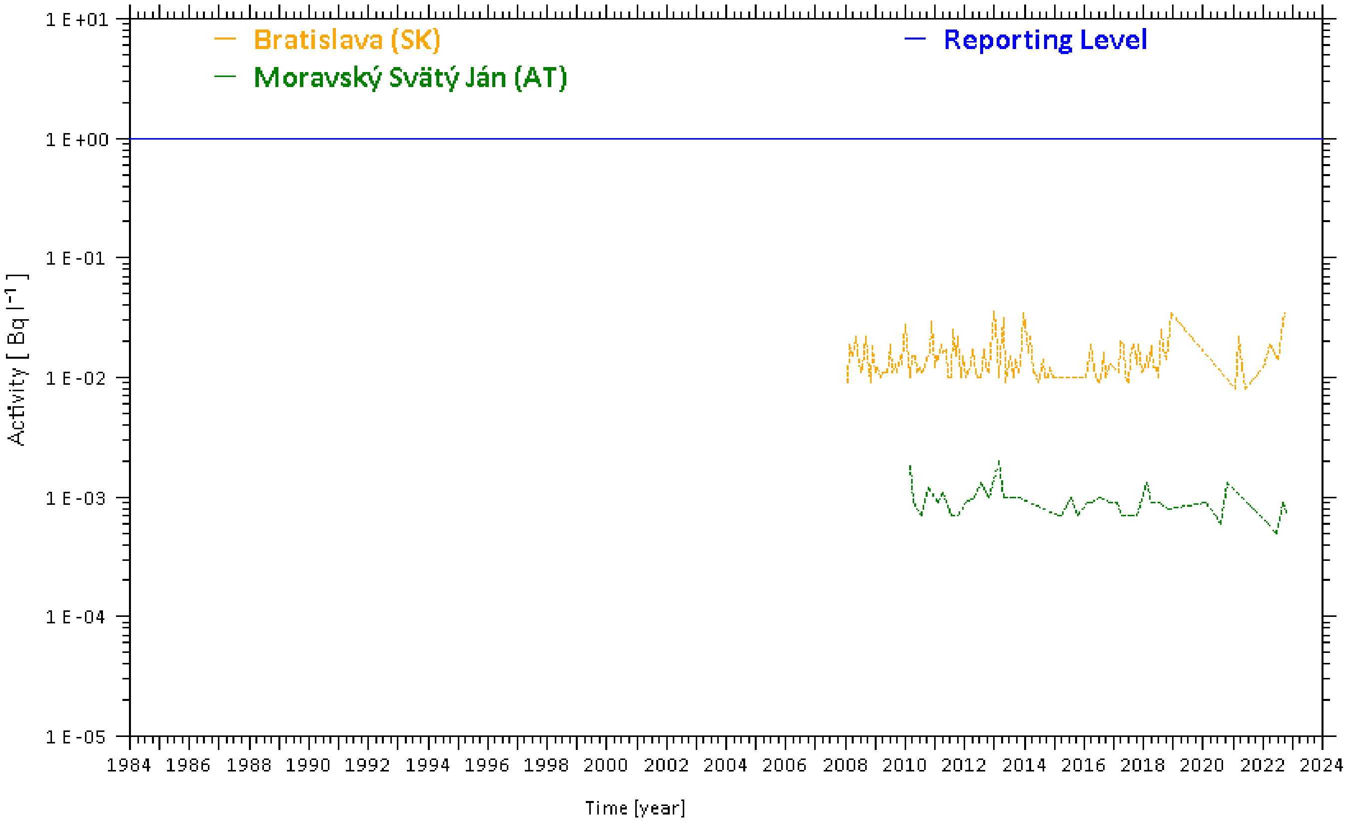


Fig. S47

Activity trends for ^{137}Cs in surface water (Kozloduj, Wied Ghammieq and Krško)

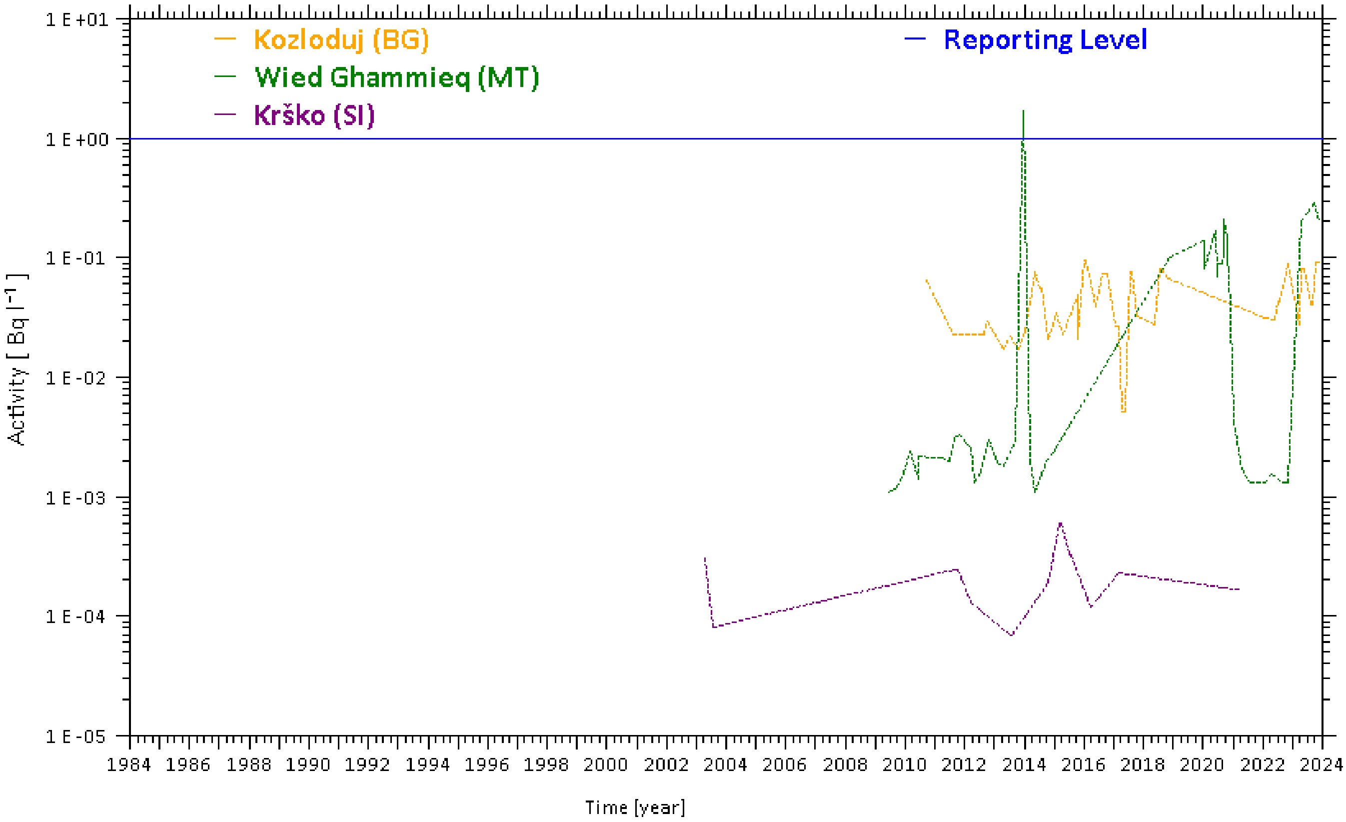


Fig. S48

Activity trends for ^{137}Cs in surface water (Cabo Ajo, Cabo de Creus and Embalse Alcantara)

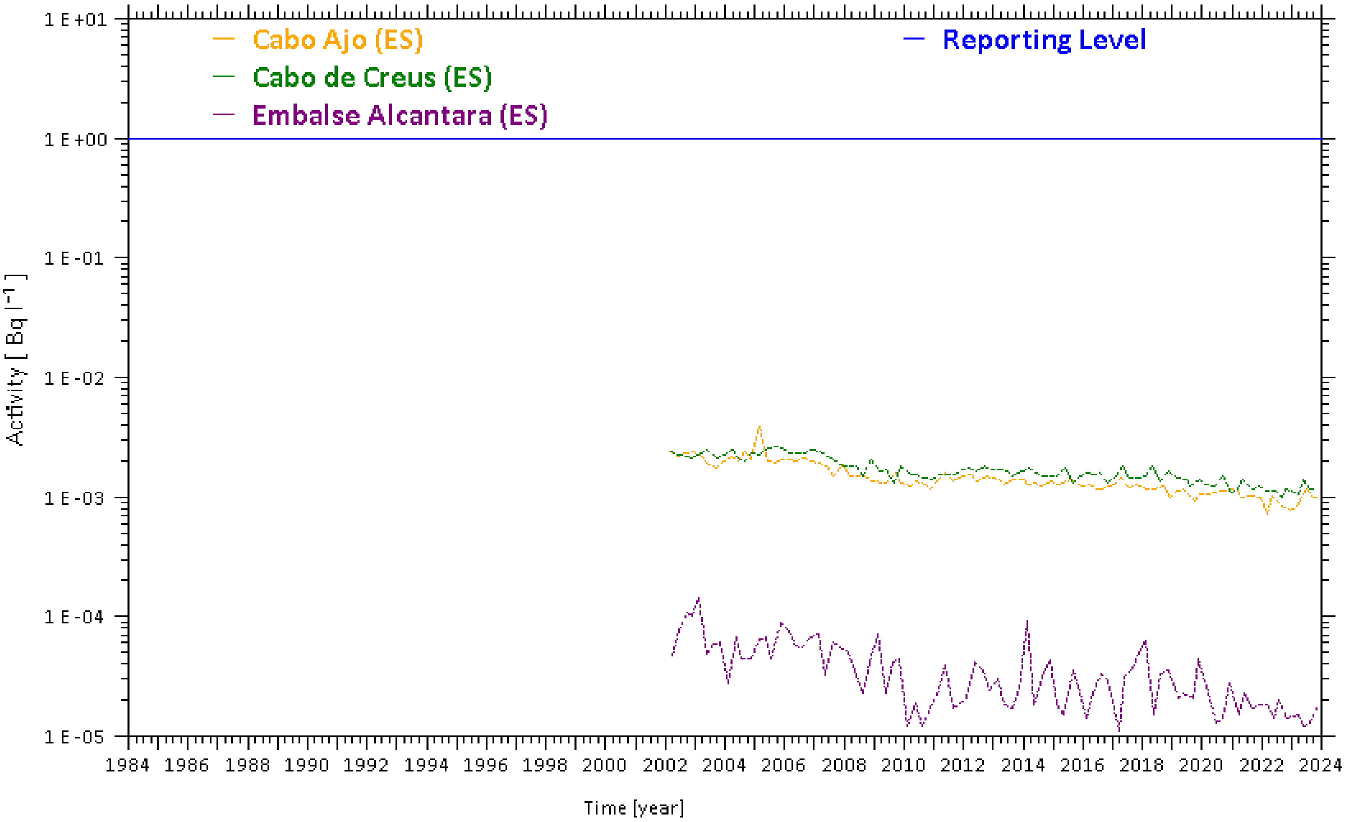


Fig. S49

Activity trends for ^{137}Cs in surface water (Cernavoda and Miercureaciuc)

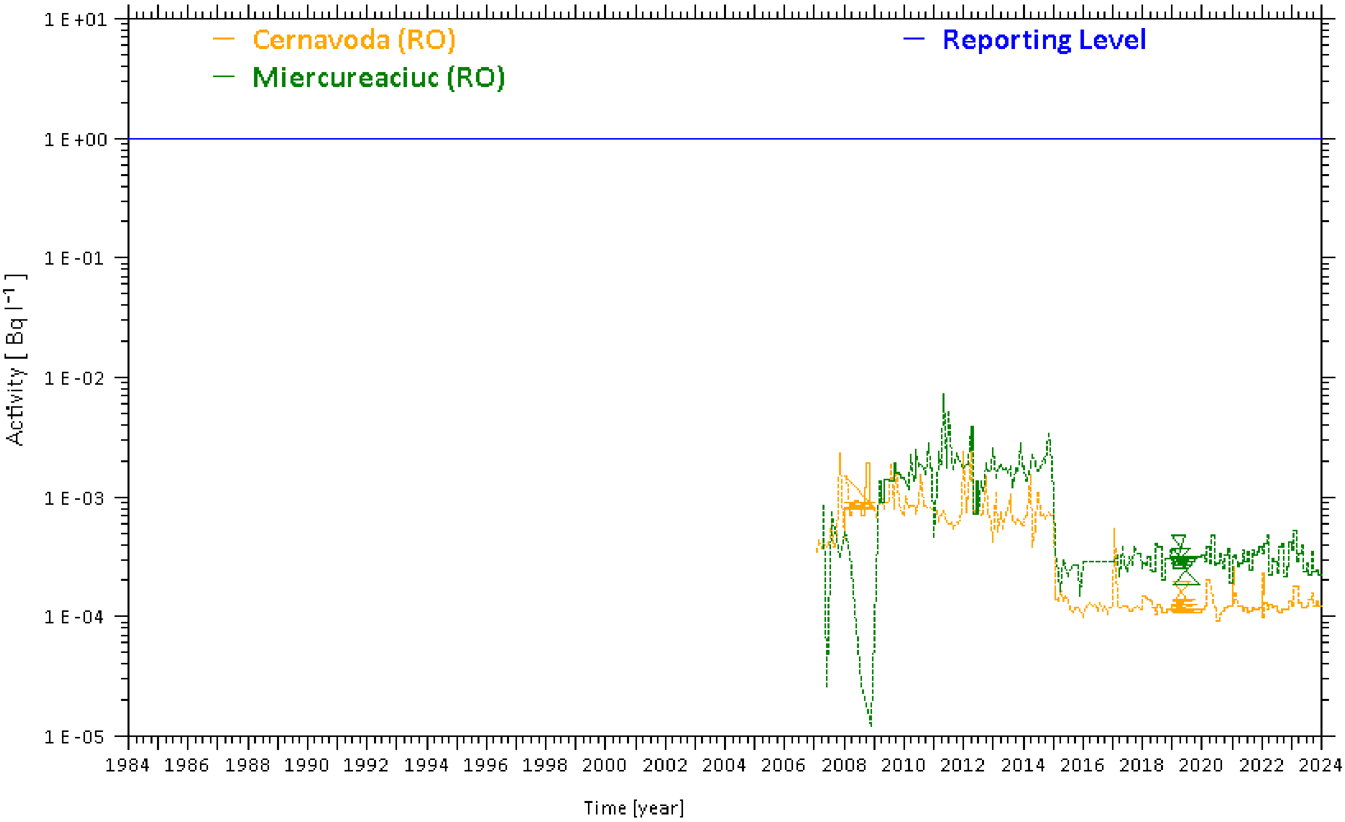
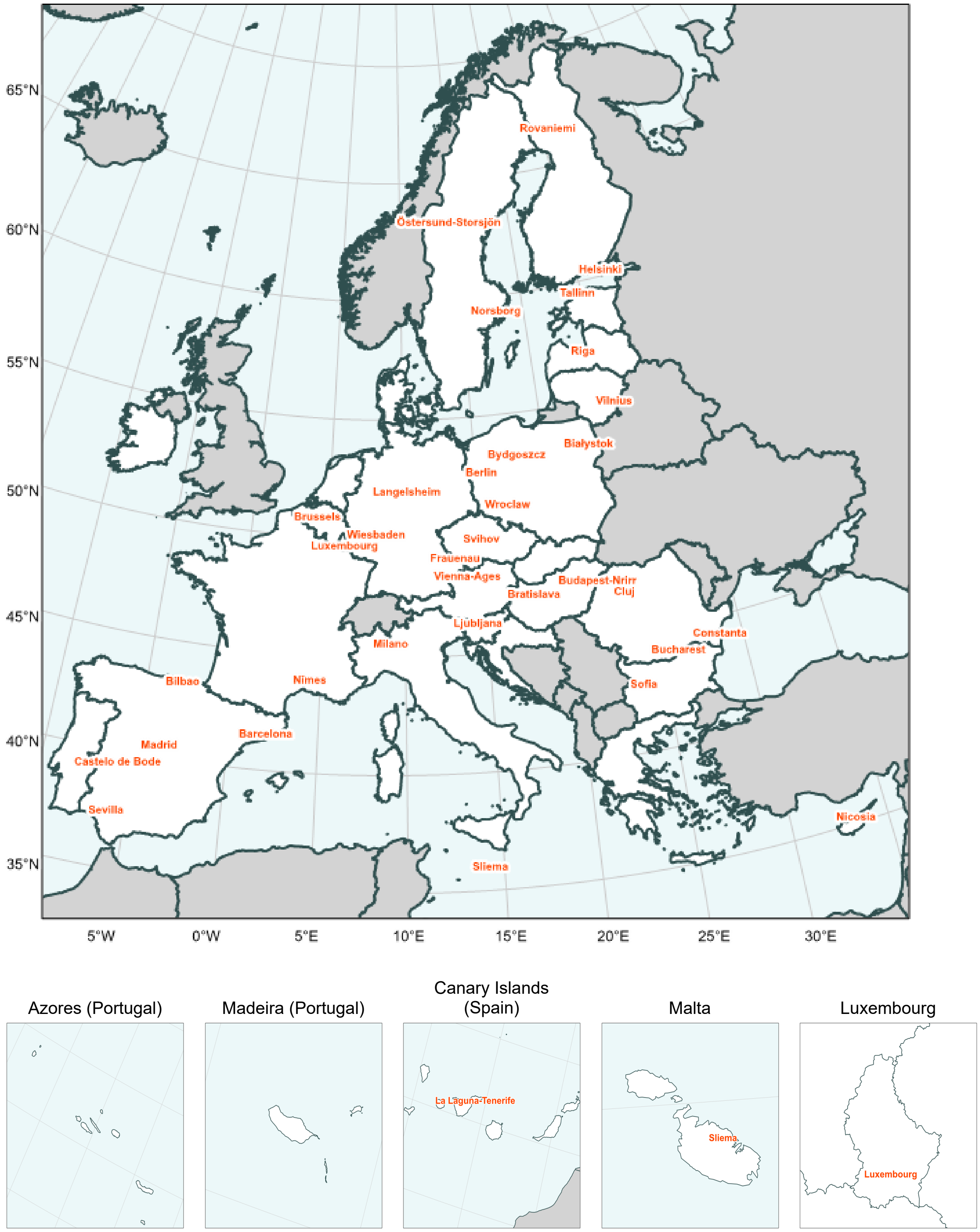


Fig. W4

Sampling locations for ^{3}H, ^{90}Sr and ^{137}Cs in drinking water considered in Figures W5 – W38



SPARSE

Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **tritium (^{3}H)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W5

Activity trends for ^{3}H in drinking water (Rovaniemi and Helsinki)

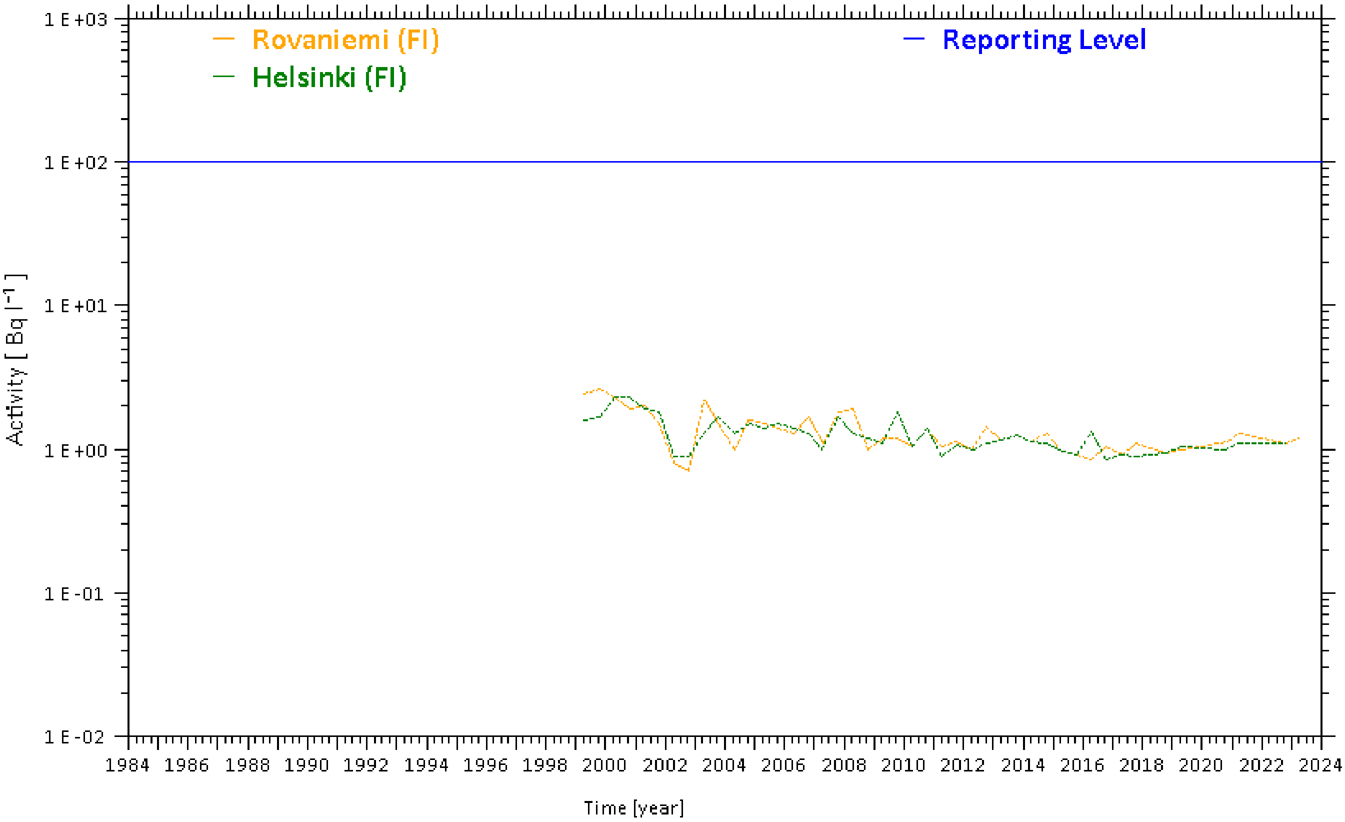
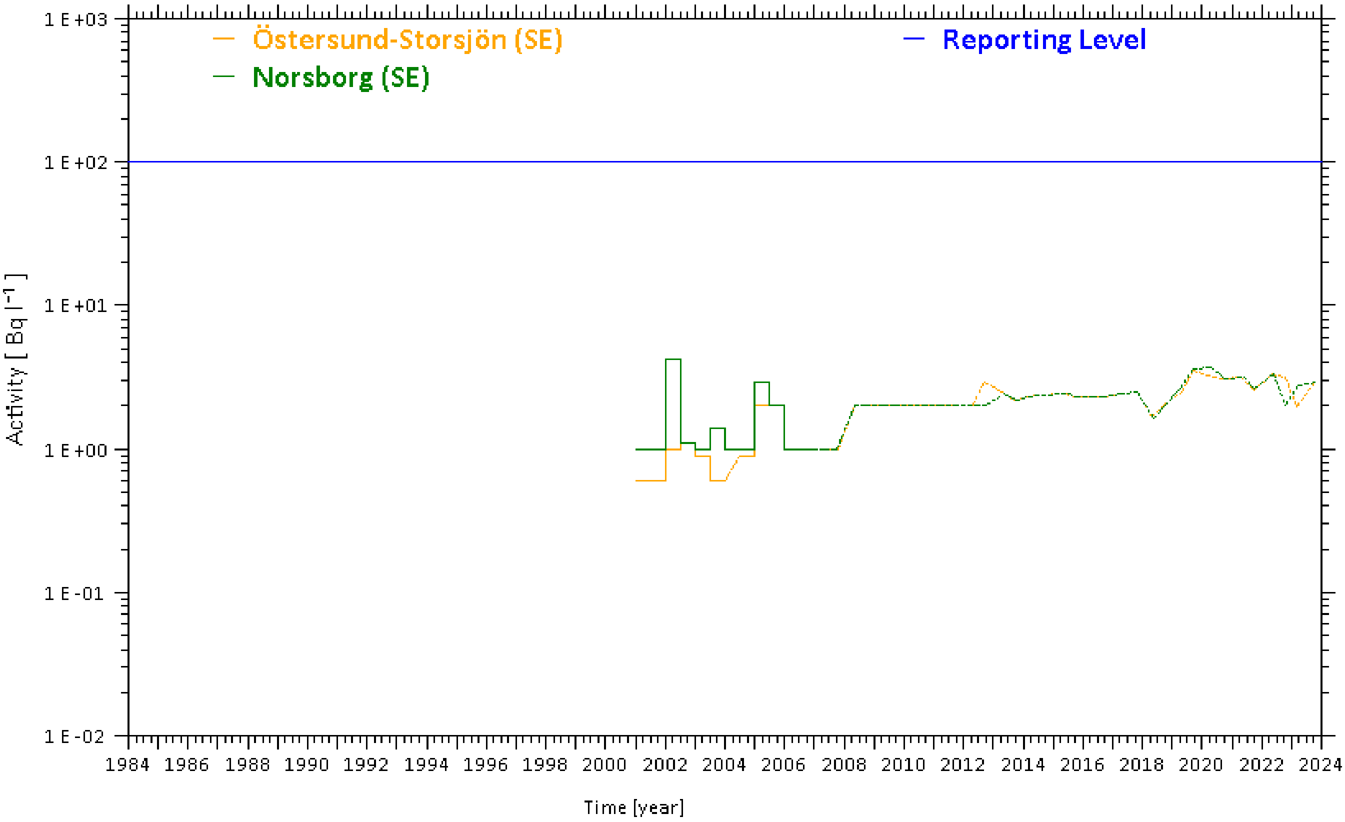


Fig. W6

Activity trends for ^{3}H in drinking water (Östersund-Storsjön and Norsborg)



SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**tritium (^{3}H)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

Fig. W7

Activity trends for ^{3}H in drinking water (Tallinn, Riga and Vilnius)

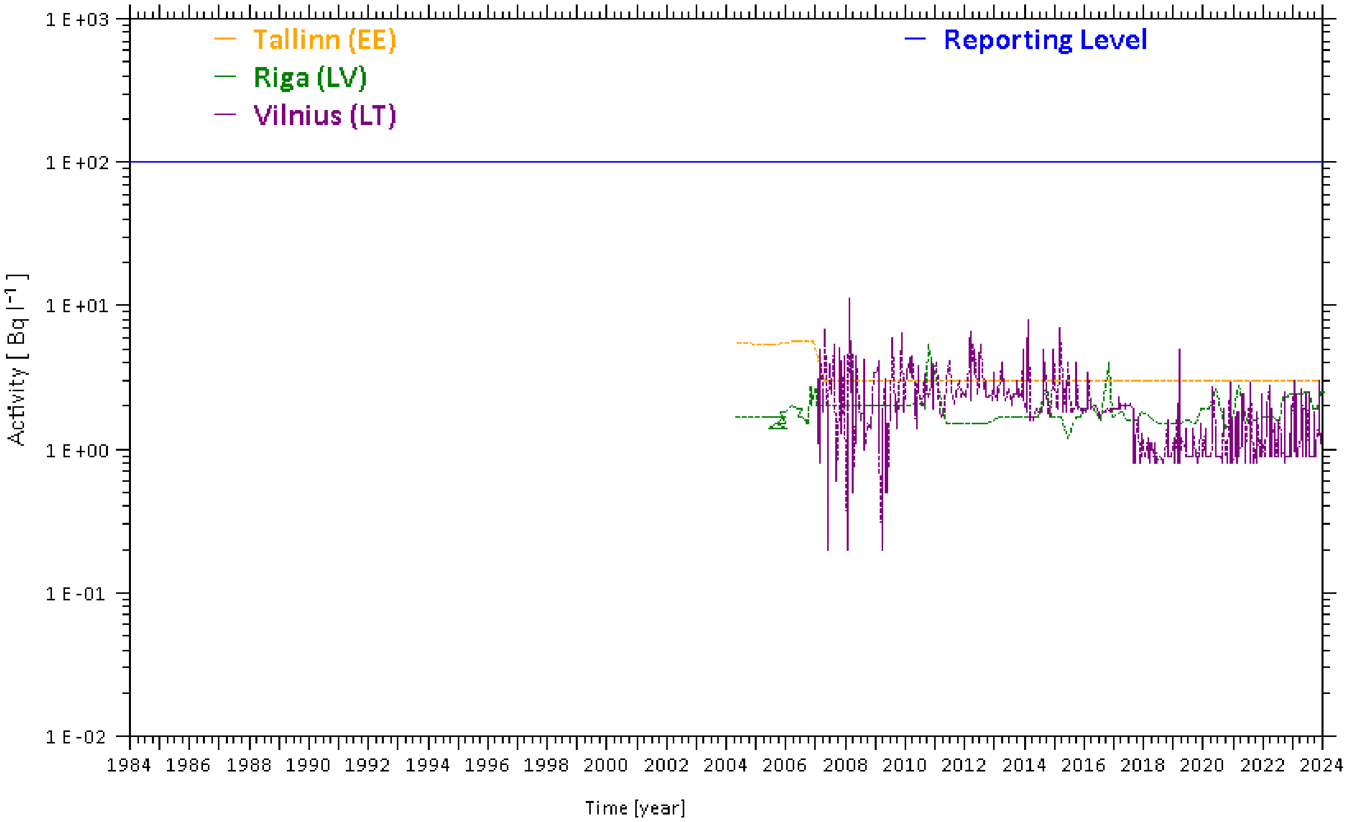
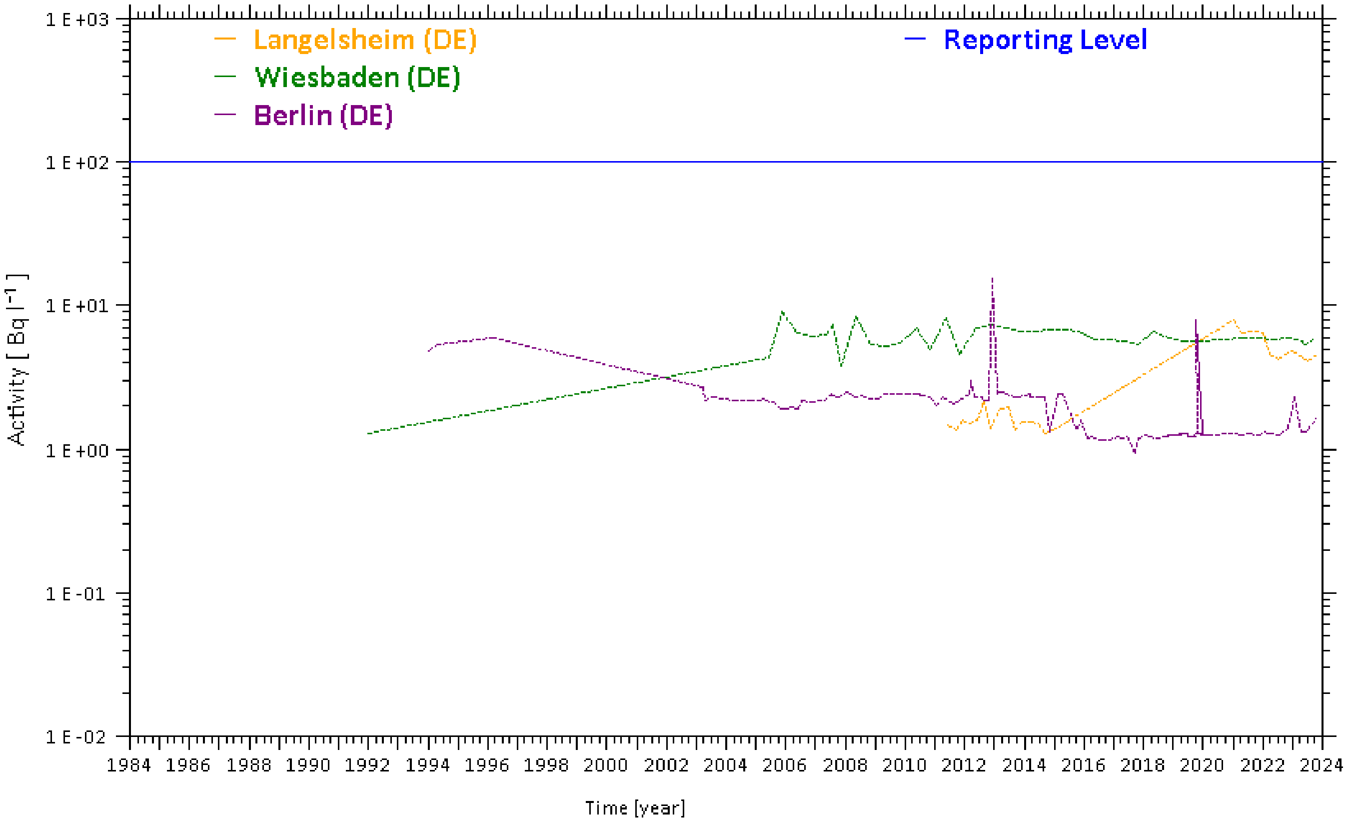


Fig. W8

Activity trends for ^{3}H in drinking water (Langelsheim, Wiesbaden and Berlin)



SPARSE

Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **tritium (^{3}H)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W9

Activity trends for ^{3}H in drinking water (Brussels and Luxembourg)

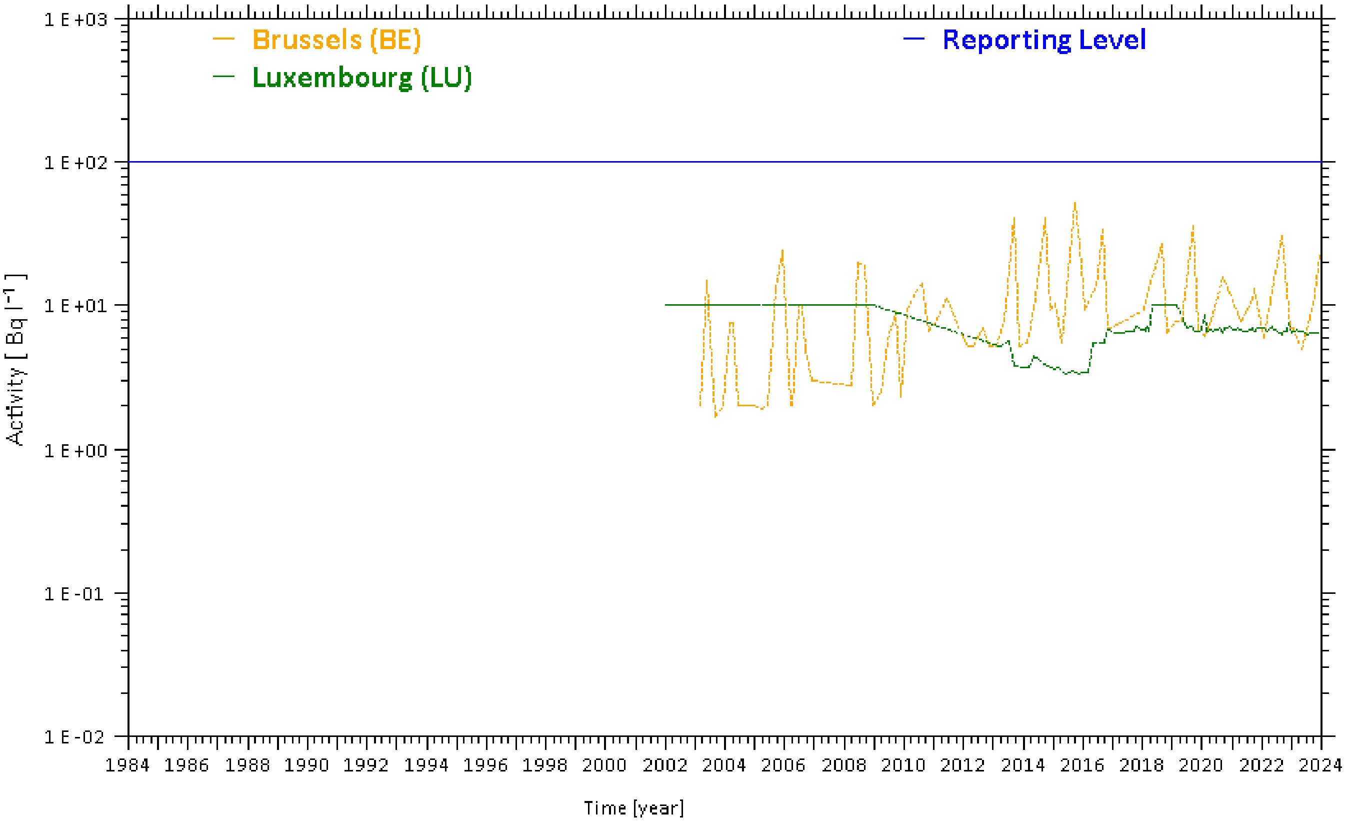
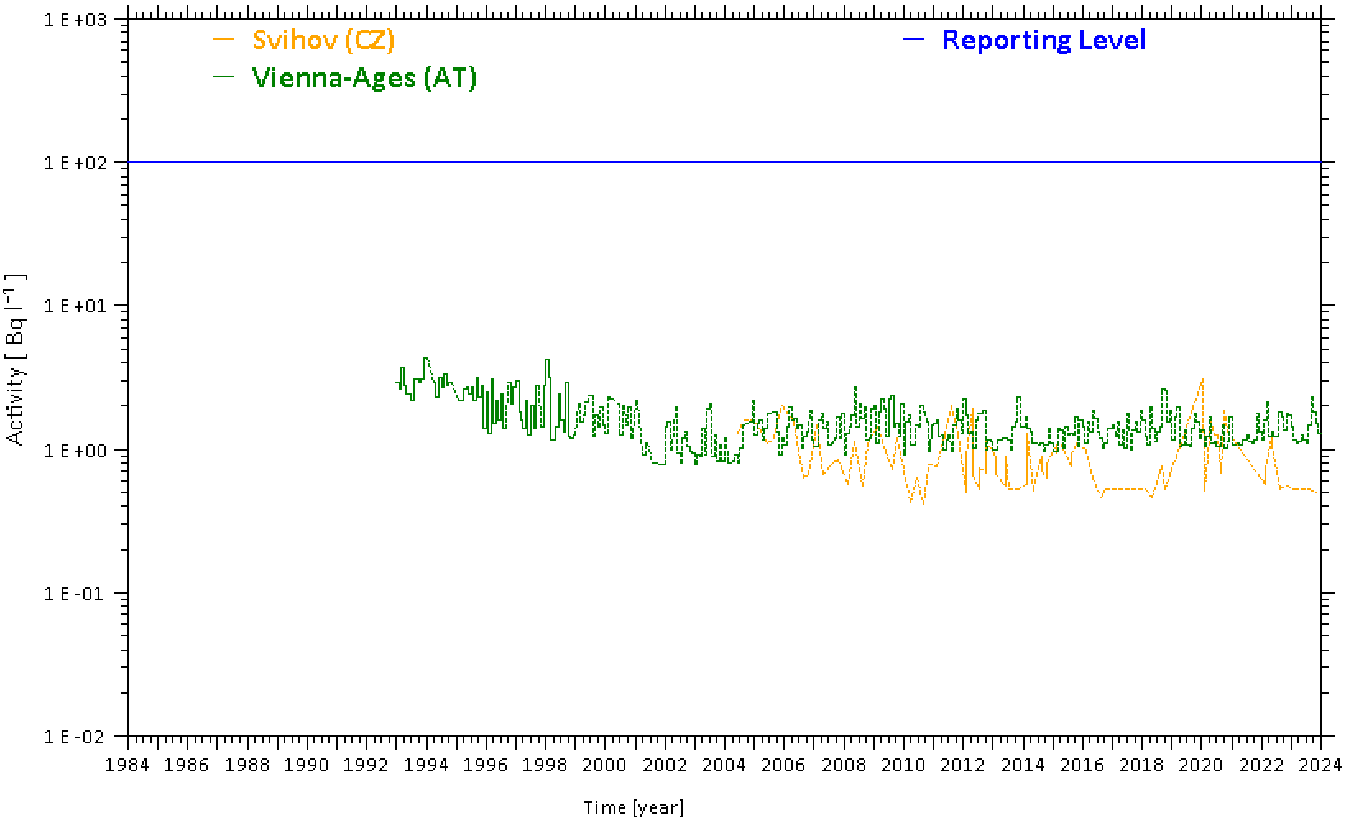


Fig. W10

Activity trends for ^{3}H in drinking water (Svihov and Vienna-Ages)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **tritium (^3H)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

SPARSE

Fig. W11

Activity trends for ^3H in drinking water (Bratislava and Budapest-Nrirr)

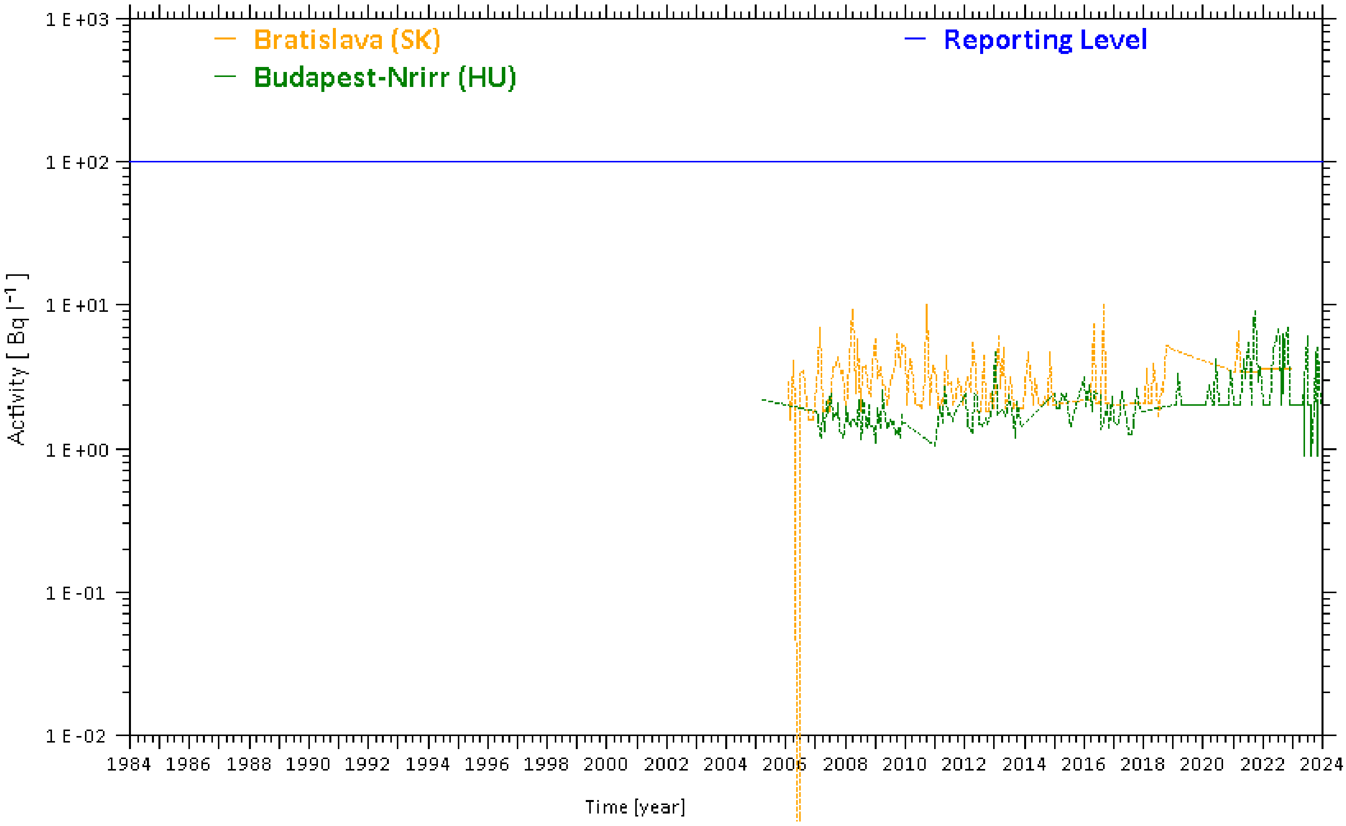
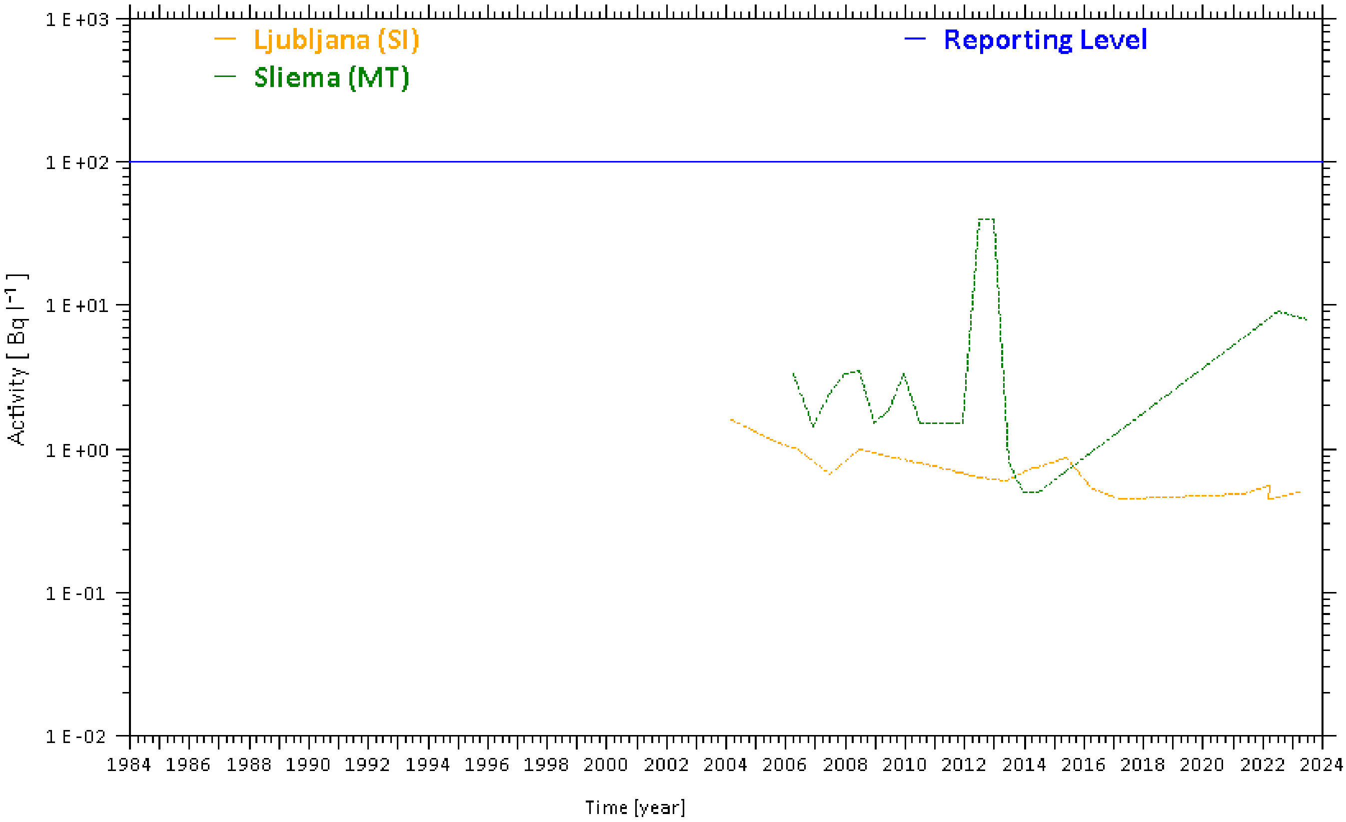


Fig. W12

Activity trends for ^3H in drinking water (Ljubljana and Sliema)



SPARSE

Activity trends

SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**tritium (^3H)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

Fig. W13

Activity trends for ^3H in drinking water (Nîmes and Bilbao)

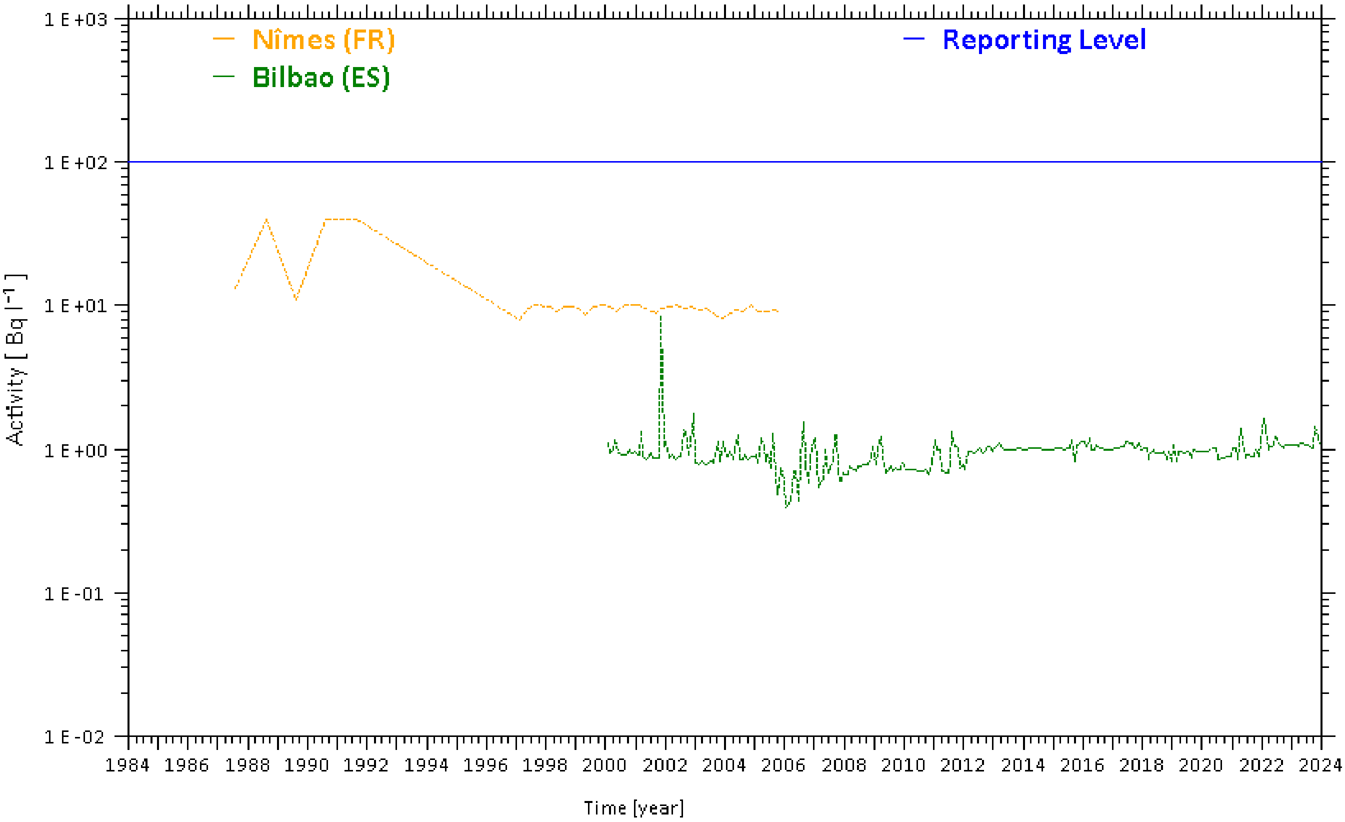
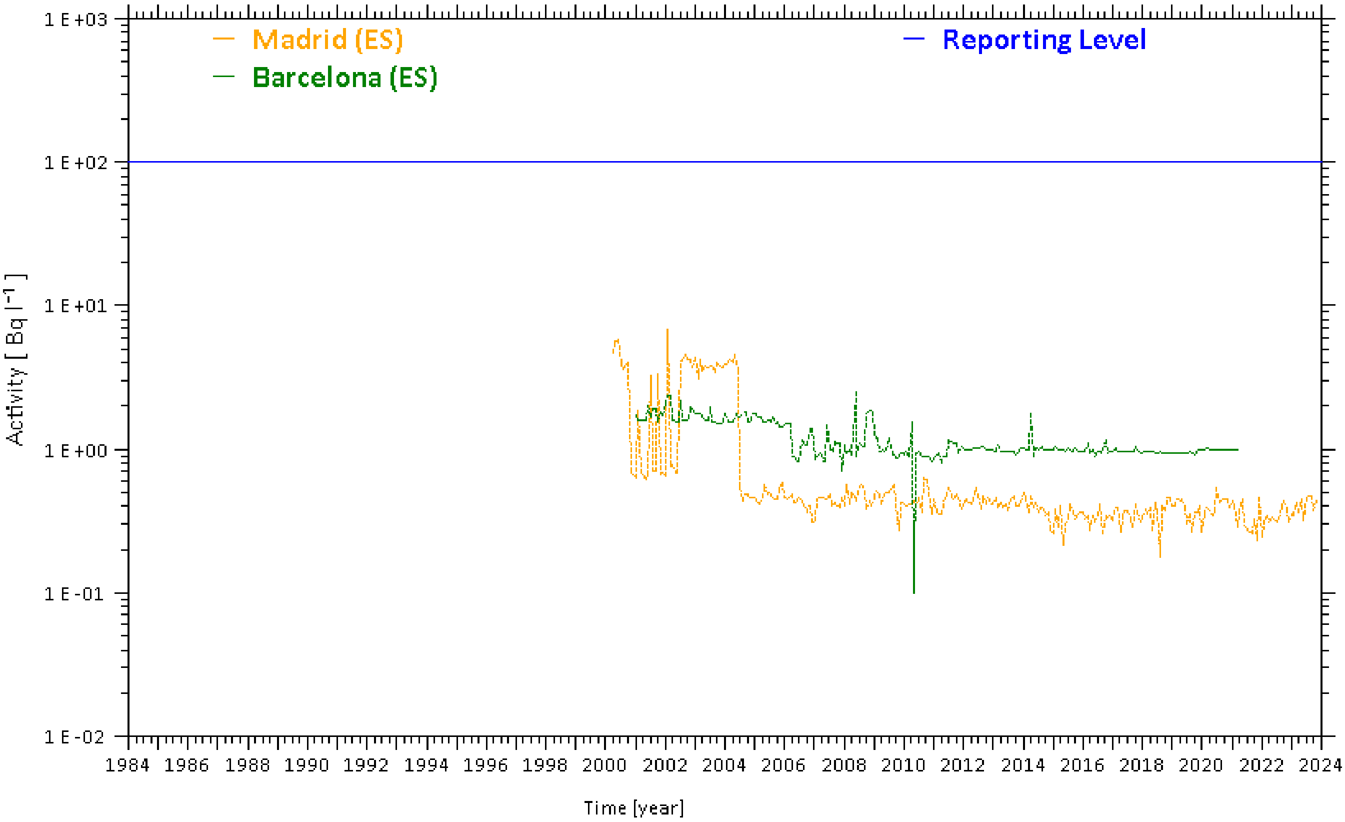


Fig. W14

Activity trends for ^3H in drinking water (Madrid and Barcelona)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **tritium (^3H)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W15

Activity trends for ^3H in drinking water (Sevilla, La Laguna-Tenerife and Castelo de Bode)

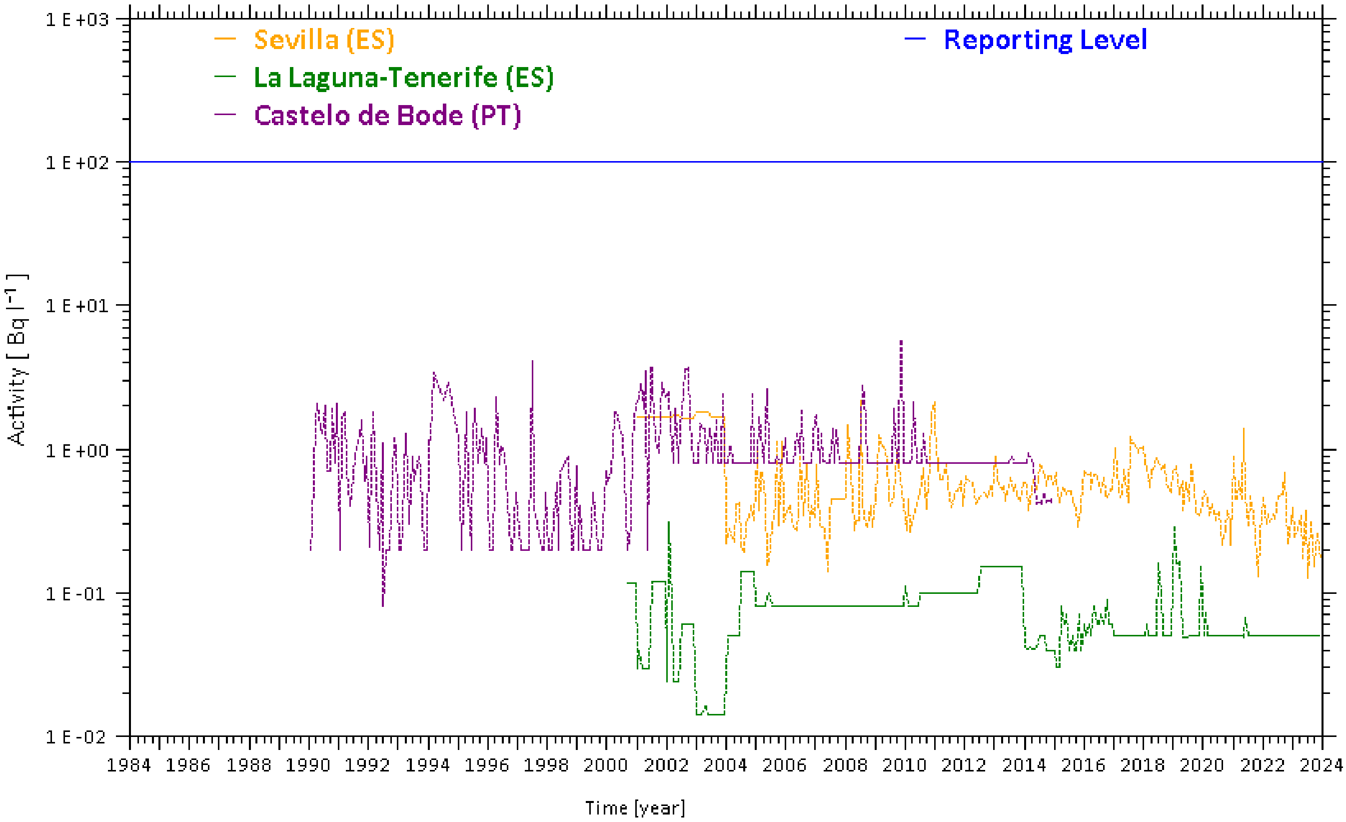
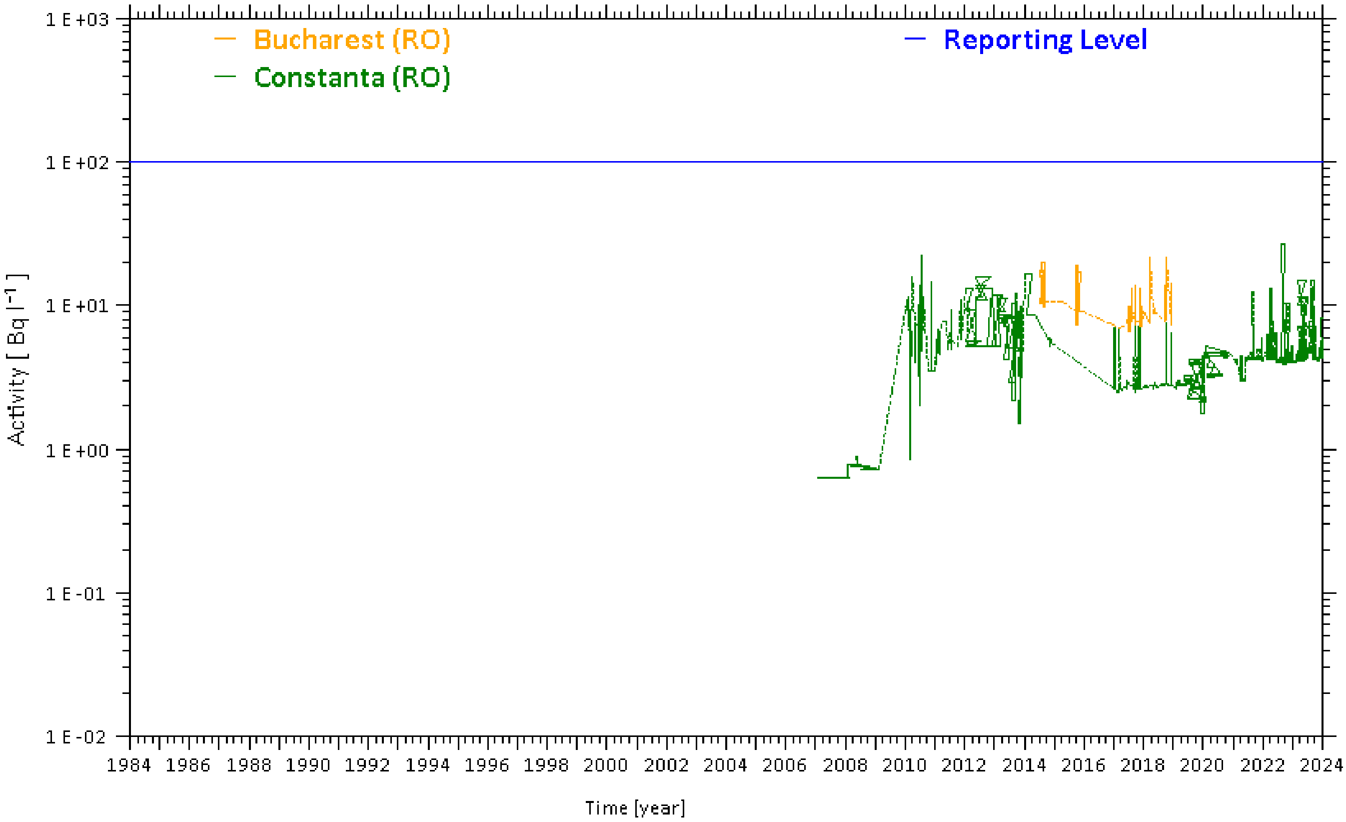


Fig. W16

Activity trends for ^3H in drinking water (Bucharest and Constanta)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W17

Activity trends for ^{90}Sr in drinking water (Rovaniemi, Helsinki and Tallinn)

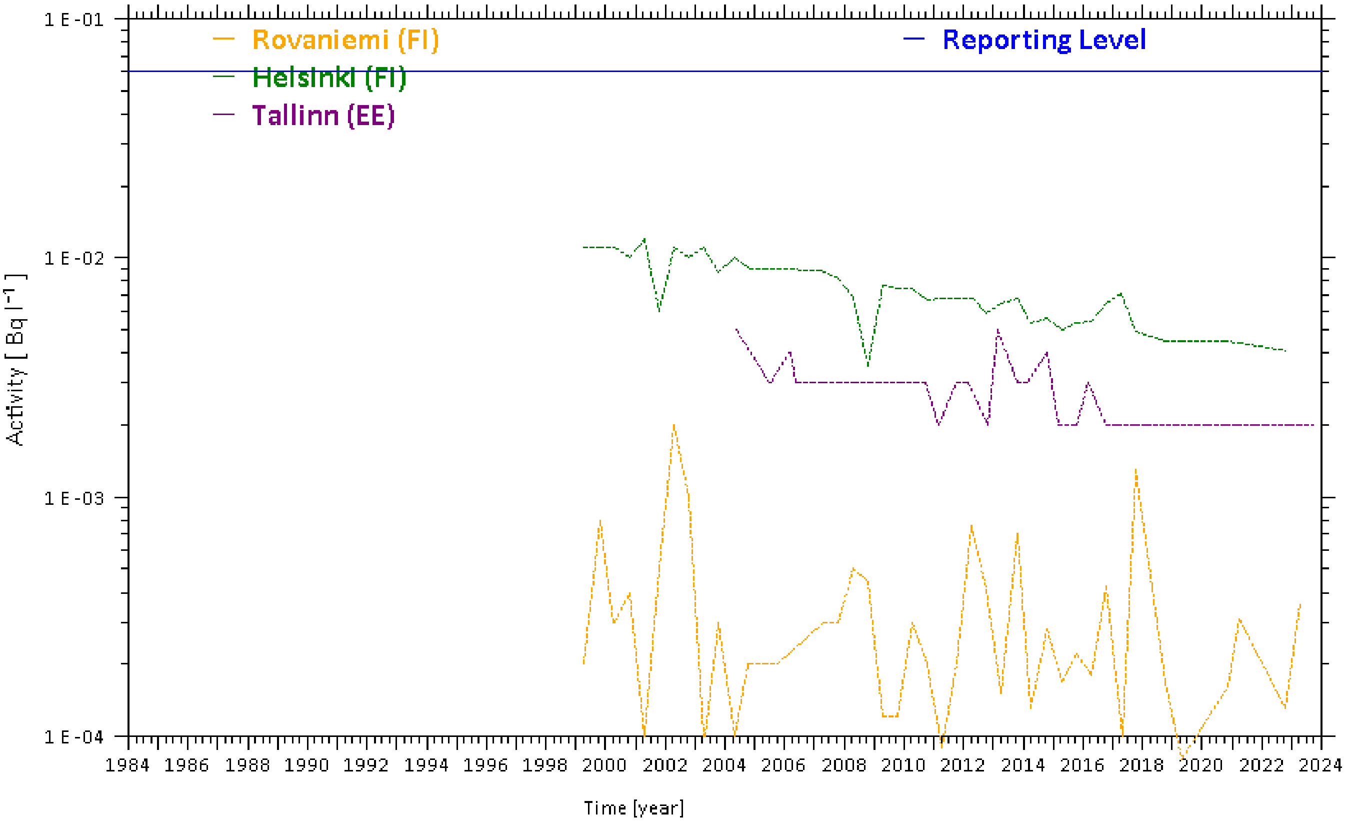
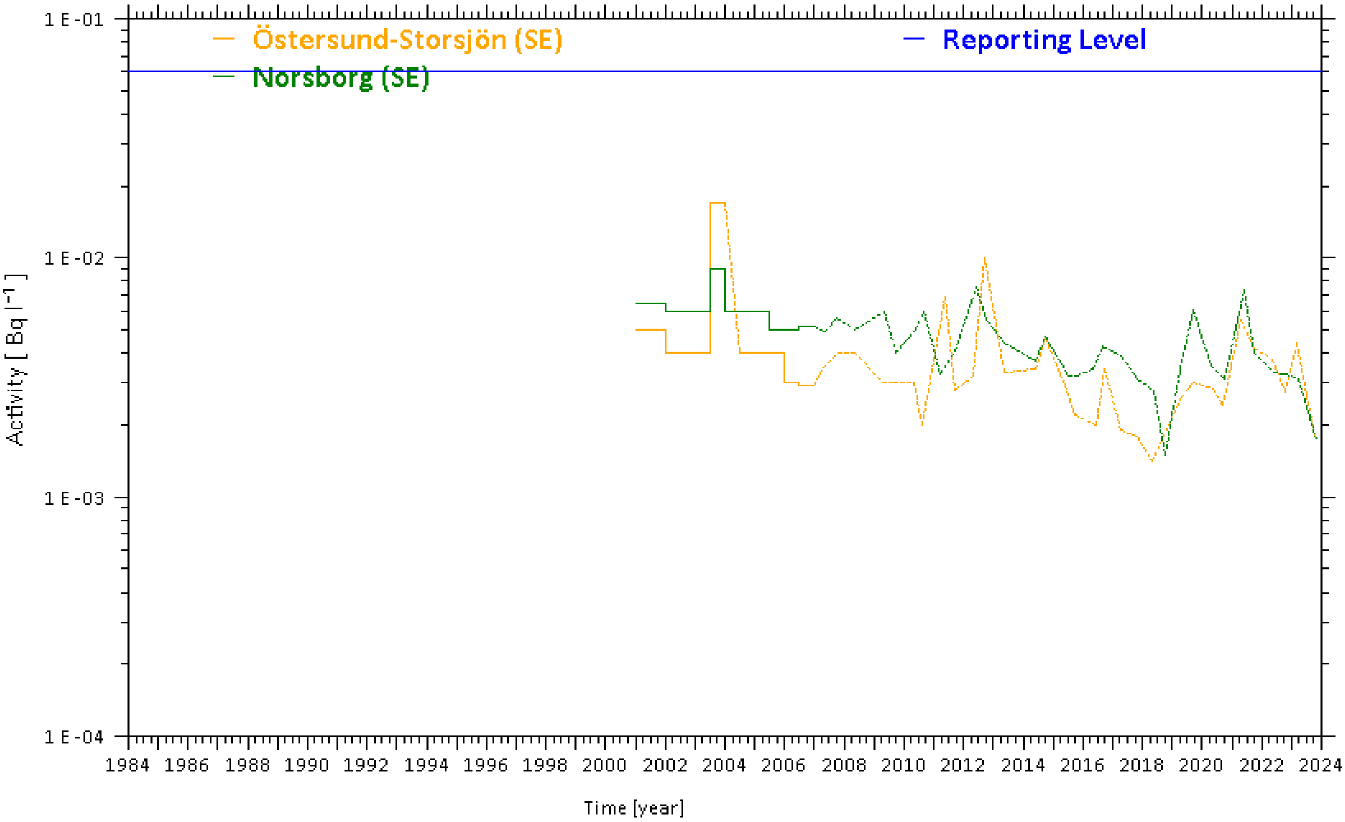


Fig. W18

Activity trends for ^{90}Sr in drinking water (Östersund-Storsjön and Norsborg)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W19

Activity trends for ^{90}Sr in drinking water (Nîmes)

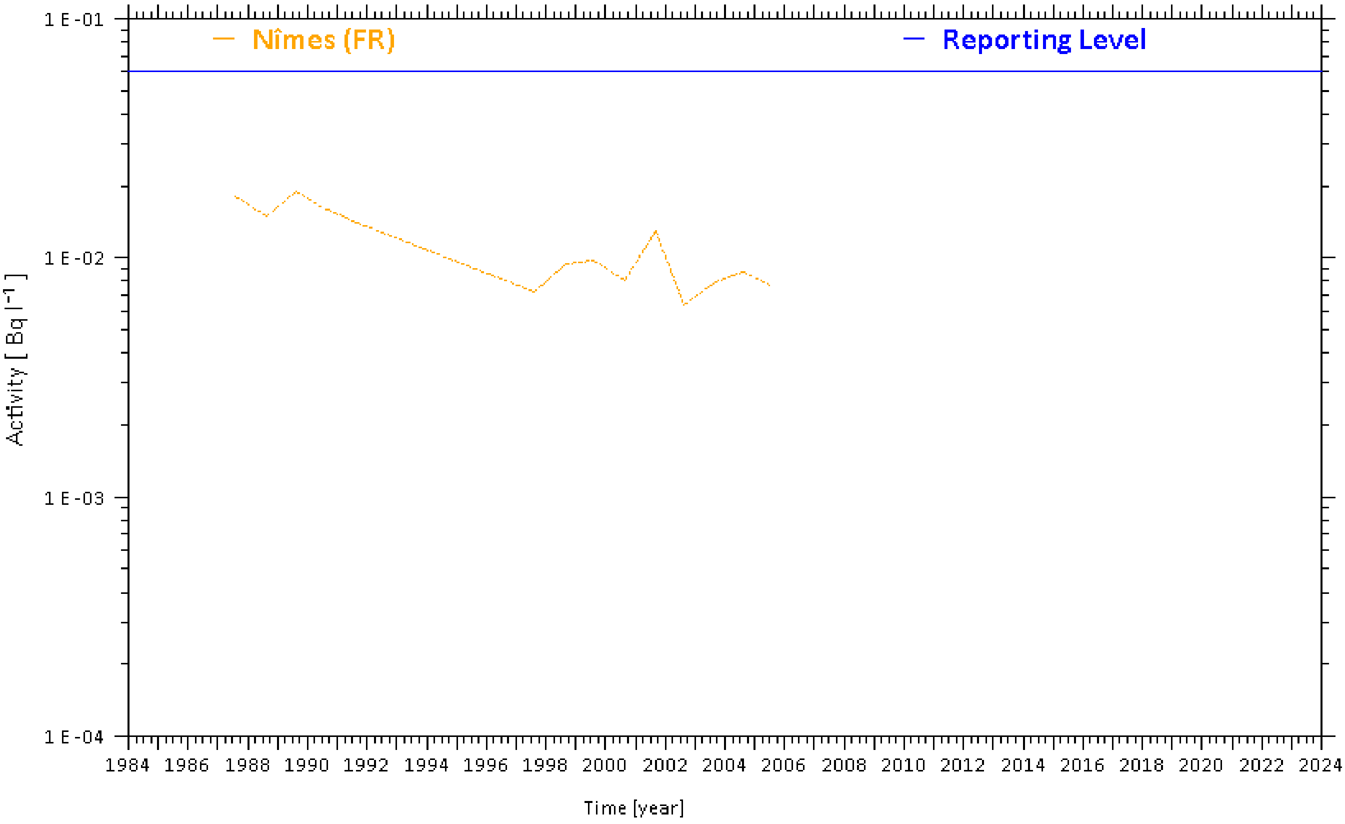
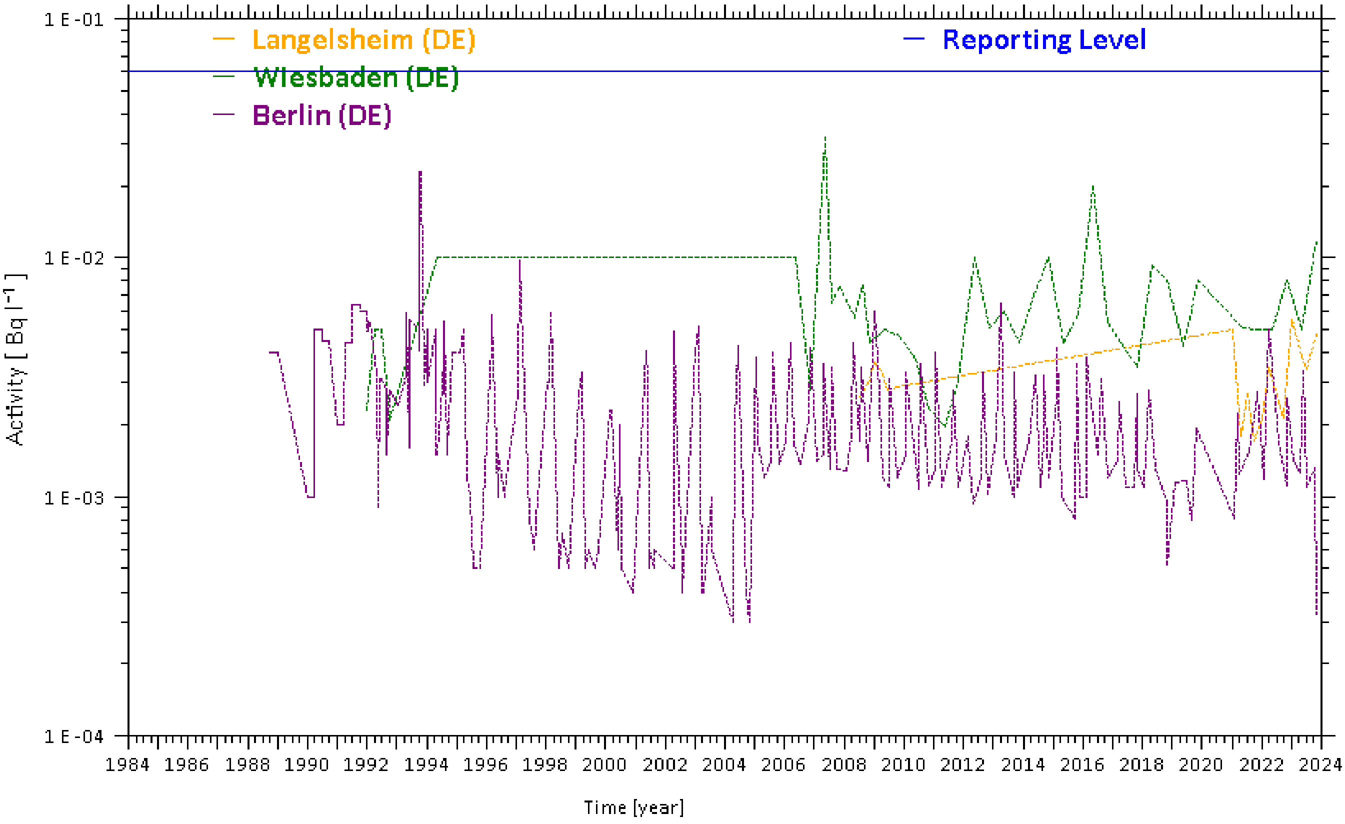


Fig. W20

Activity trends for ^{90}Sr in drinking water (Langelsheim, Wiesbaden and Berlin)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W21

Activity trends for ^{90}Sr in drinking water (Frauenau and Svihov)

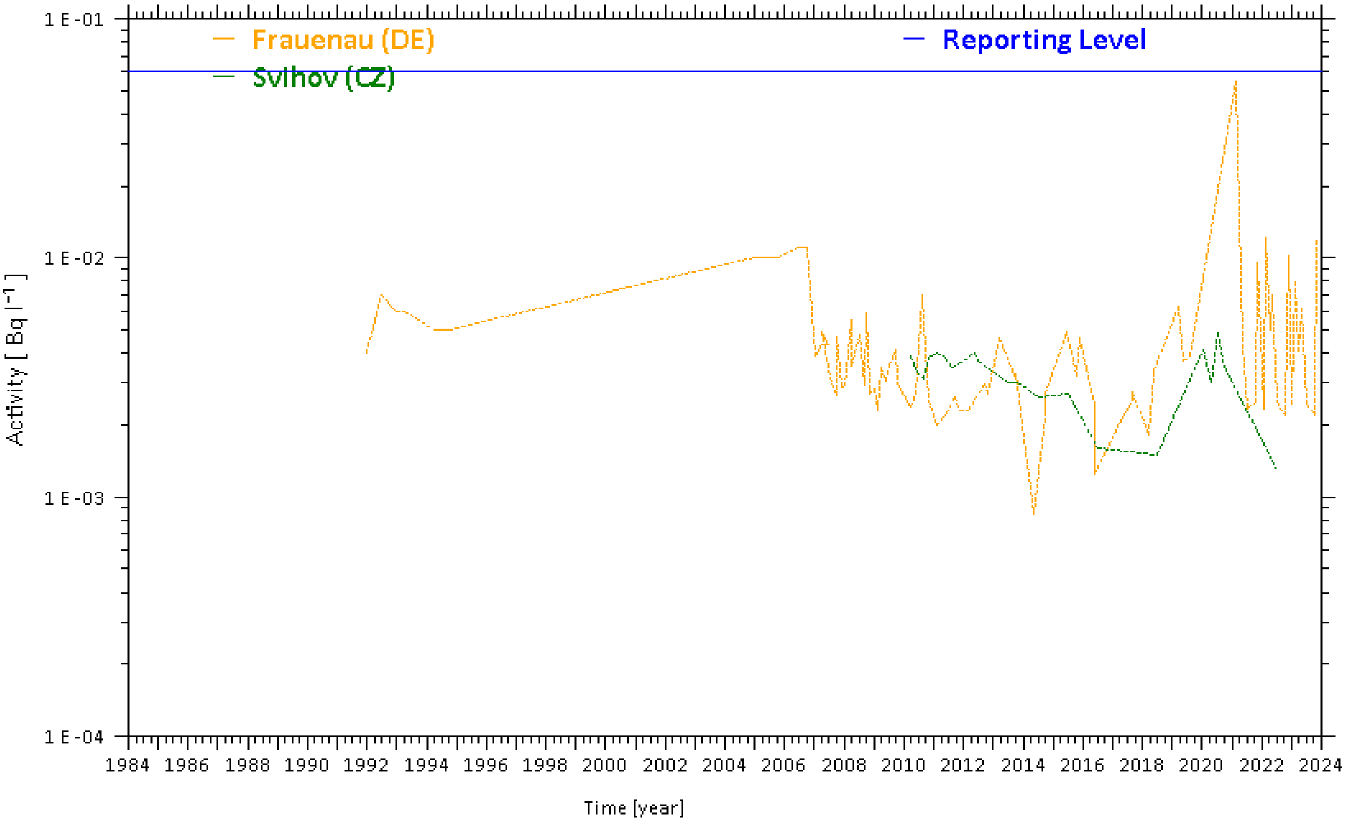
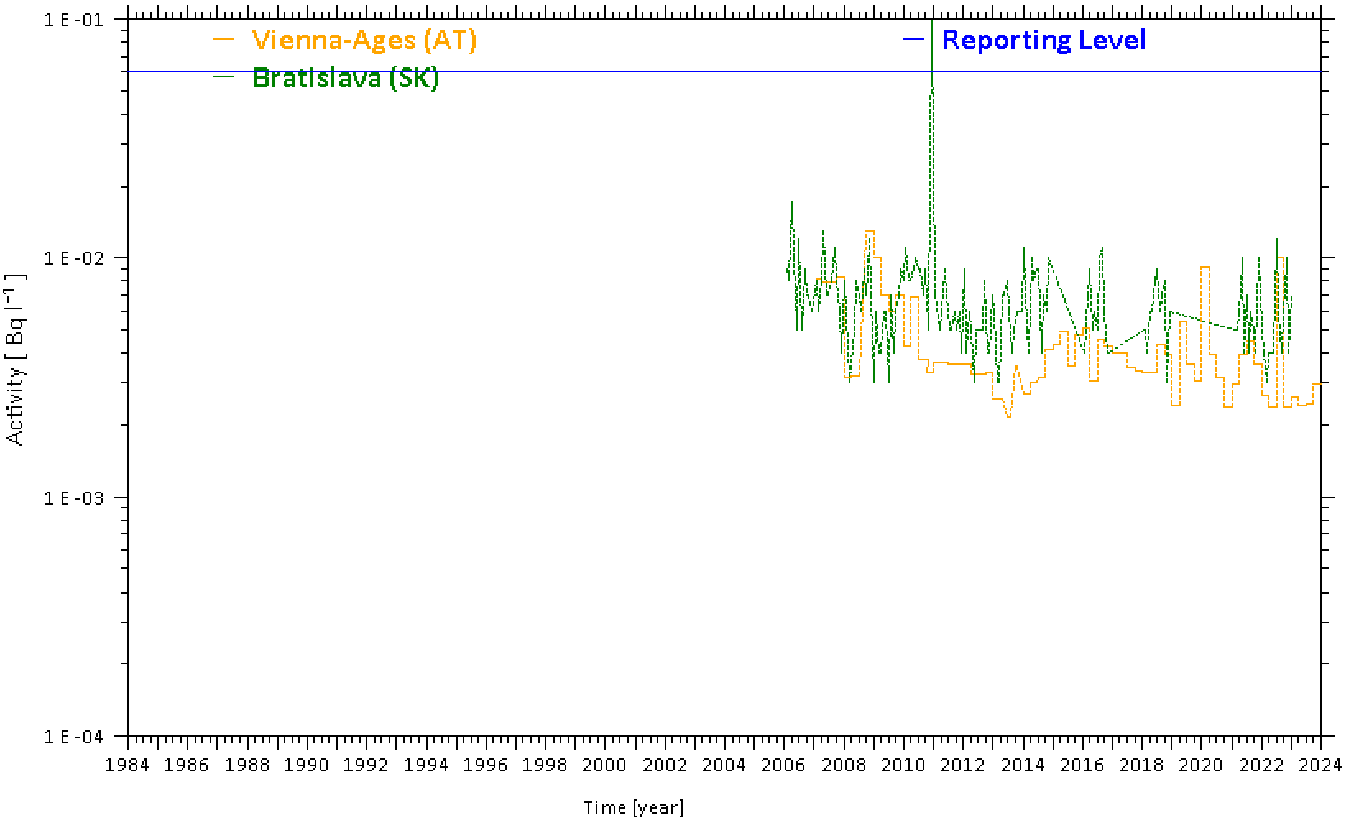


Fig. W22

Activity trends for ^{90}Sr in drinking water (Vienna-Ages and Bratislava)



Activity trends

SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**strontium-90 (^{90}Sr)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

SPARSE

Fig. W23

Activity trends for ^{90}Sr in drinking water (Ljubljana, Sliema and Sofia)

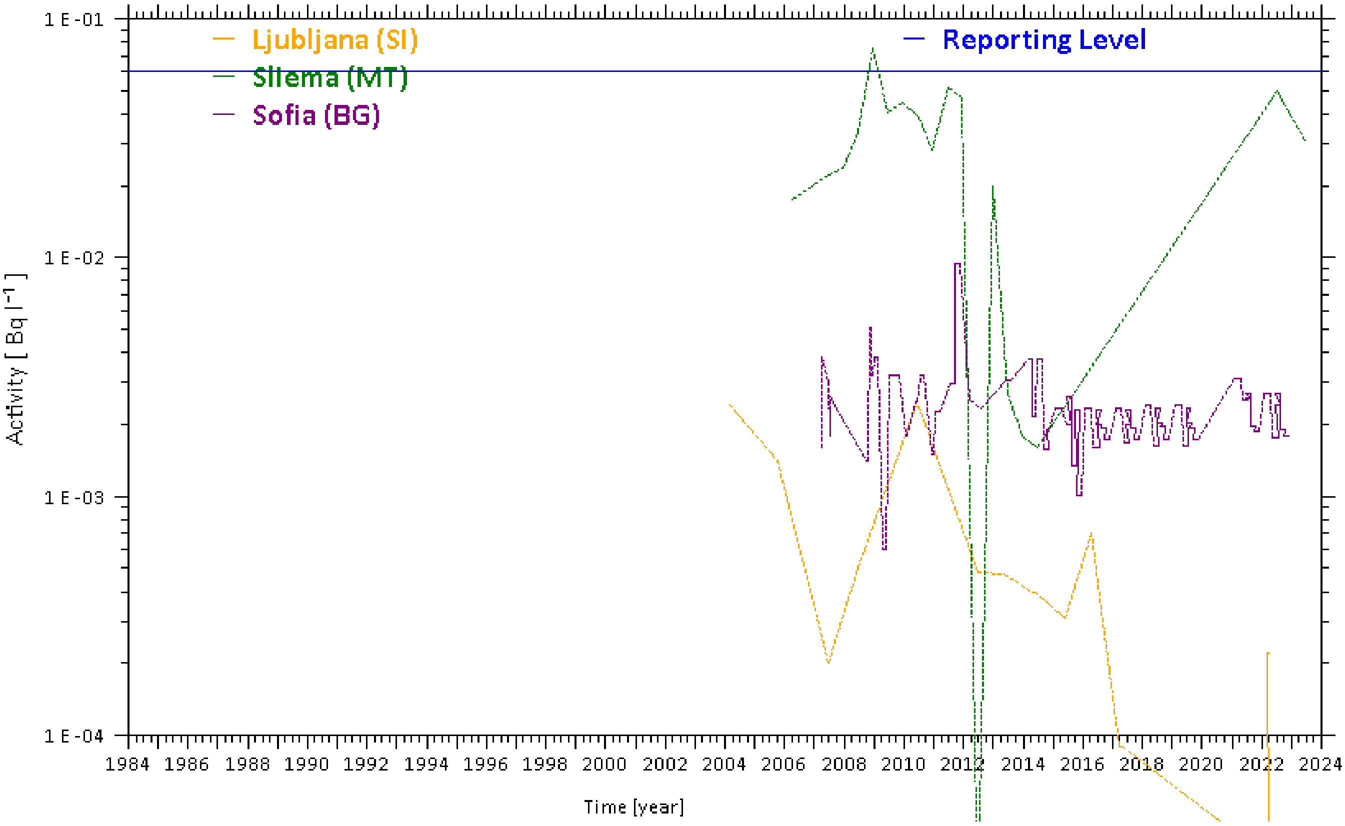
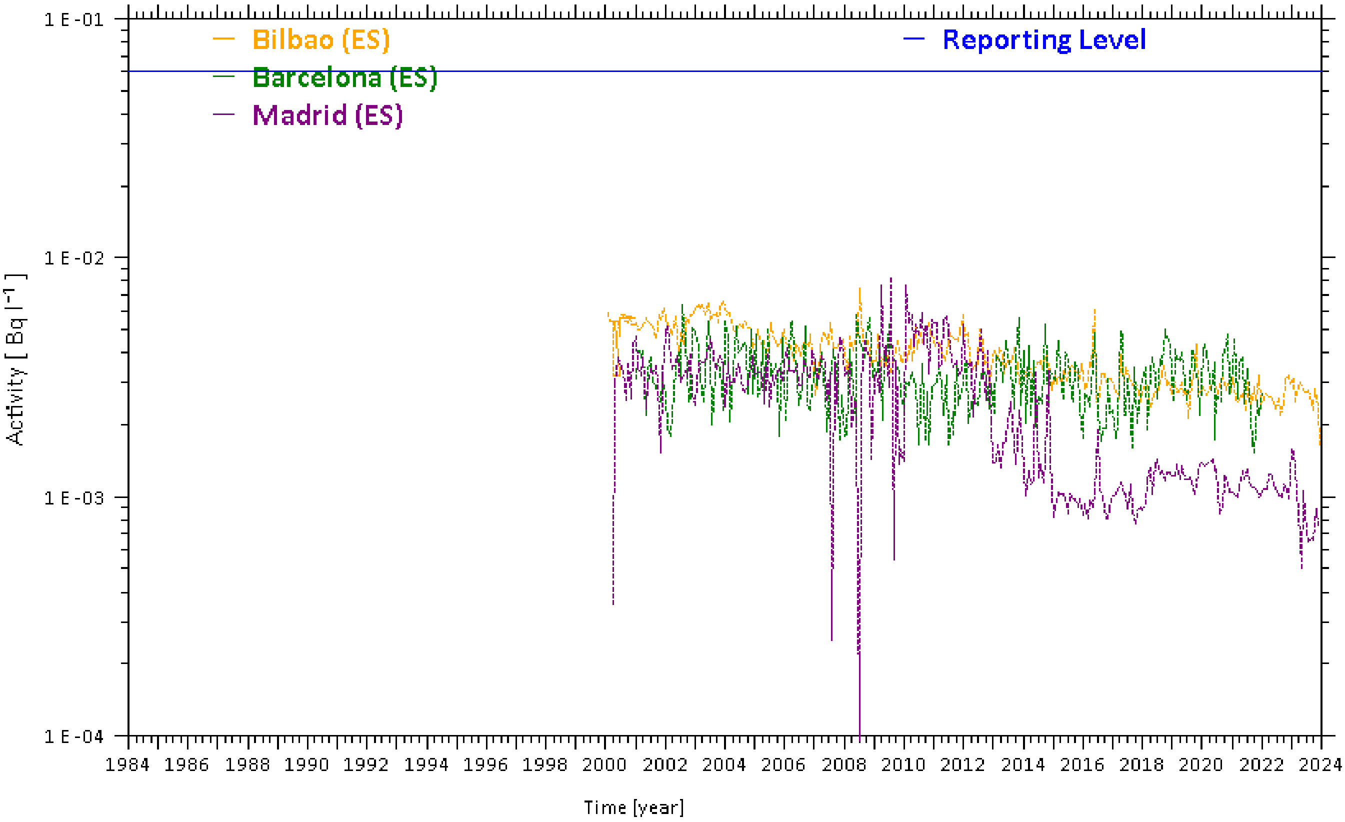


Fig. W24

Activity trends for ^{90}Sr in drinking water (Bilbao, Barcelona and Madrid)



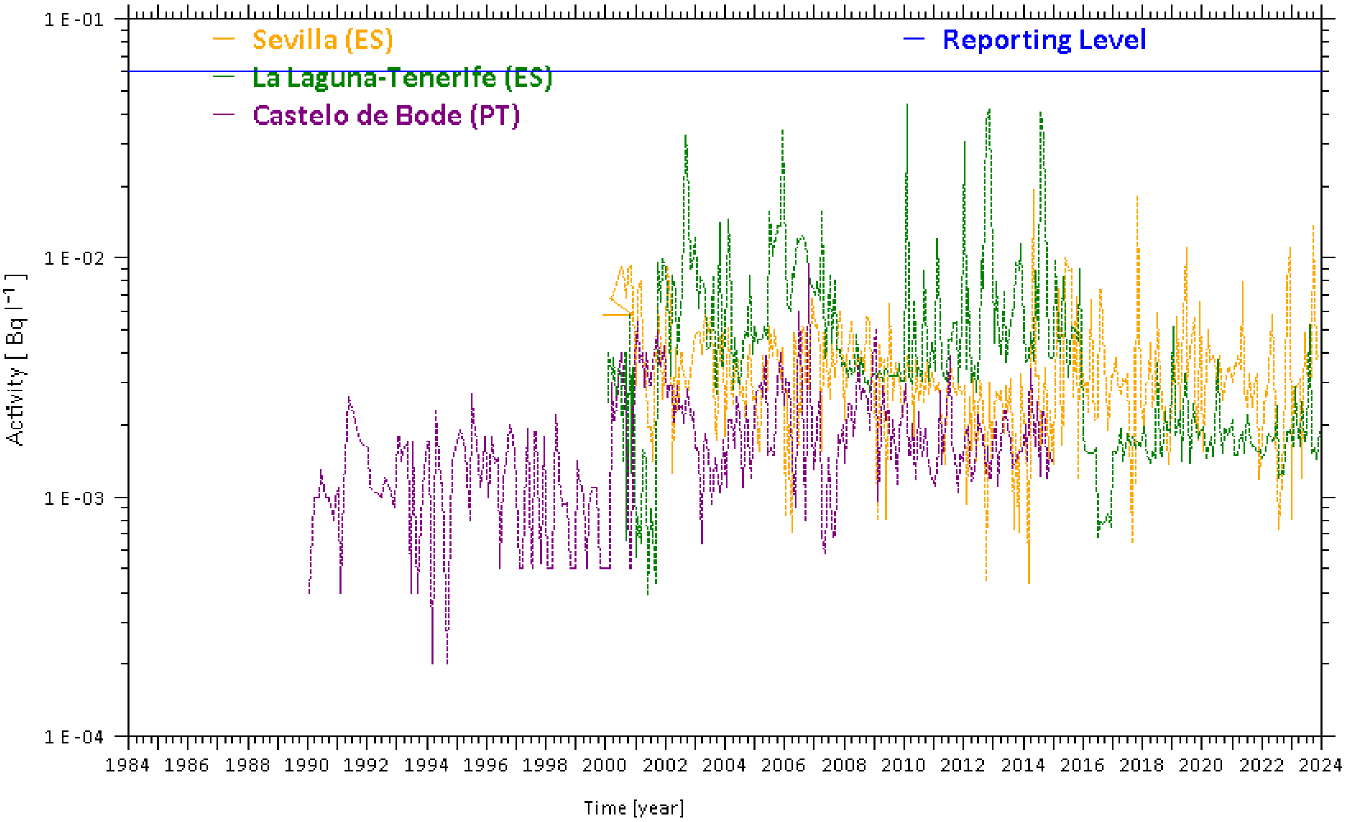
SPARSE

Activity trends

SAMPLE TYPE	:	**drinking water**	
NUCLIDE CATEGORY	:	**strontium-90 (^{90}Sr)**	
MEASUREMENT UNIT	:	**Bq l $^{-1}$**	(Bq per litre)

Fig. W25

Activity trends for ^{90}Sr in drinking water (Sevilla, La Laguna-Tenerife and Castelo de Bode)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W26

Activity trends for ^{137}Cs in drinking water (Rovaniemi and Helsinki)

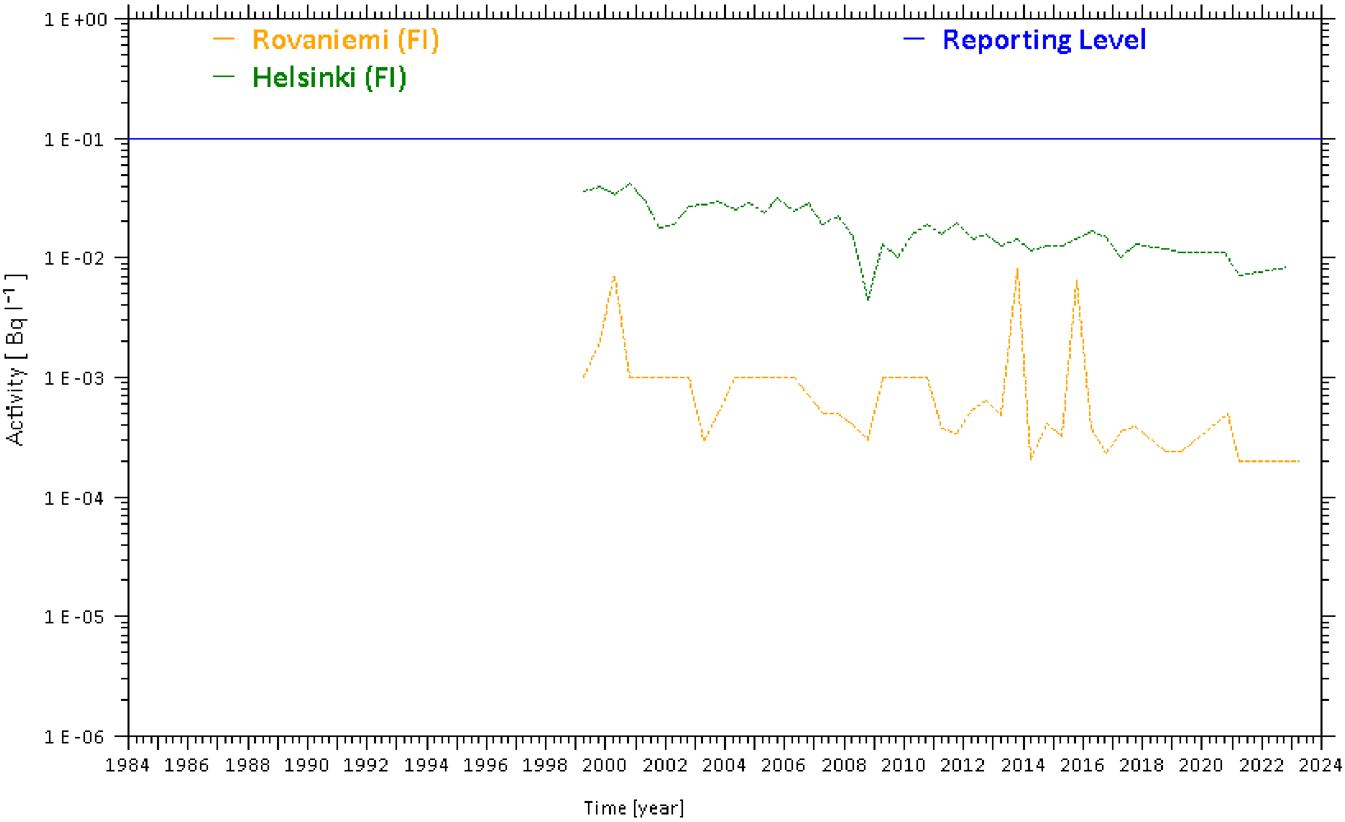
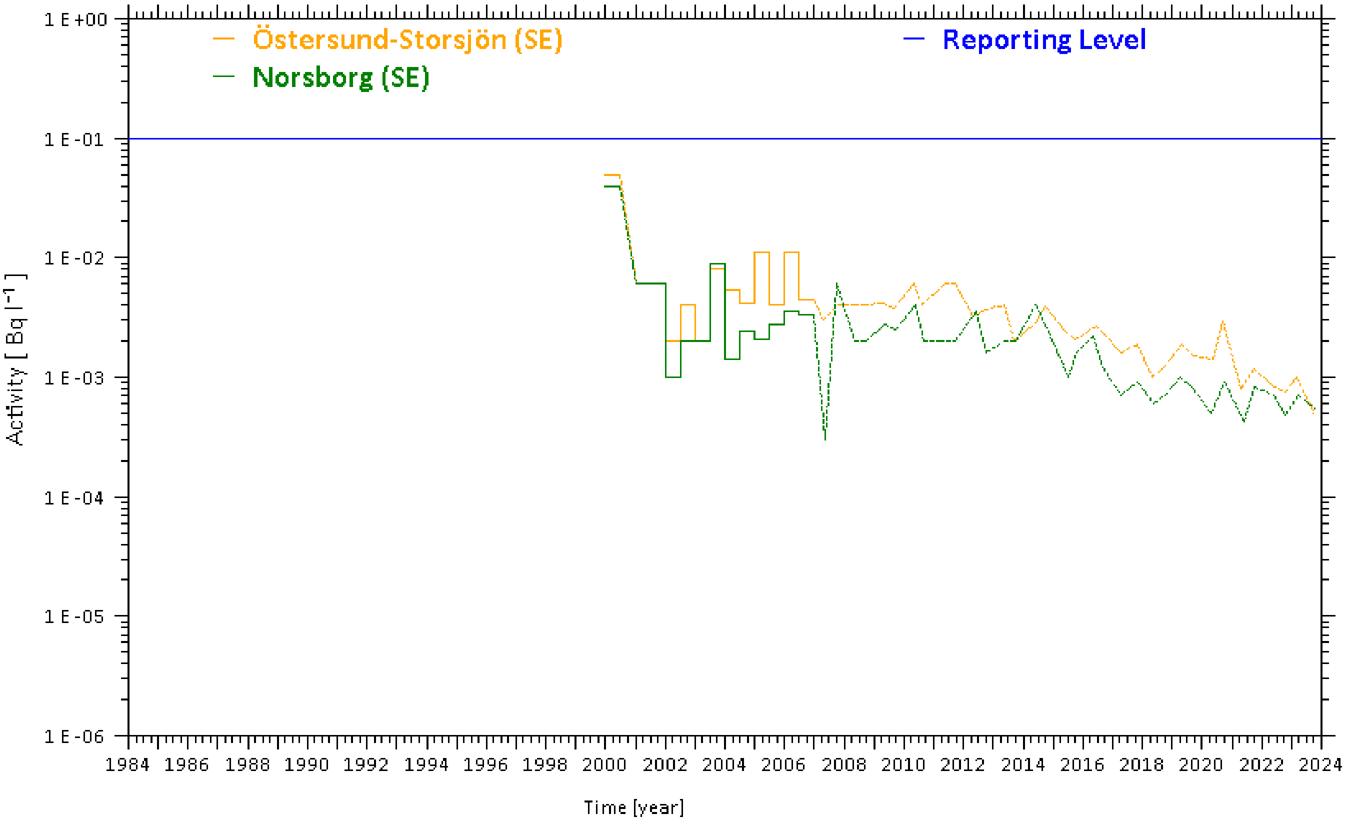


Fig. W27

Activity trends for ^{137}Cs in drinking water (Östersund-Storsjön and Norsborg)



SPARSE

Activity trends

SAMPLE TYPE : **drinking water**

NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**

MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W28

Activity trends for ^{137}Cs in drinking water (Tallinn and Riga)

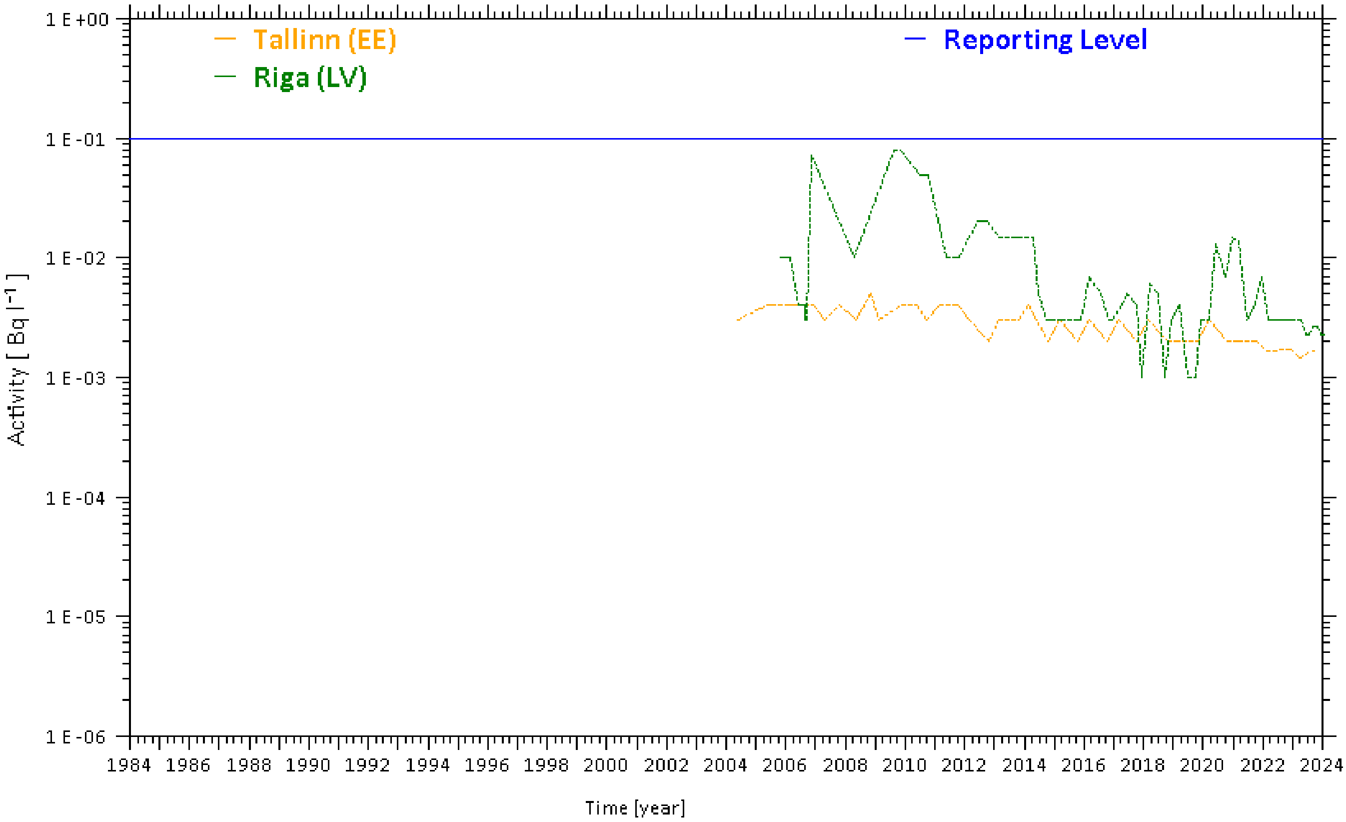
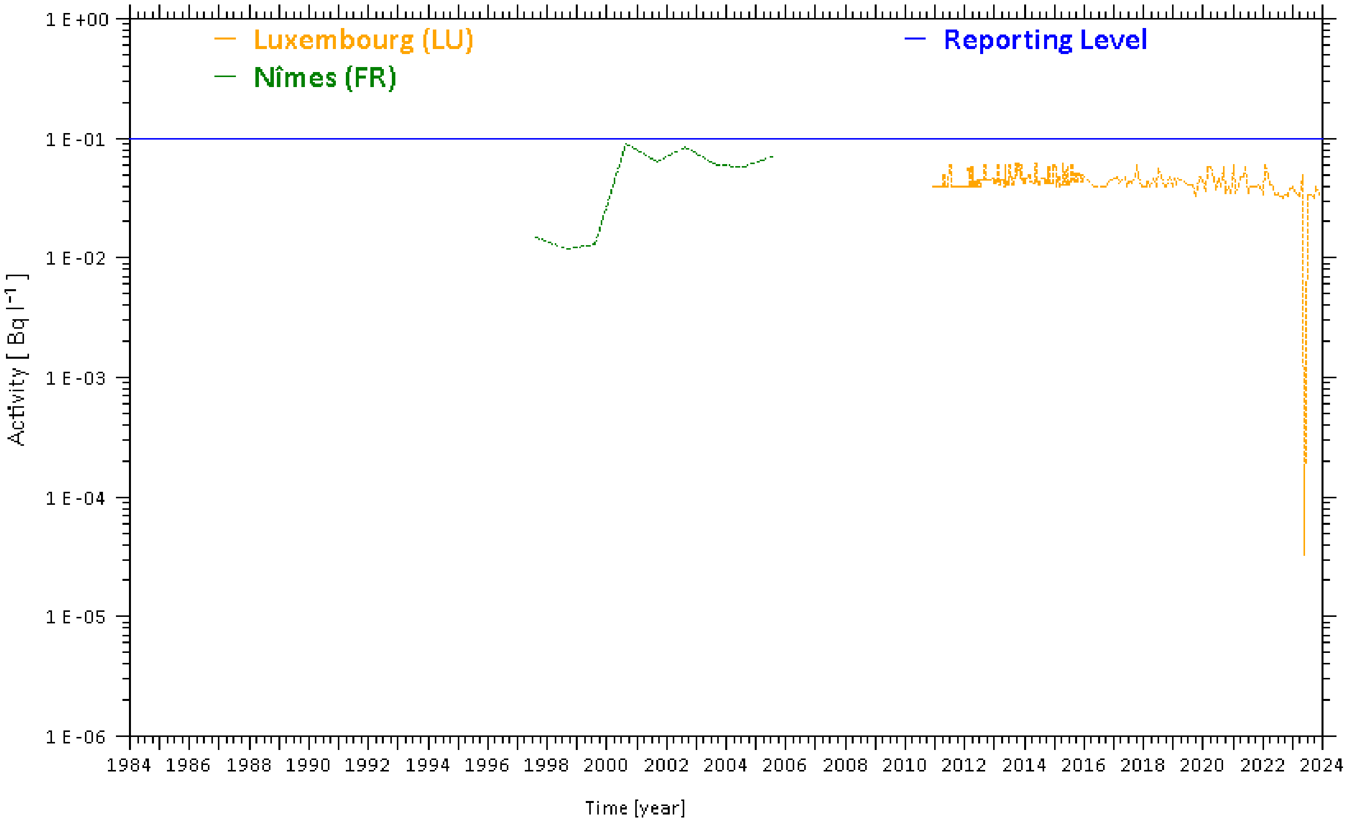


Fig. W29

Activity trends for ^{137}Cs in drinking water (Luxembourg and Nîmes)



Activity trends

SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

SPARSE

Fig. W30

Activity trends for ^{137}Cs in drinking water (Langelsheim, Wiesbaden and Berlin)

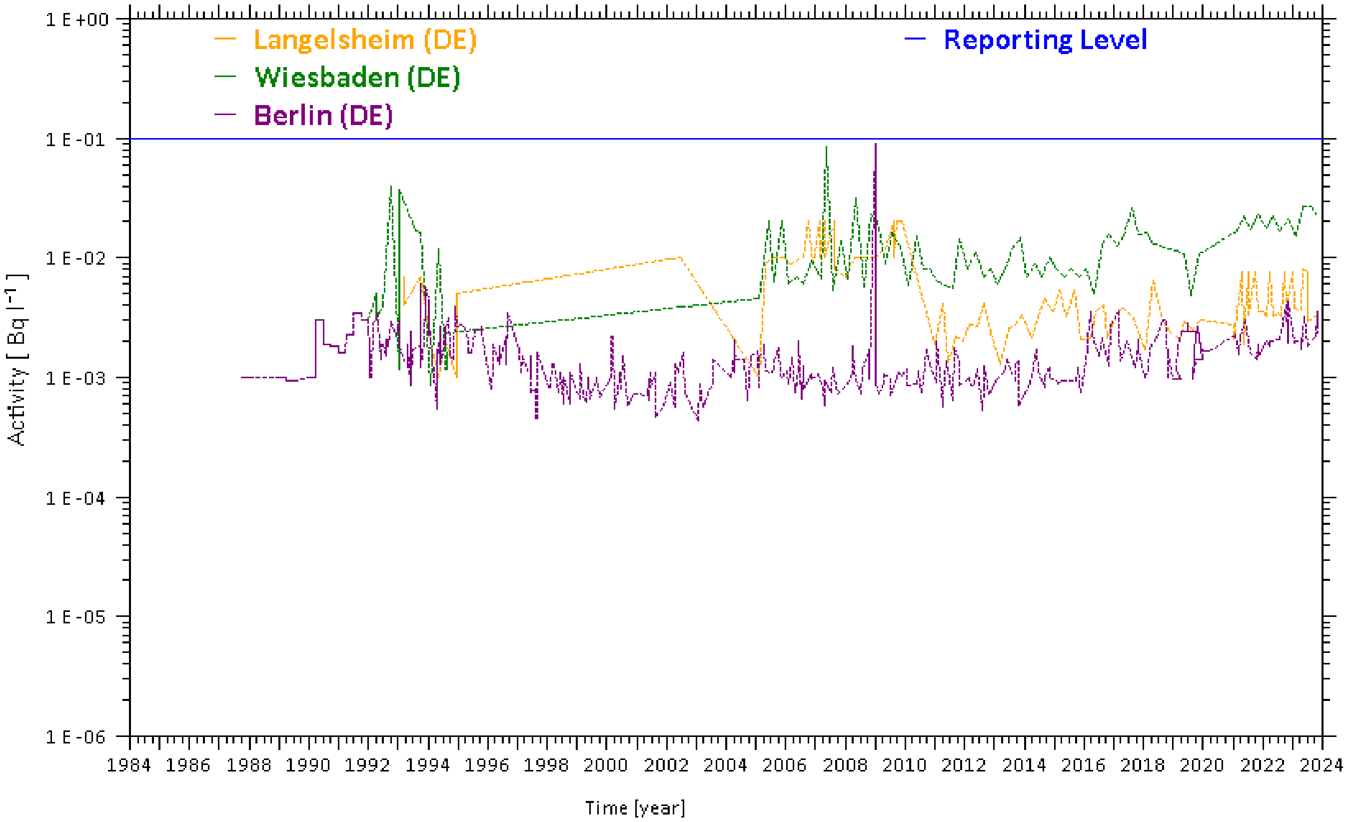
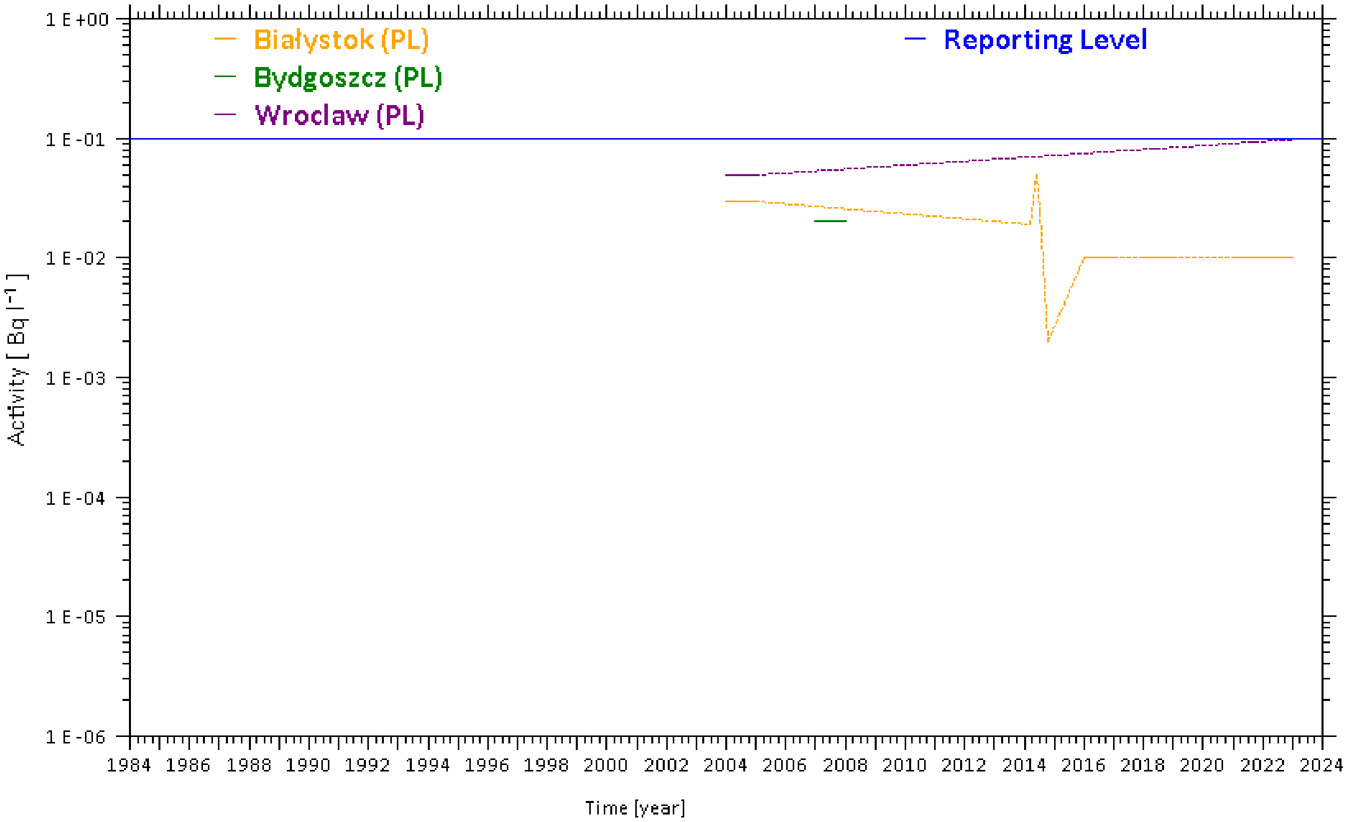


Fig. W31

Activity trends for ^{137}Cs in drinking water (Białystok, Bydgoszcz and Wroclaw)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W32

Activity trends for ^{137}Cs in drinking water (Frauenau and Svihov)

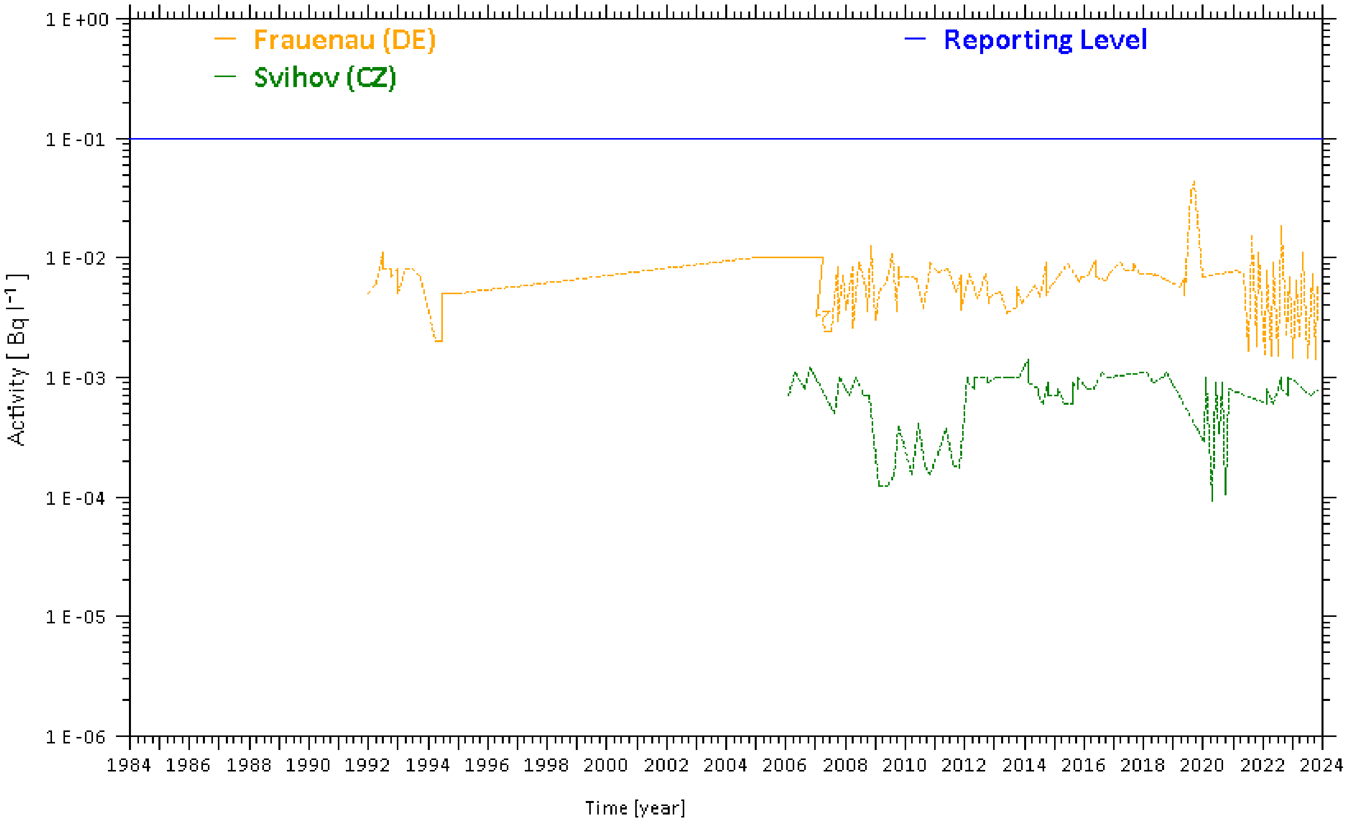
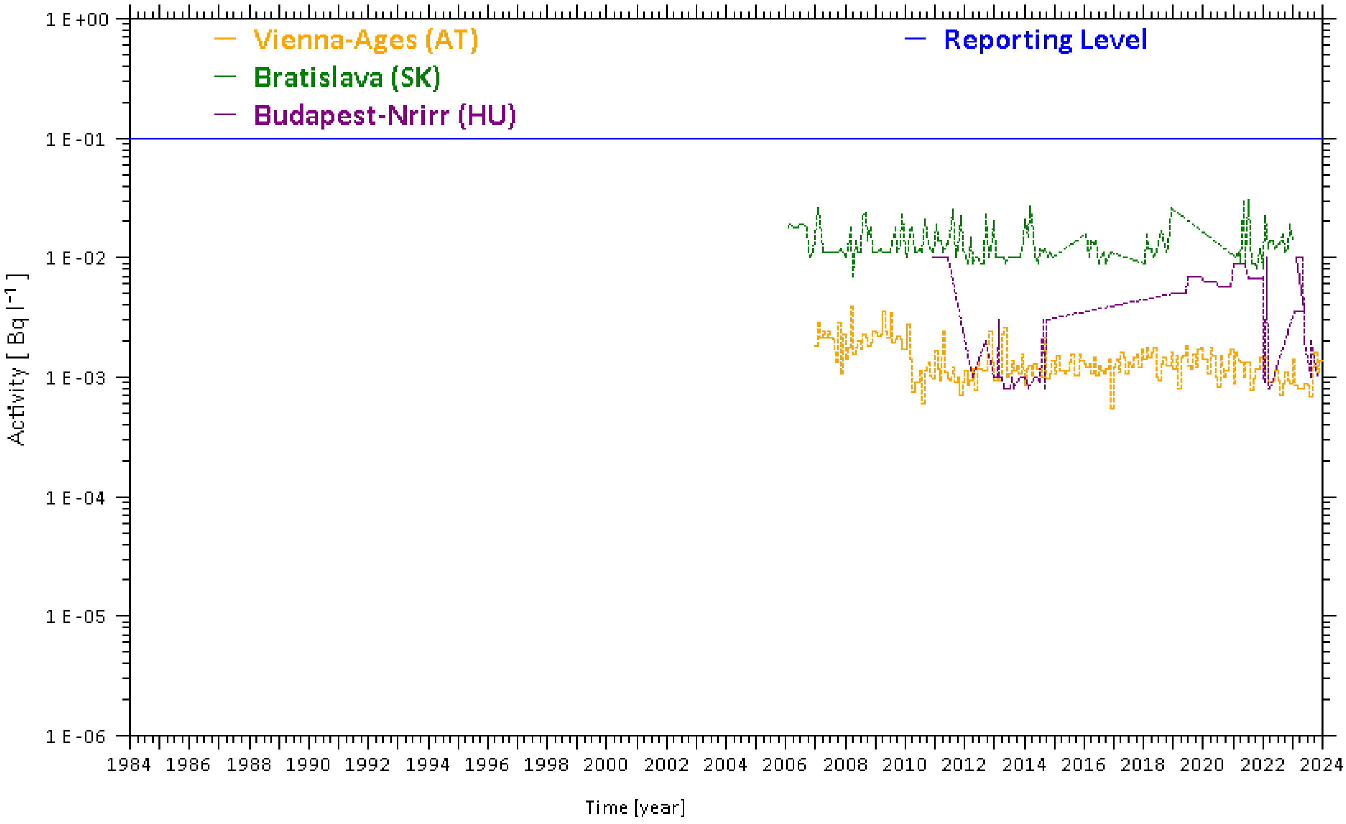


Fig. W33

Activity trends for ^{137}Cs in drinking water (Vienna-Ages, Bratislava and Budapest-Nrirr)



Activity trends

SAMPLE TYPE : drinking water
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

SPARSE

Fig. W34

Activity trends for ^{137}Cs in drinking water (Milano and Ljubljana)

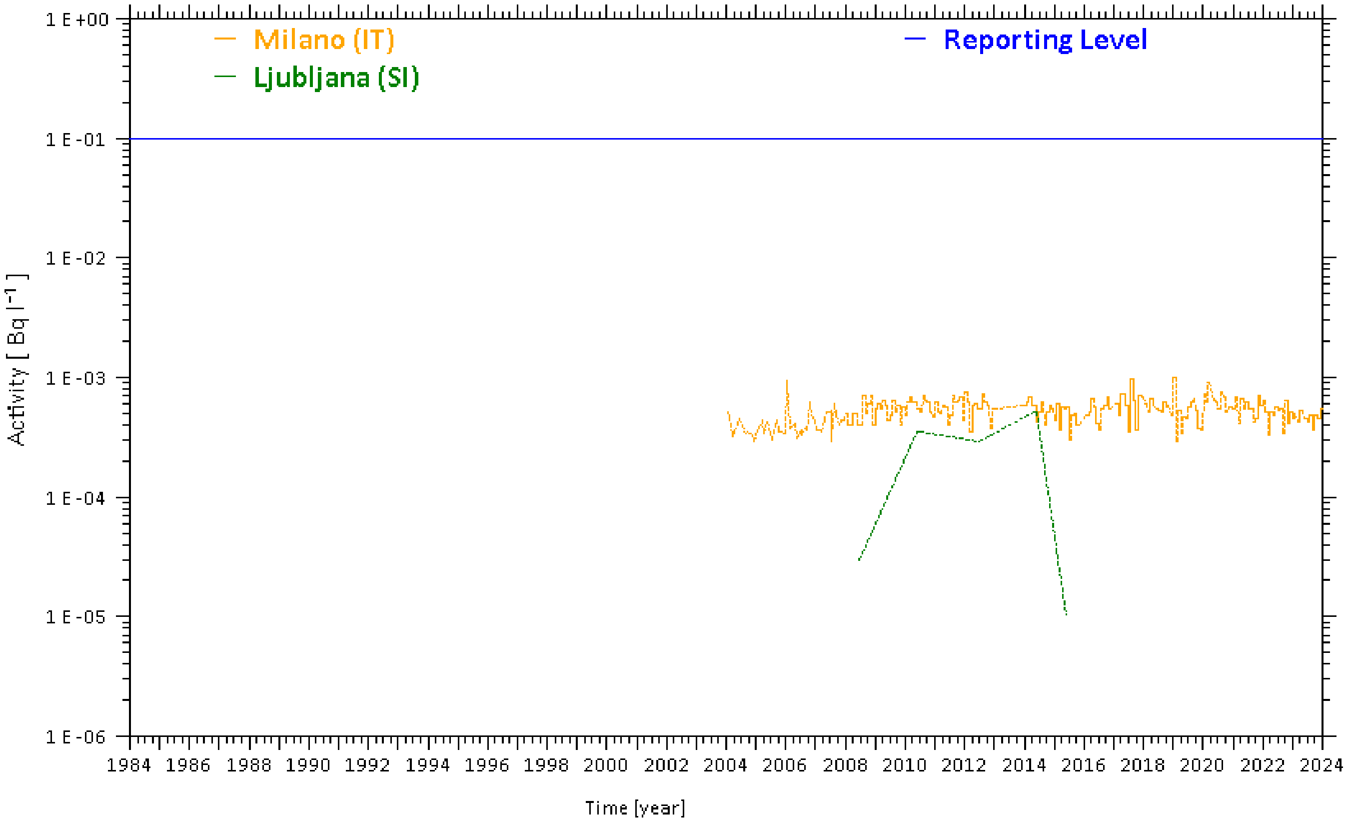
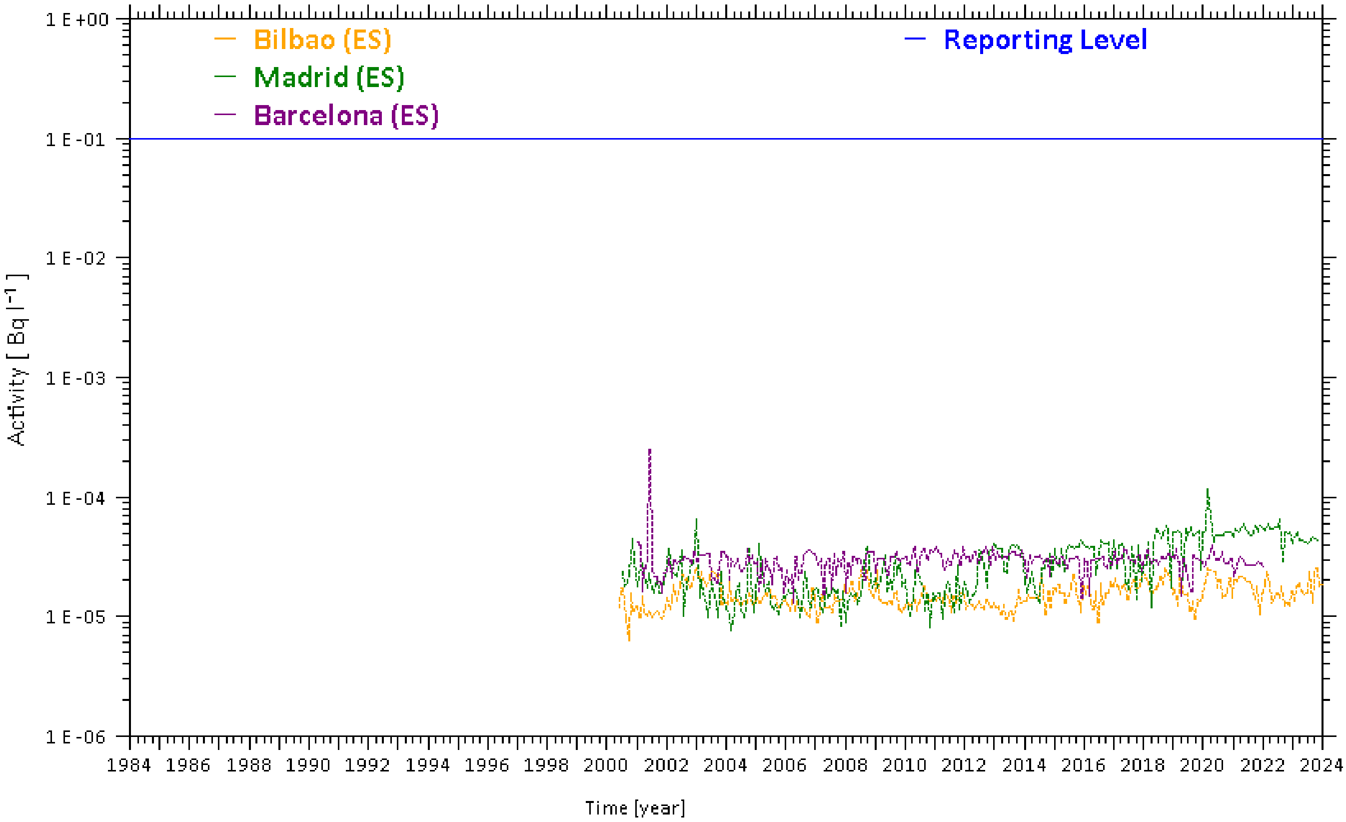


Fig. W35

Activity trends for ^{137}Cs in drinking water (Bilbao, Madrid and Barcelona)



Activity trends

SAMPLE TYPE	:	**drinking water**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

Fig. W36

Activity trends for ^{137}Cs in drinking water (Sevilla, Castelo de Bode and La Laguna-Tenerife)

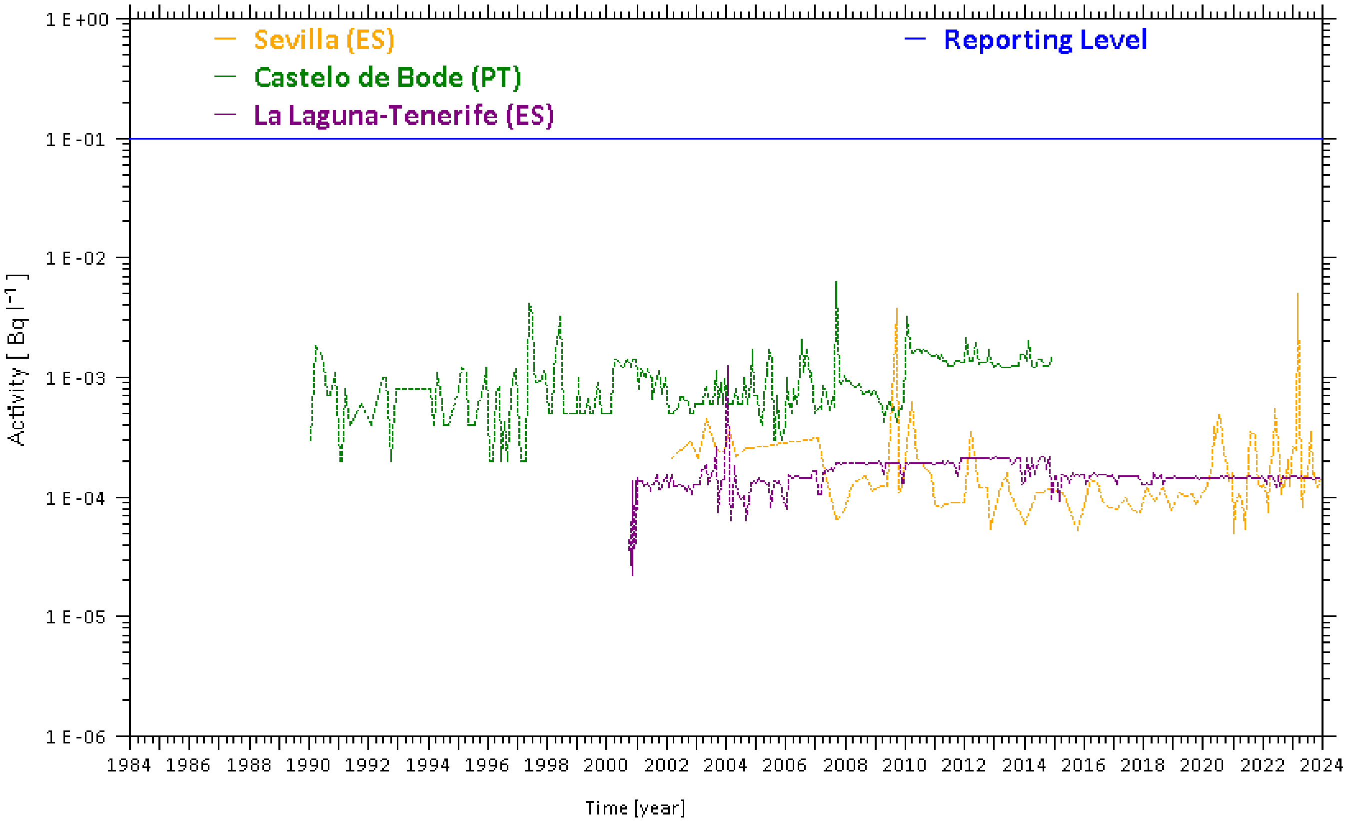
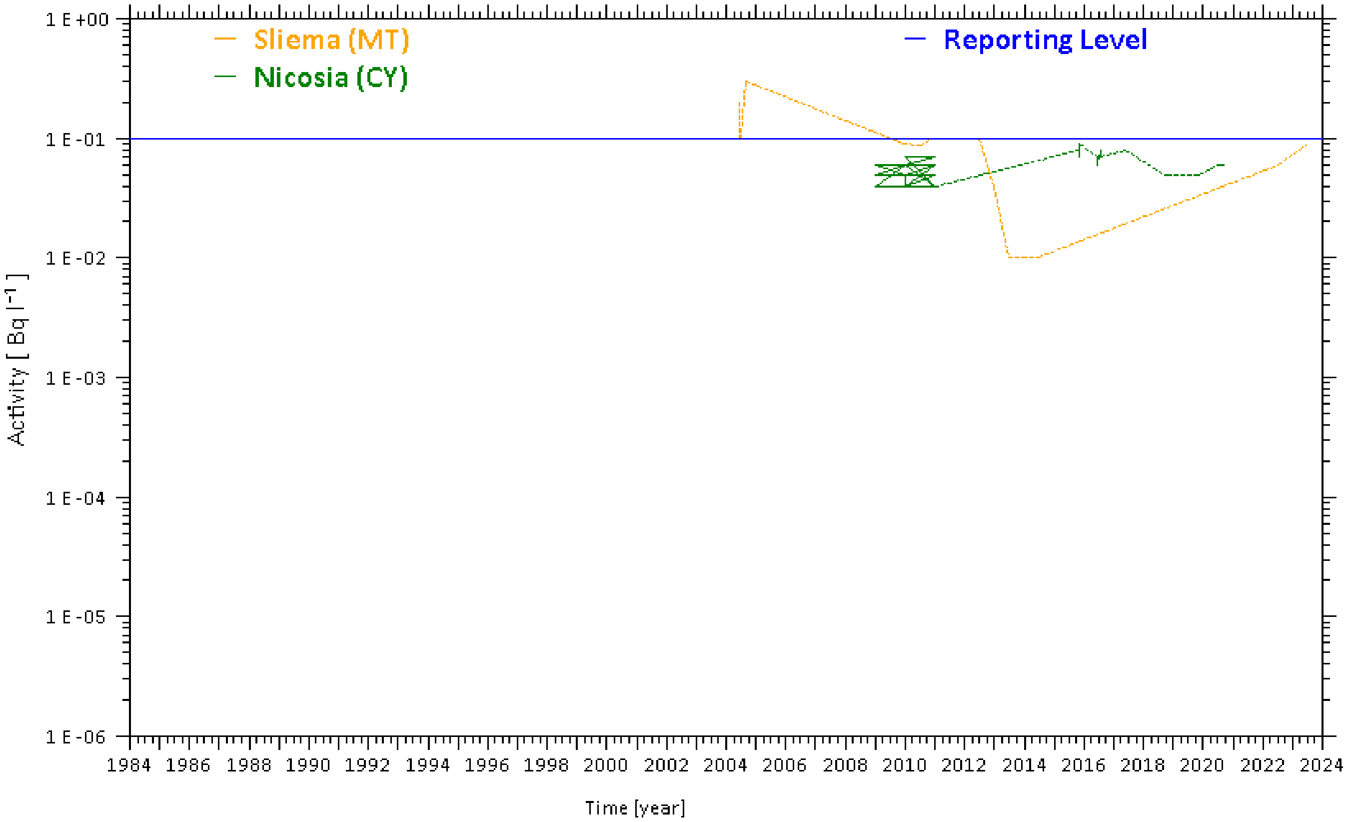


Fig. W37

Activity trends for ^{137}Cs in drinking water (Sliema and Nicosia)



Activity trends

SAMPLE TYPE : **drinking water**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. W38

Activity trends for ^{137}Cs in drinking water (Bucharest and Cluj)

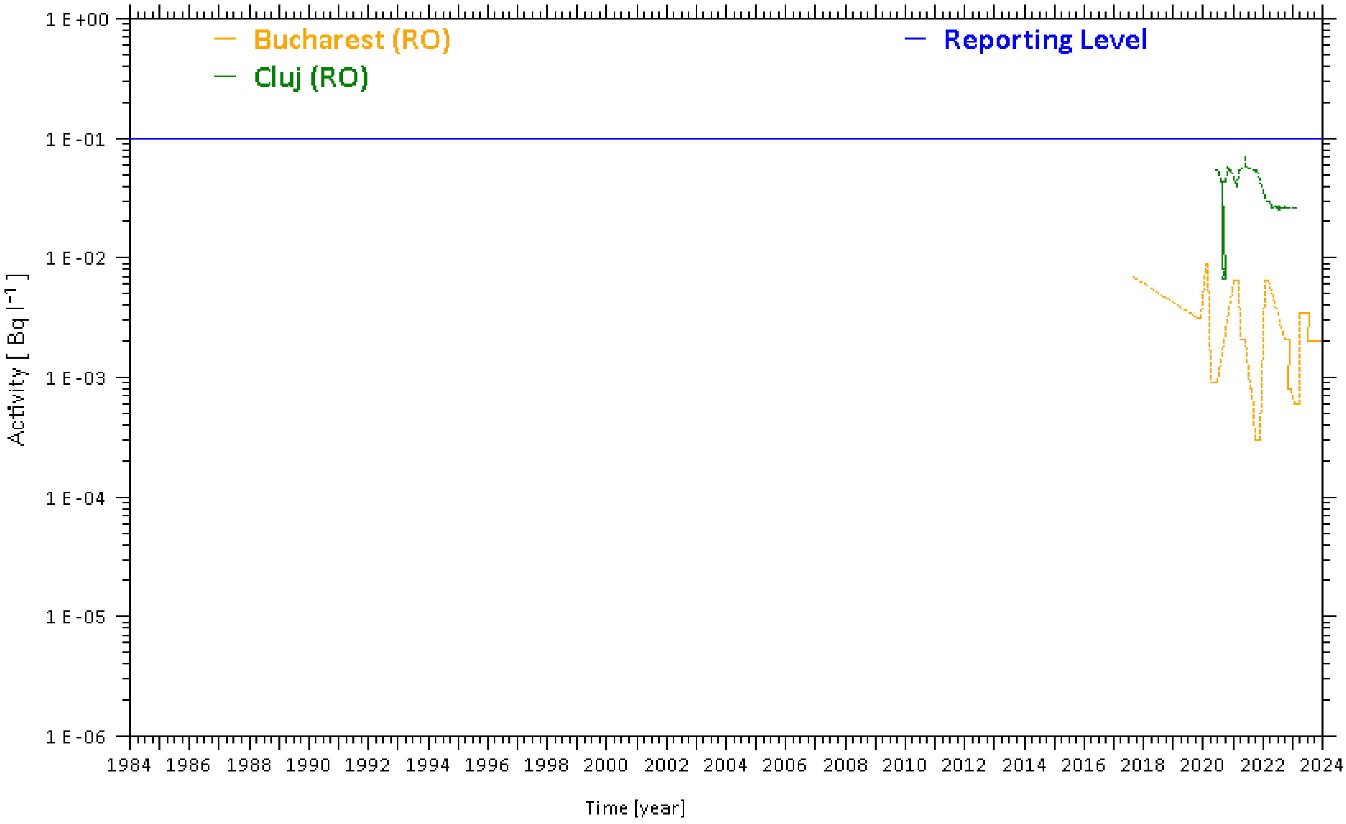
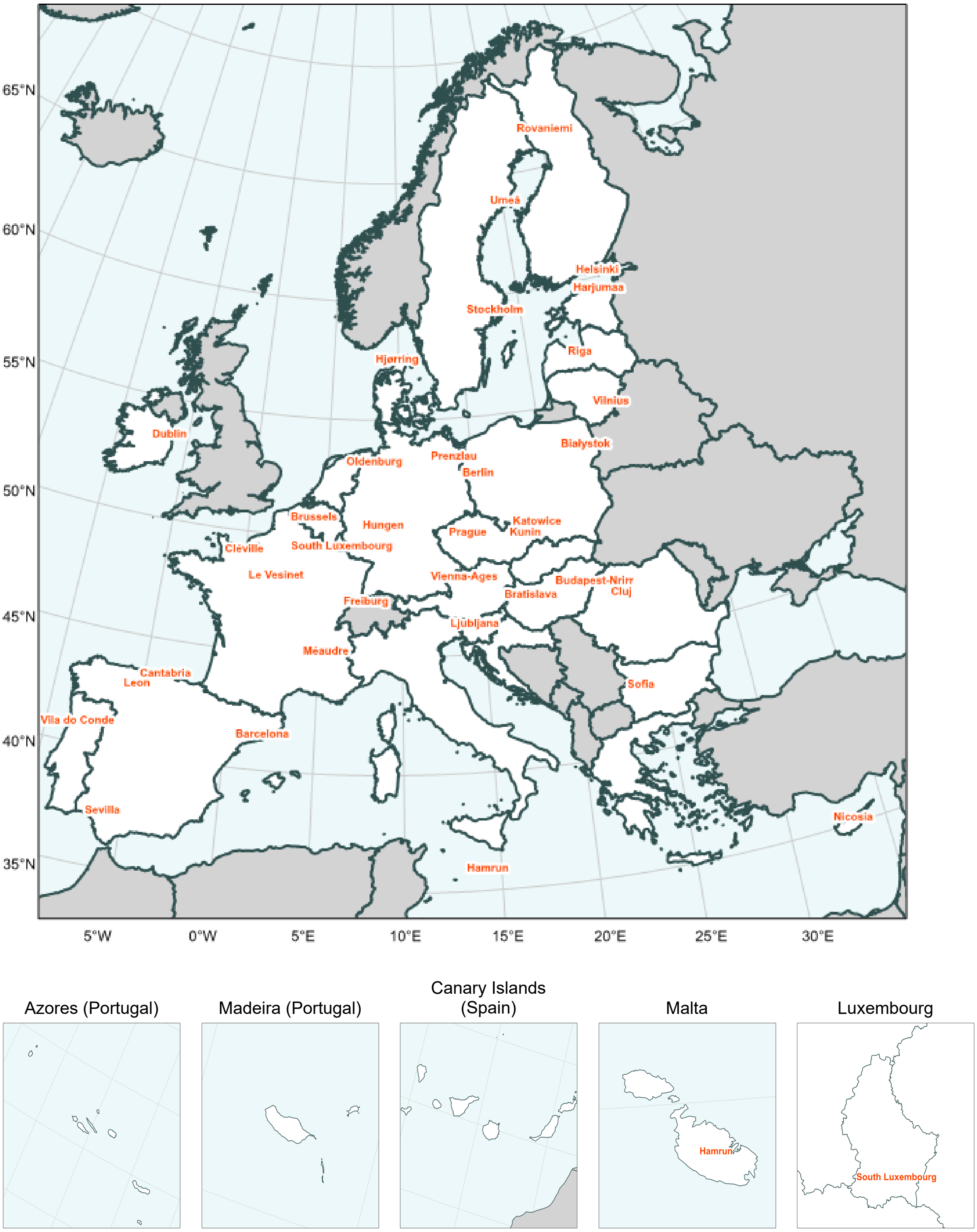


Fig. M3

Sampling locations for ^{90}Sr and ^{137}Cs in milk considered in Figures M4 – M32



SPARSE

Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M4

Activity trends for ^{90}Sr in milk (Hjørring, Rovaniemi and Helsinki)

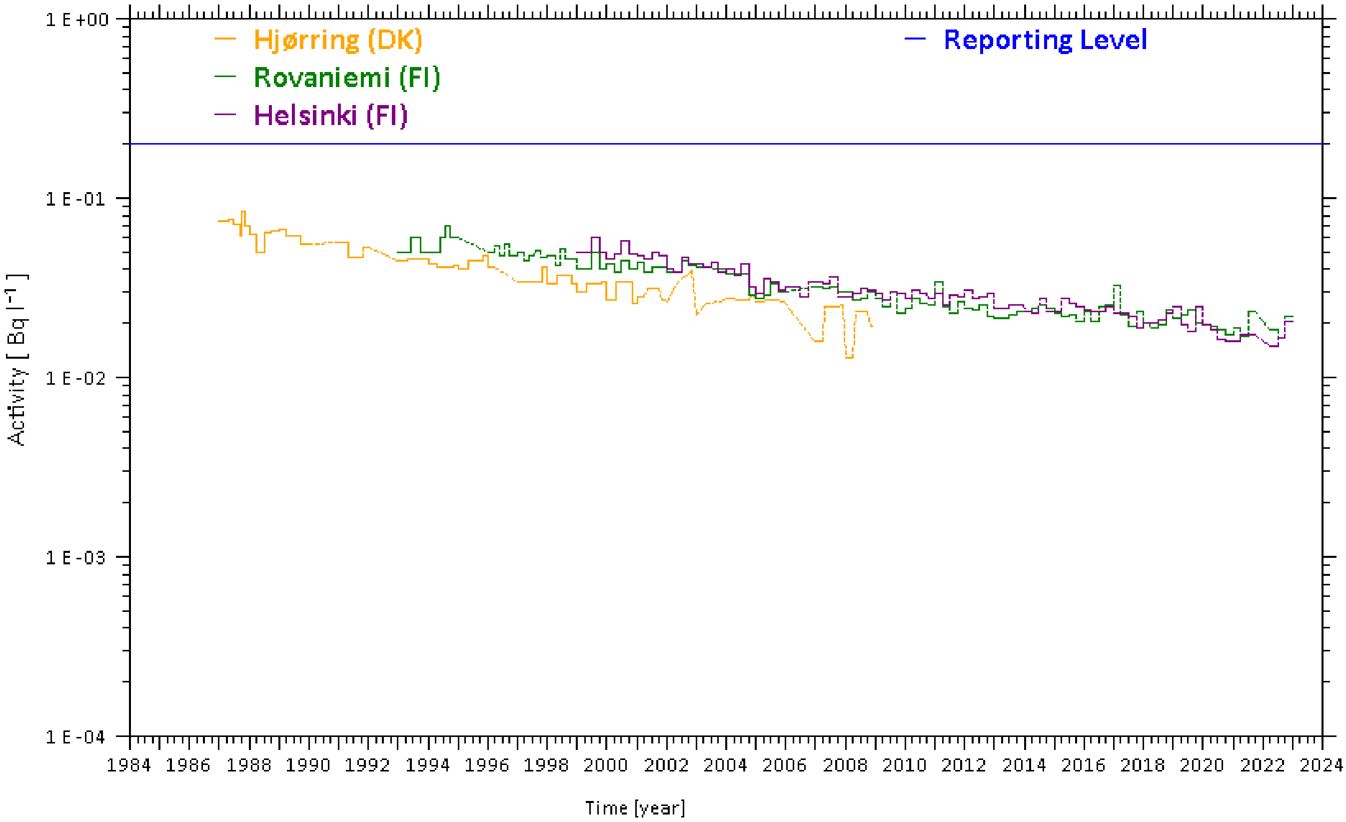
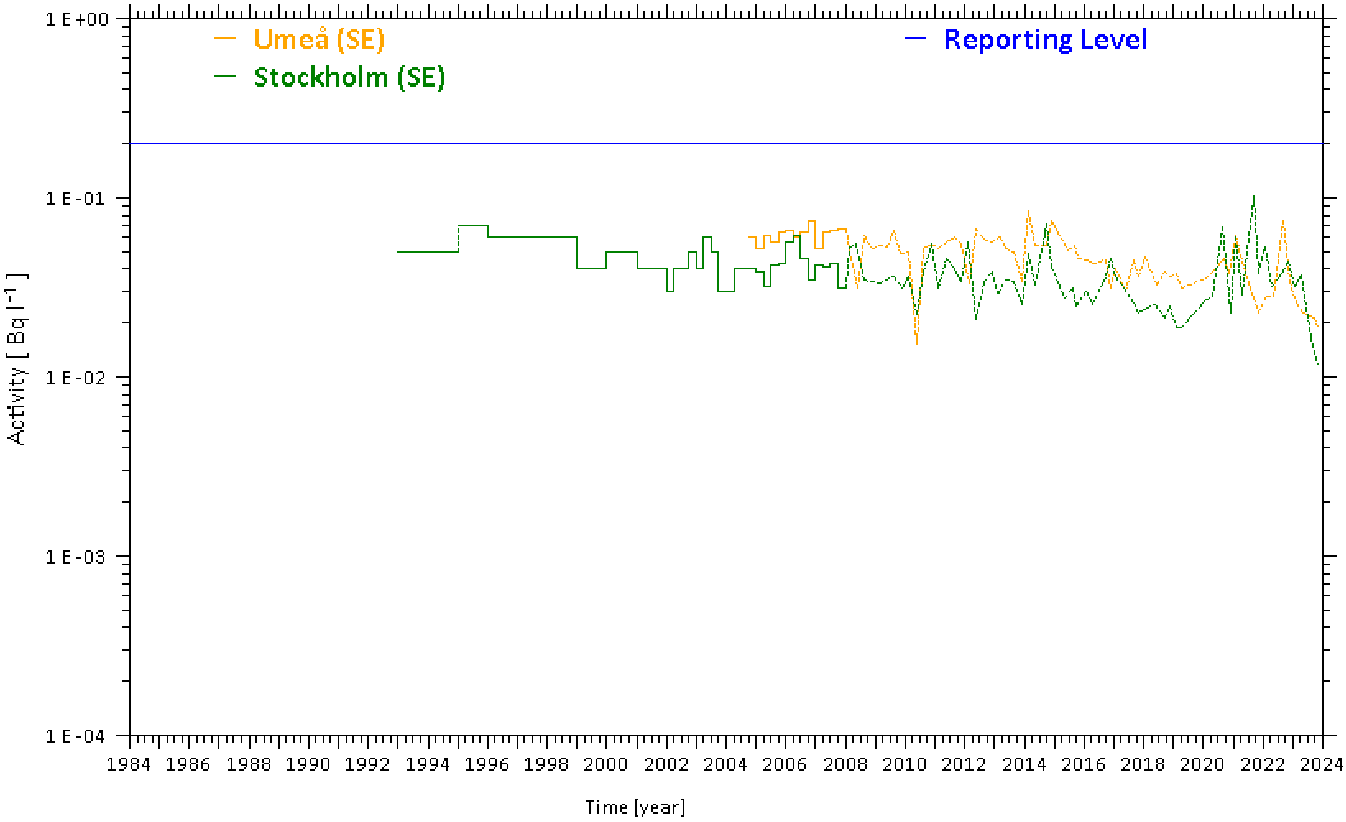


Fig. M5

Activity trends for ^{90}Sr in milk (Umeå and Stockholm)



Activity trends

SAMPLE TYPE : milk

NUCLIDE CATEGORY : strontium-90 (^{90}Sr)

MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M6

Activity trends for ^{90}Sr in milk (Harjumaa, Riga and Vilnius)

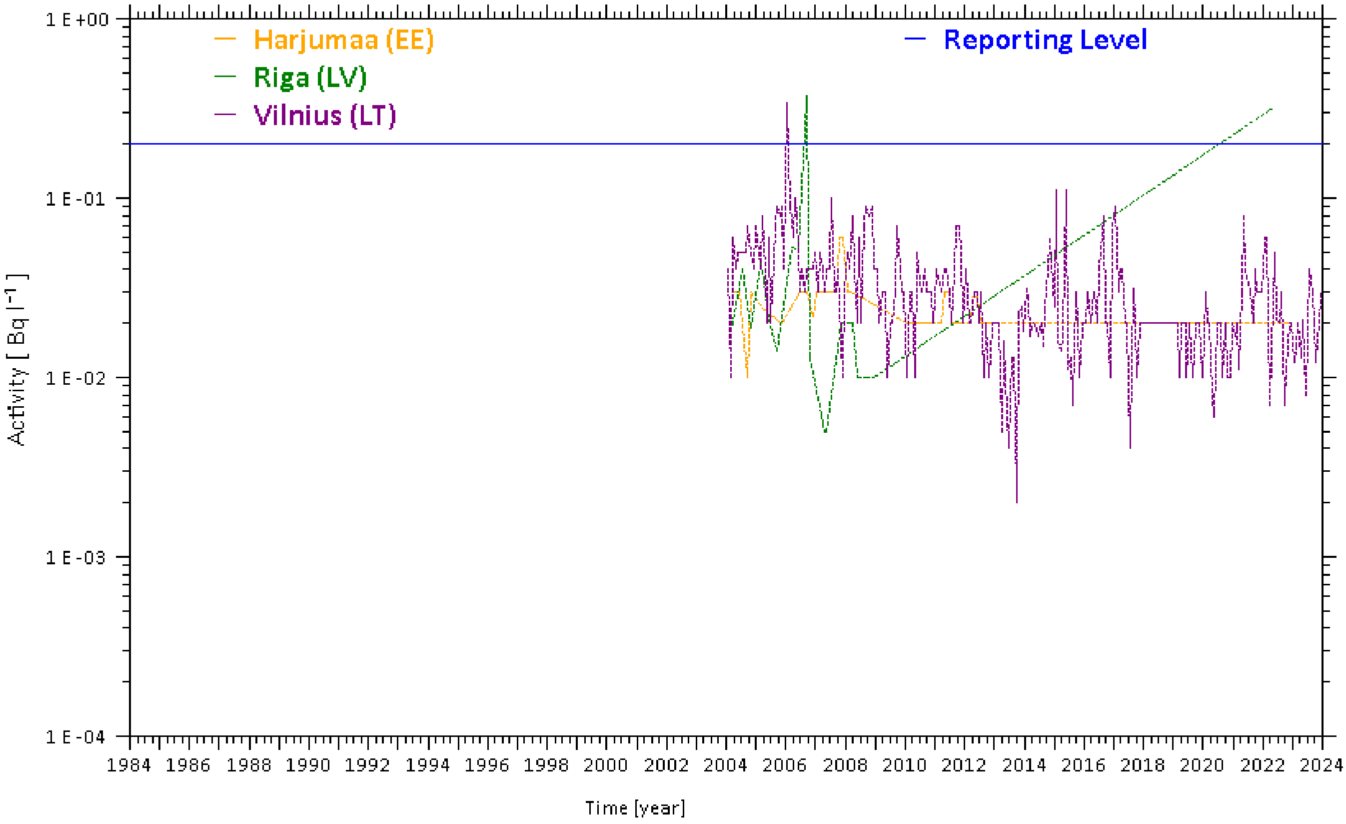
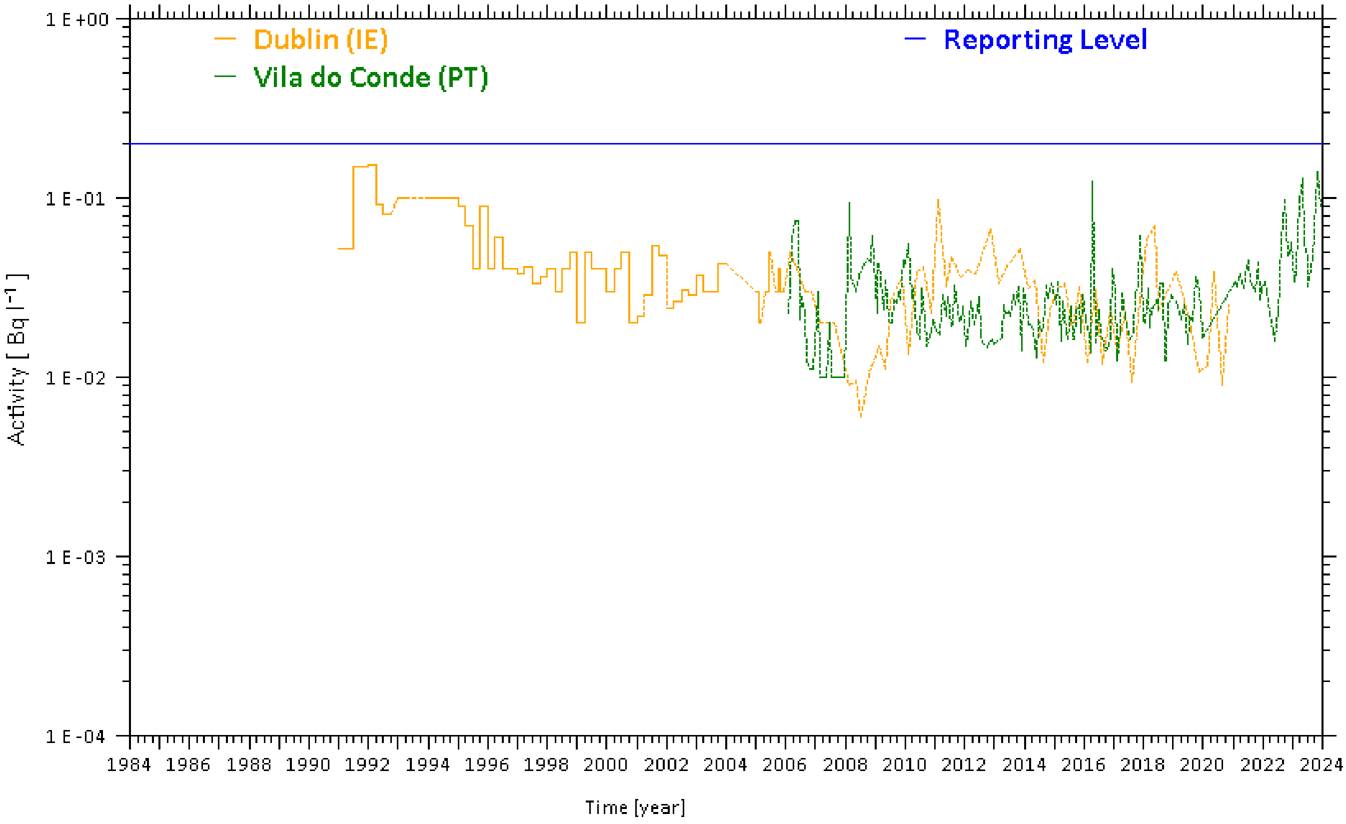


Fig. M7

Activity trends for ^{90}Sr in milk (Dublin and Vila do Conde)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M8

Activity trends for ^{90}Sr in milk (Prenzlau, Oldenburg and Hungen)

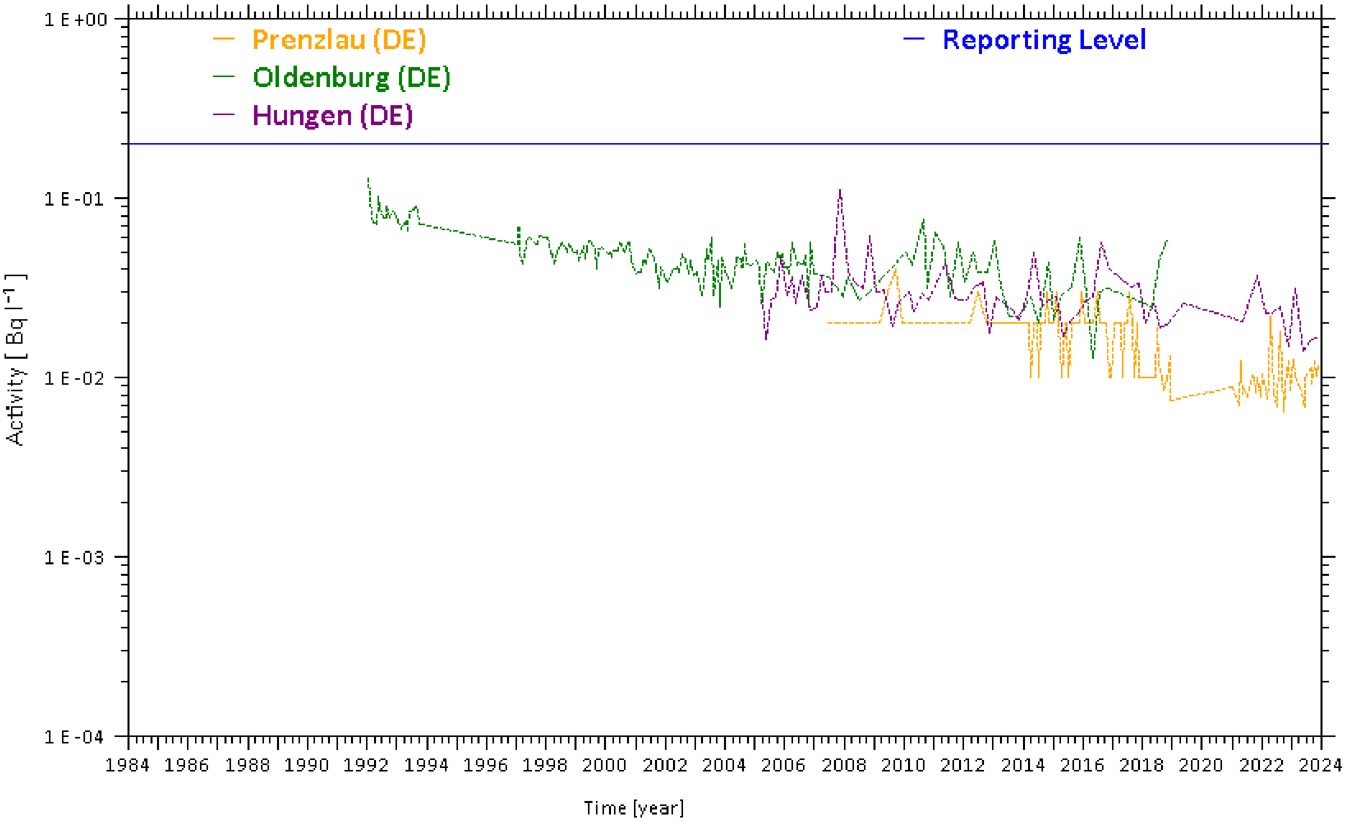
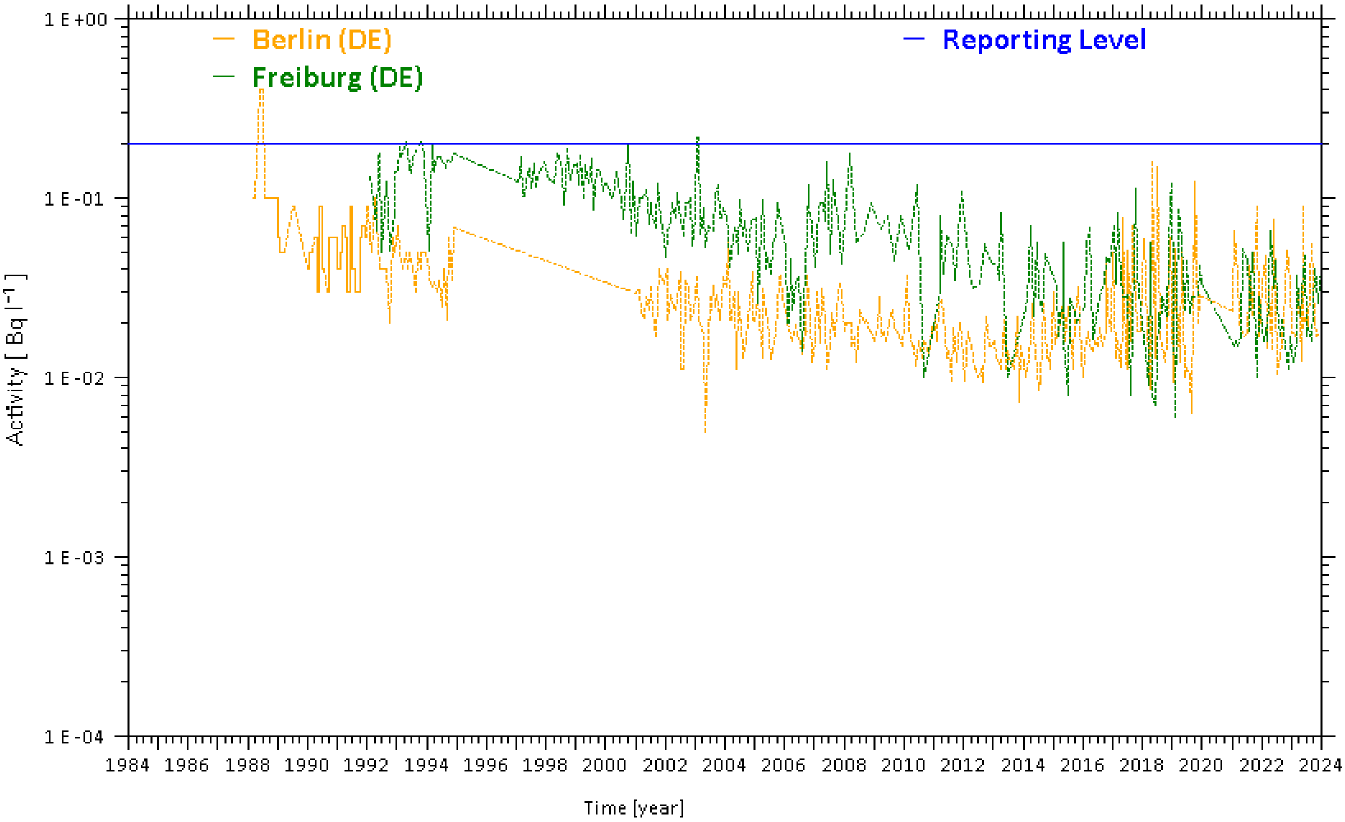


Fig. M9

Activity trends for ^{90}Sr in milk (Berlin and Freiburg)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M10

Activity trends for ^{90}Sr in milk (Białystok, Prague and Kunin)

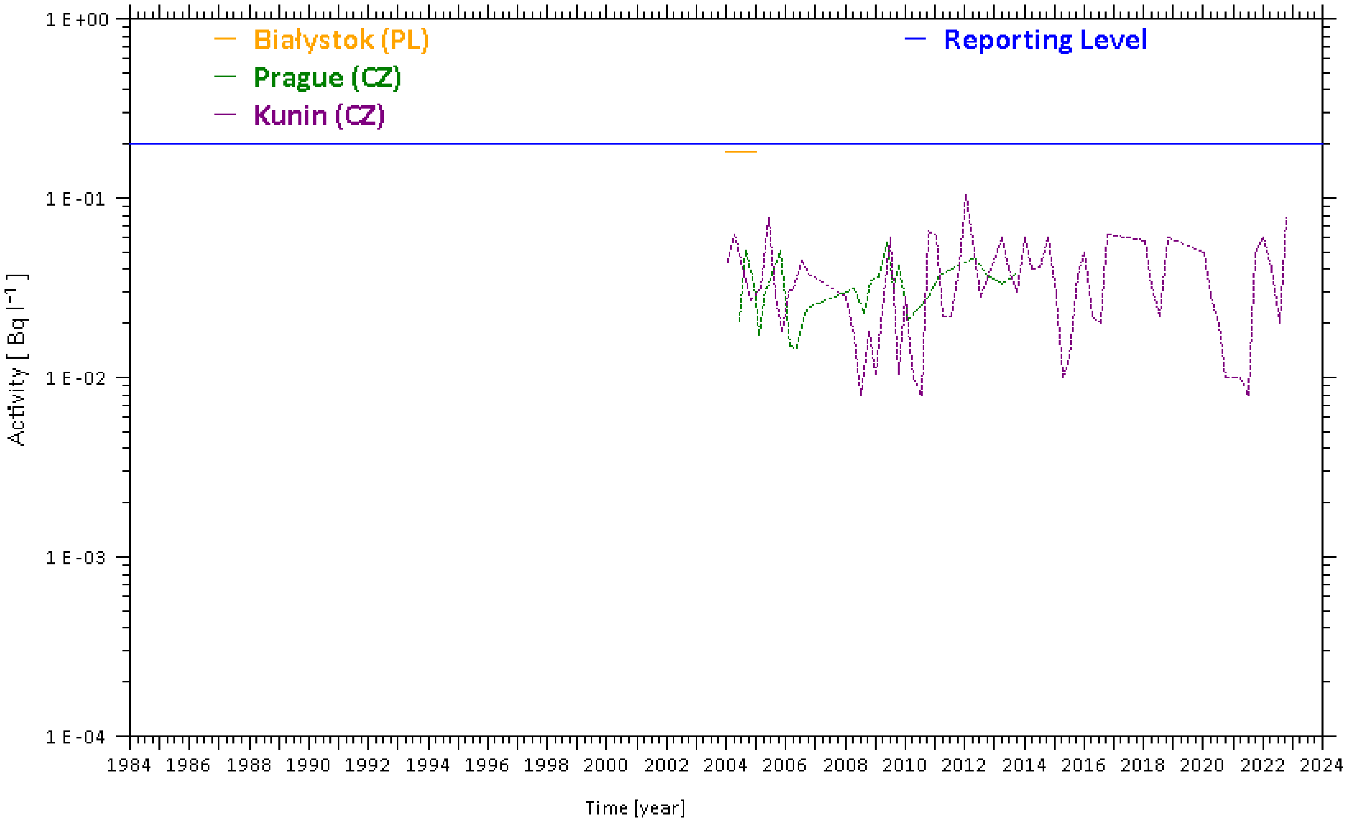
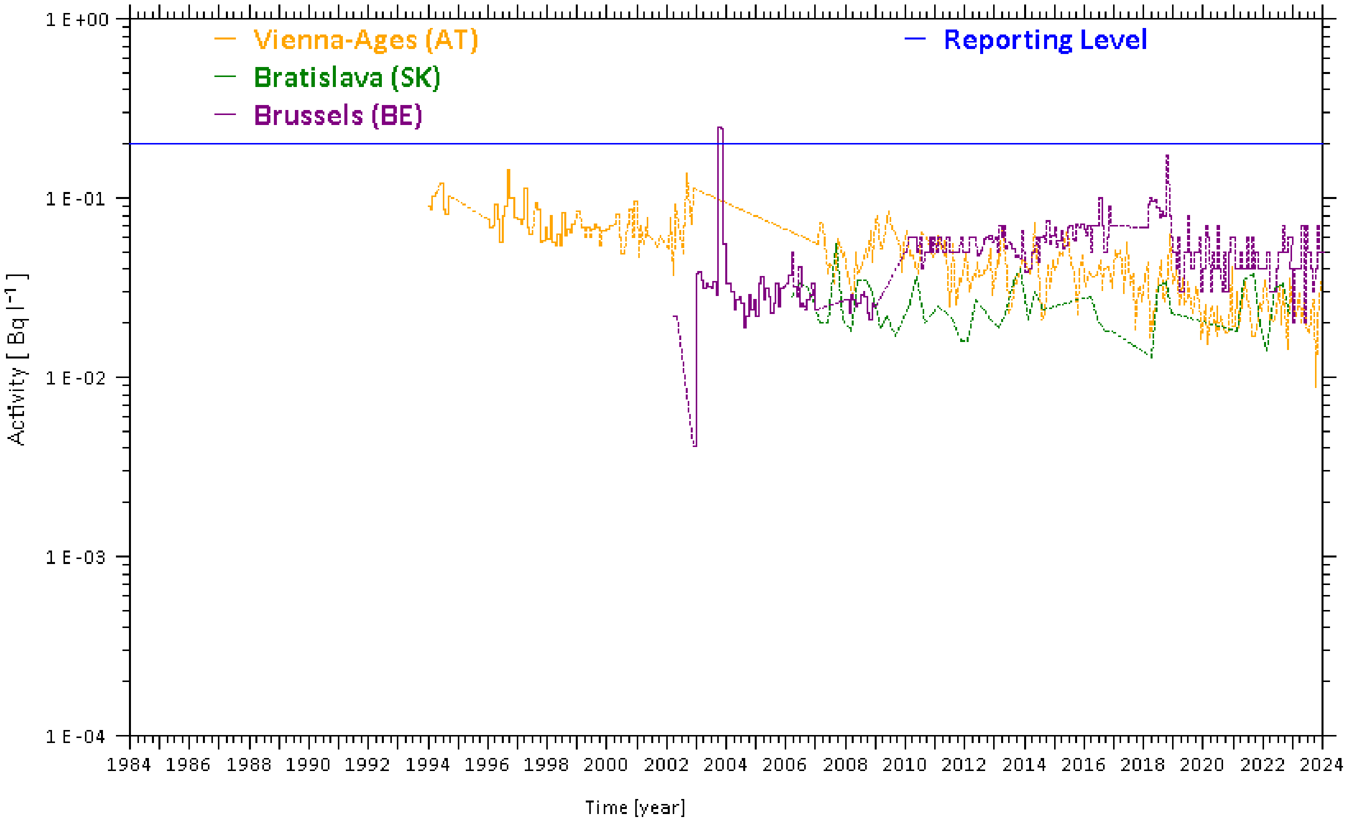


Fig. M11

Activity trends for ^{90}Sr in milk (Vienna-Ages, Bratislava and Brussels)



SPARSE

Activity trends

SAMPLE TYPE : **milk**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. M12

Activity trends for ^{90}Sr in milk (Cléville, Le Vesinet and Méaudre)

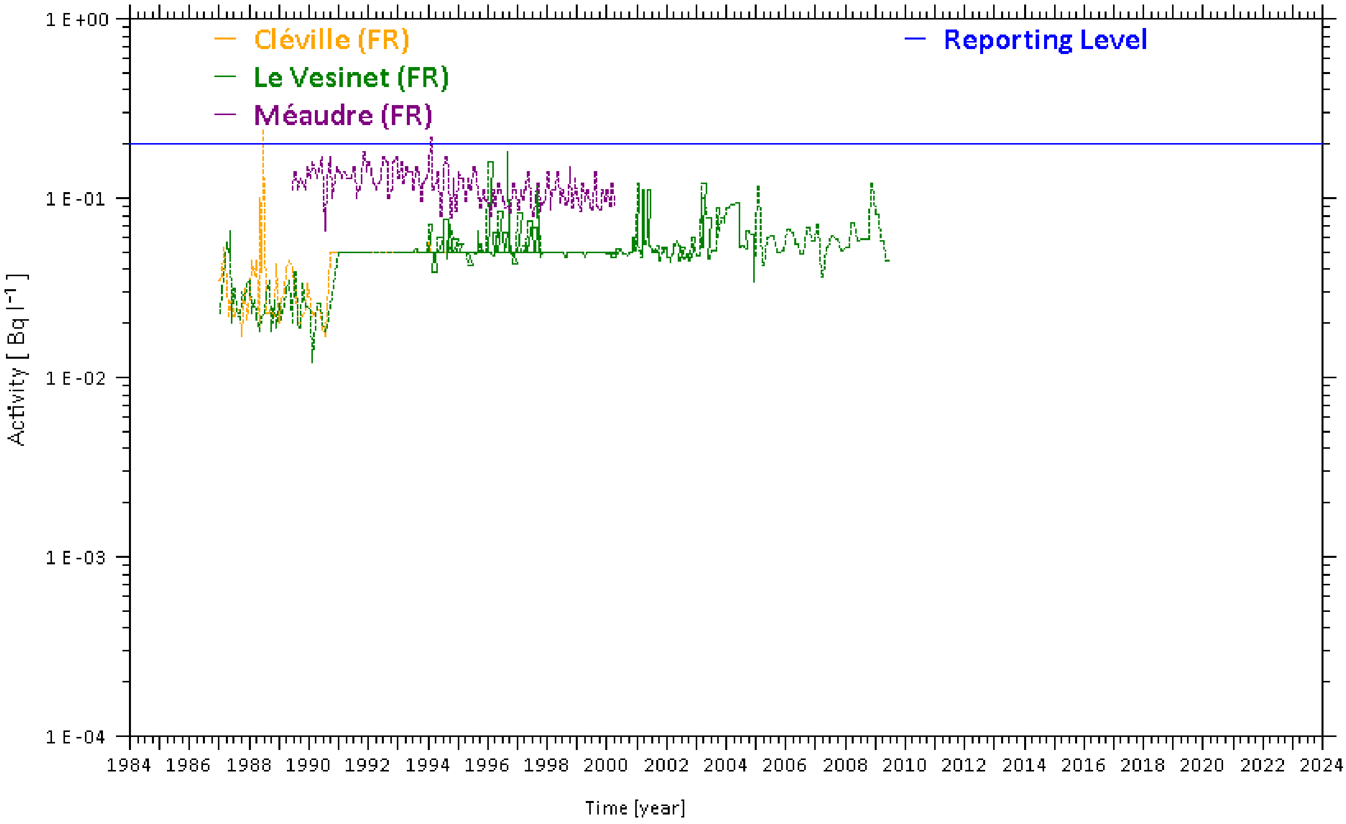


Fig. M13

Activity trends for ^{90}Sr in milk (Ljubljana and Budapest-Nrirr)

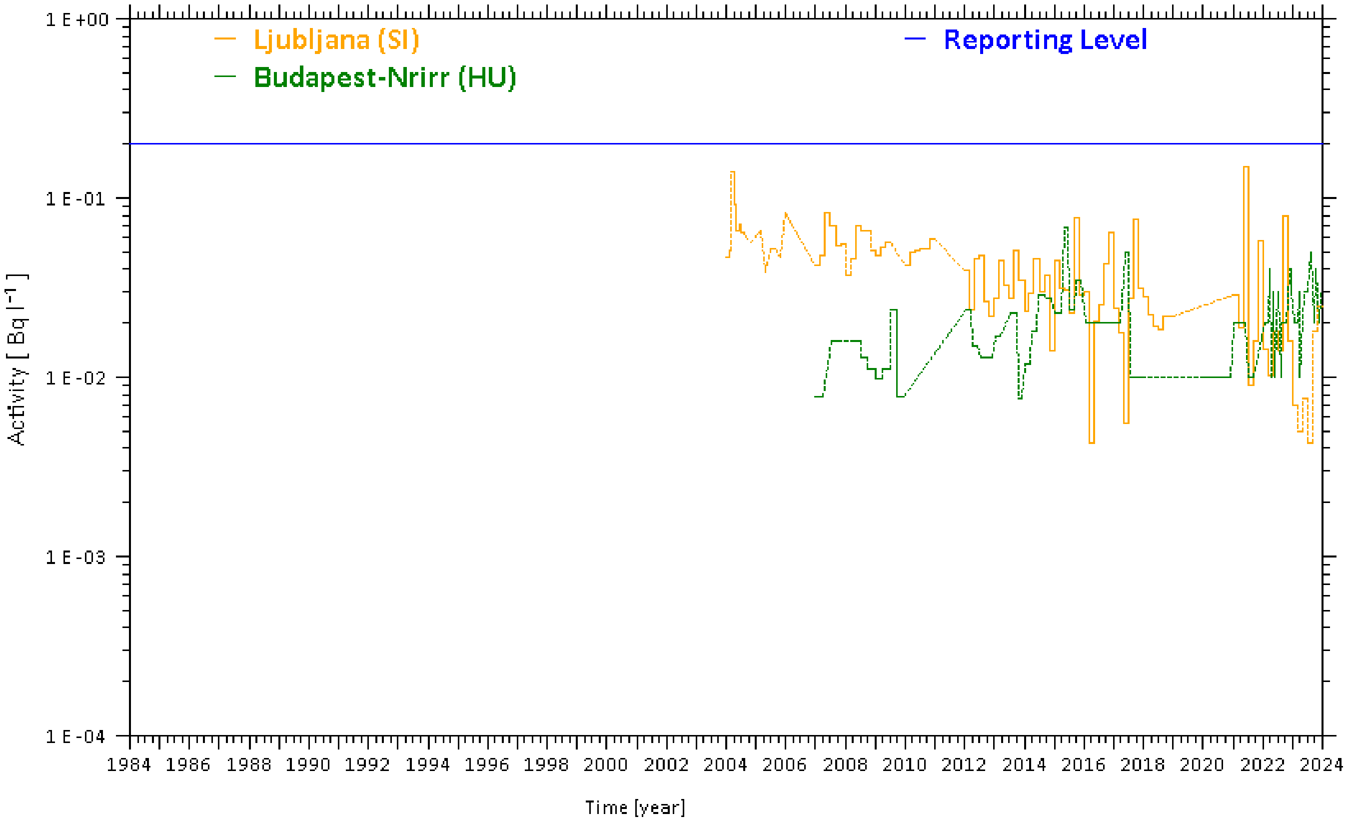


Fig. M14

Activity trends for ^{90}Sr in milk (Sofia and Nicosia)

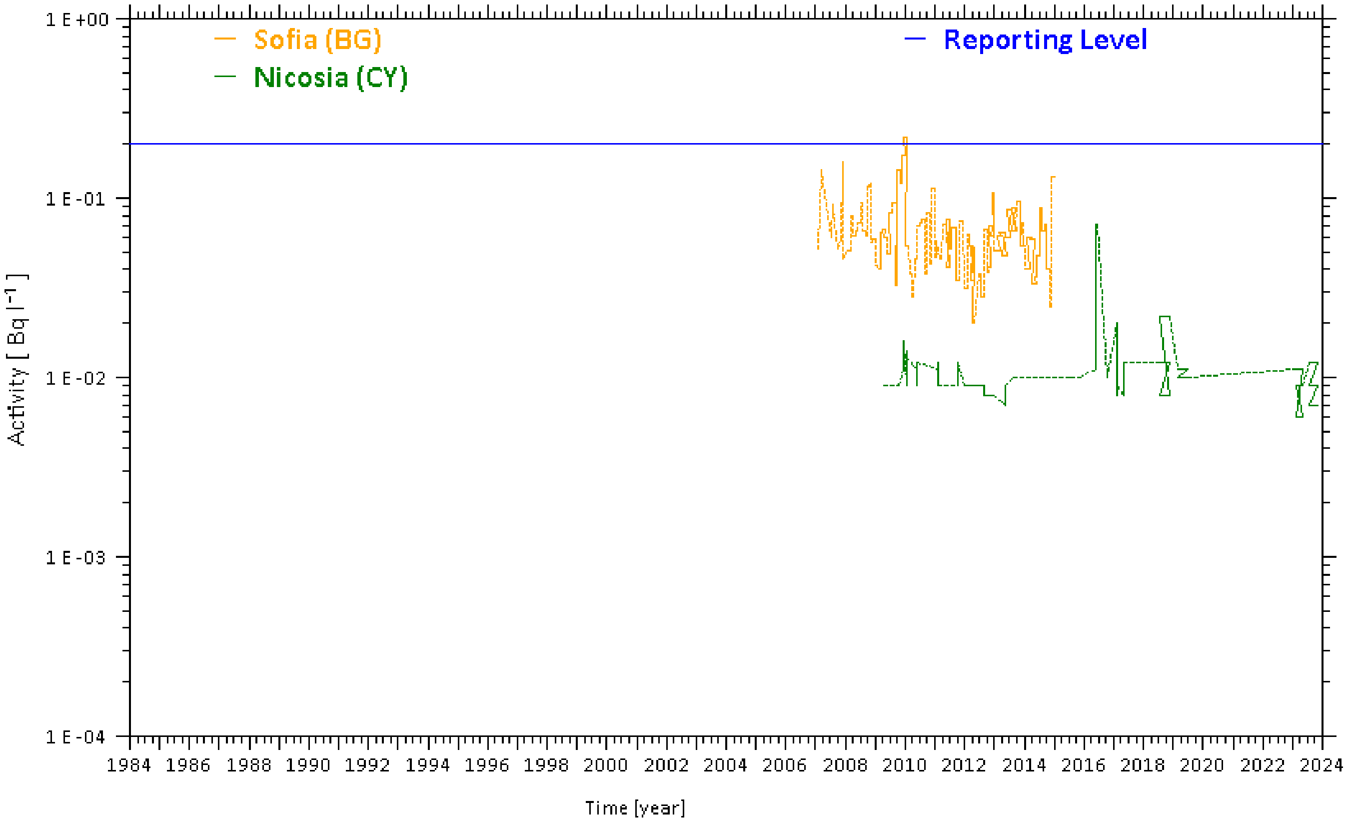
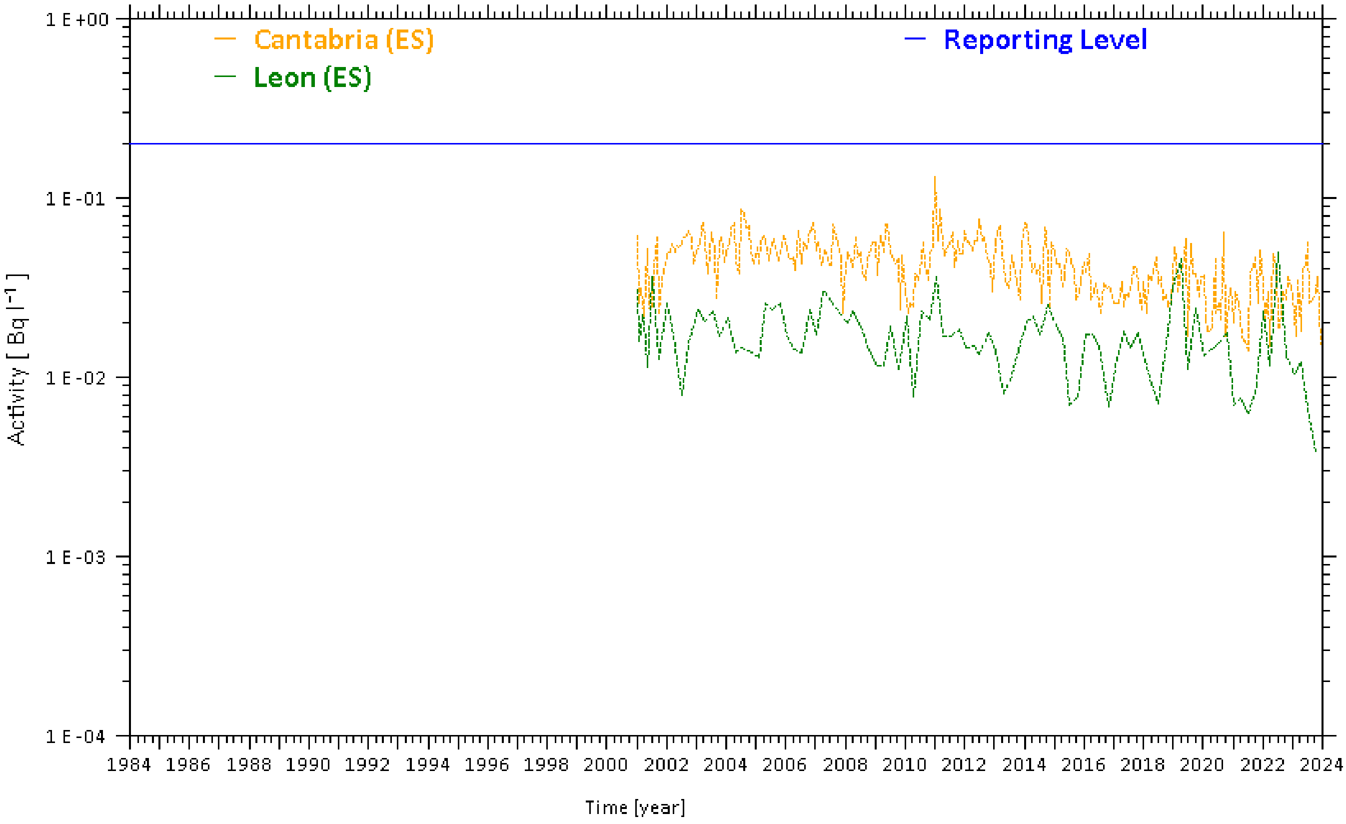


Fig. M15

Activity trends for ^{90}Sr in milk (Cantabria and Leon)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M16

Activity trends for ^{90}Sr in milk (Sevilla and Barcelona)

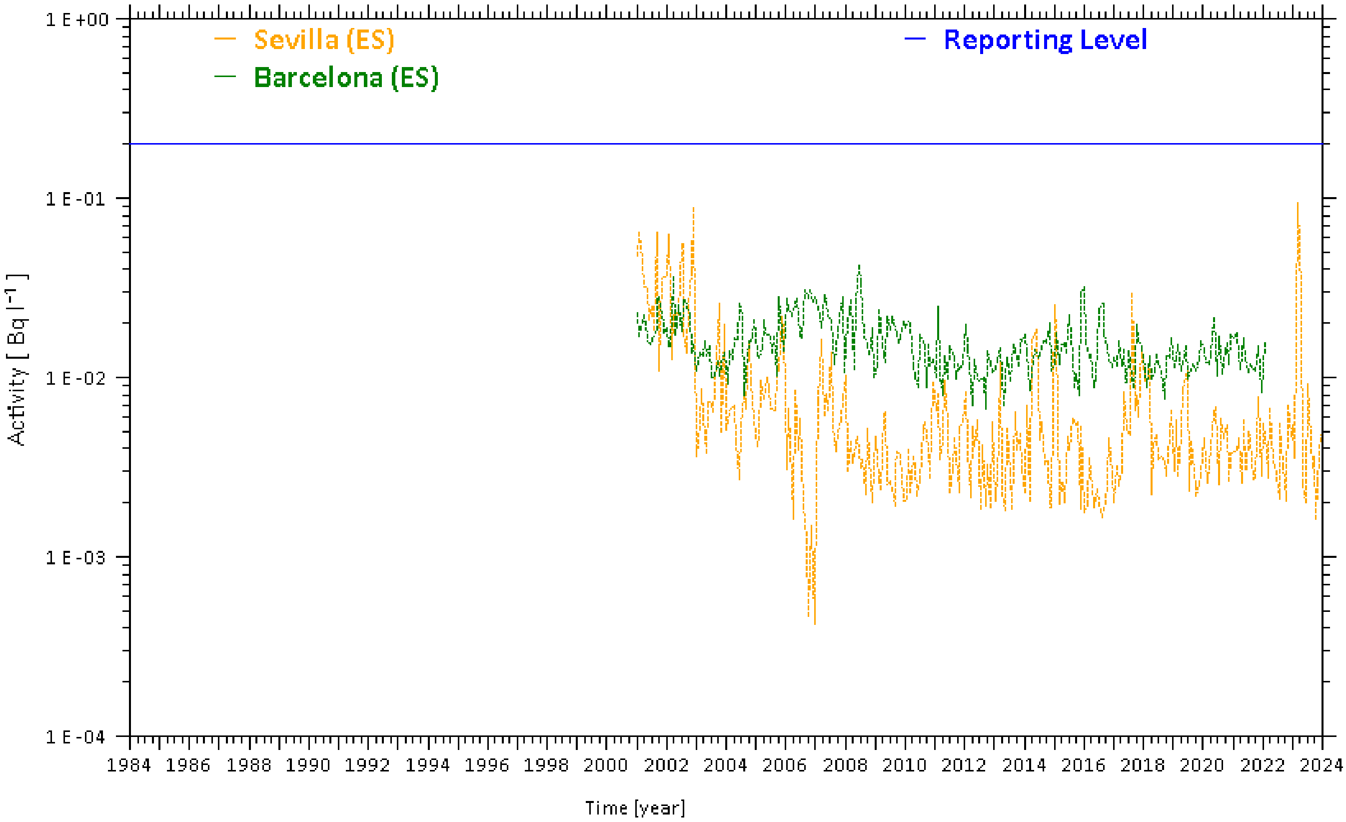
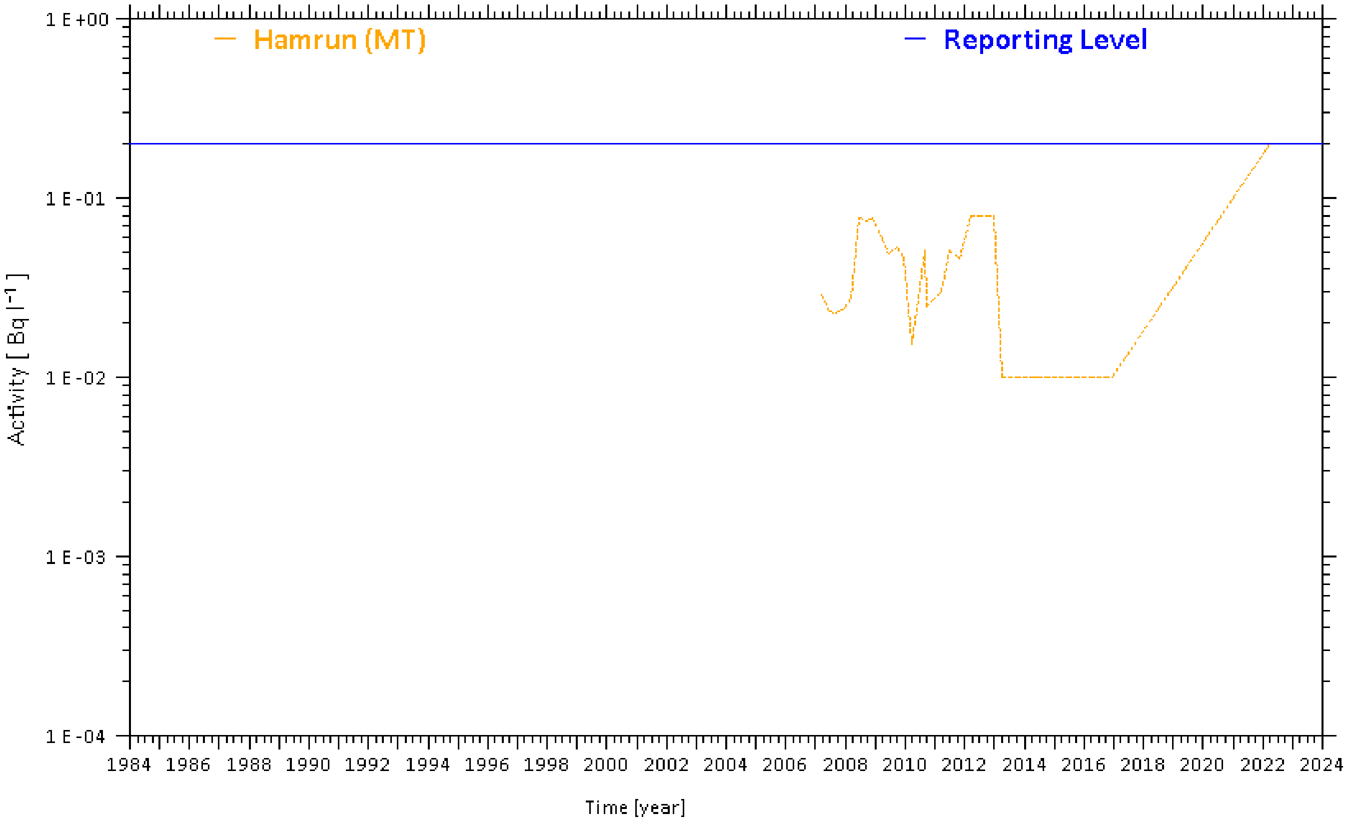


Fig. M17

Activity trends for ^{90}Sr in milk (Hamrun)



SAMPLE TYPE	:	**milk**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq l $^{-1}$** (Bq per litre)

Fig. M18

Activity trends for ^{137}Cs in milk (Hjørring, Rovaniemi and Helsinki)

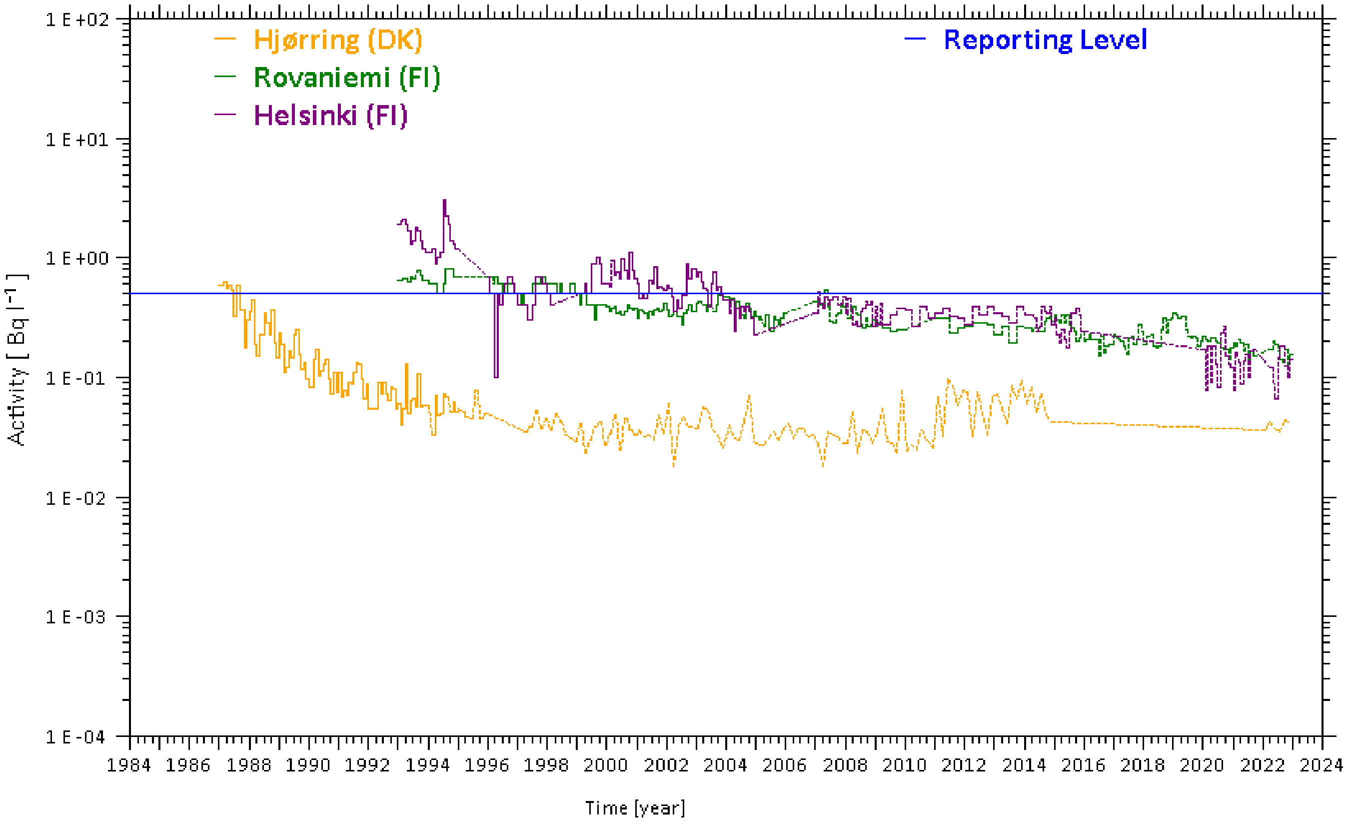
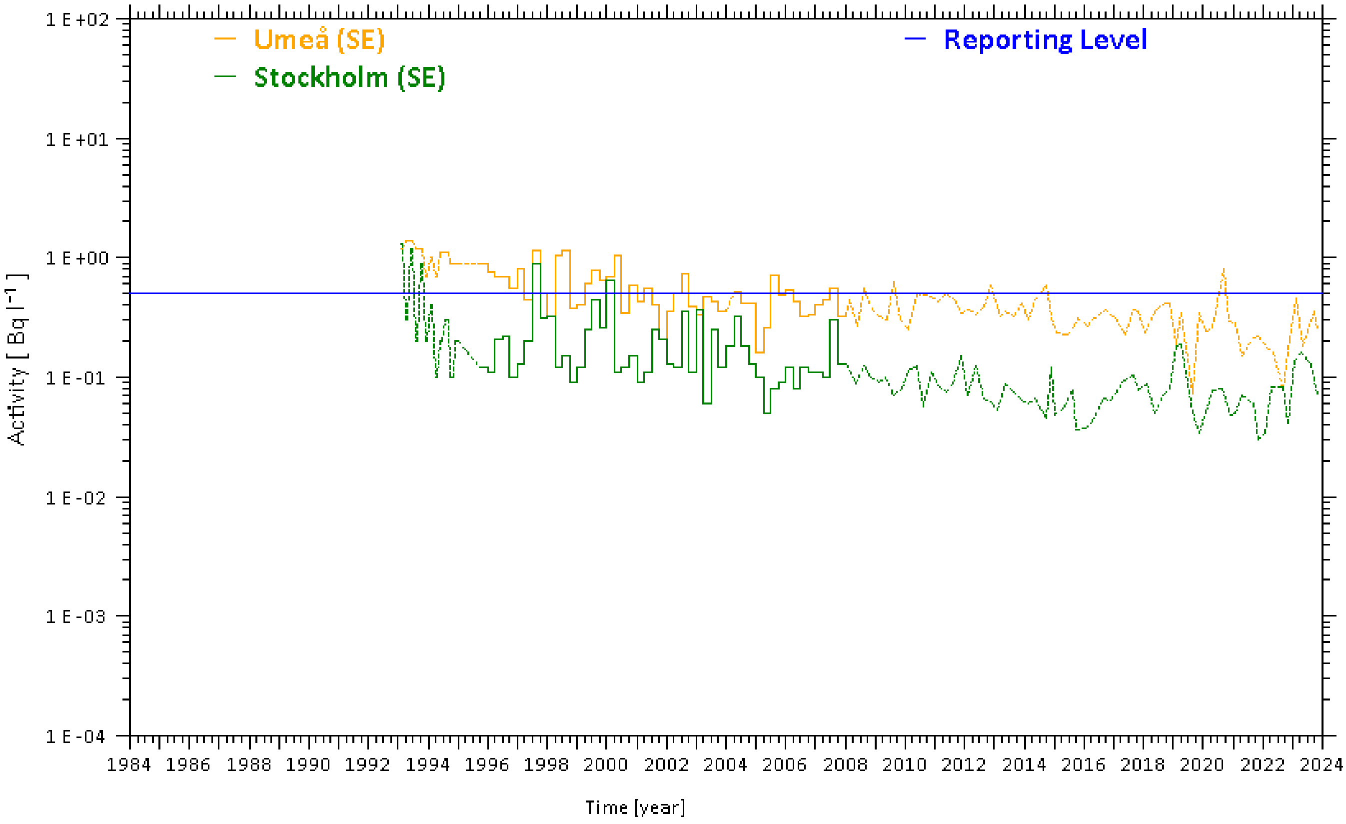


Fig. M19

Activity trends for ^{137}Cs in milk (Umeå and Stockholm)



Activity trends

SAMPLE TYPE	:	**milk**	
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**	
MEASUREMENT UNIT	:	**Bq l $^{-1}$**	(Bq per litre)

Fig. M20

Activity trends for ^{137}Cs in milk (Harjumaa, Riga and Vilnius)

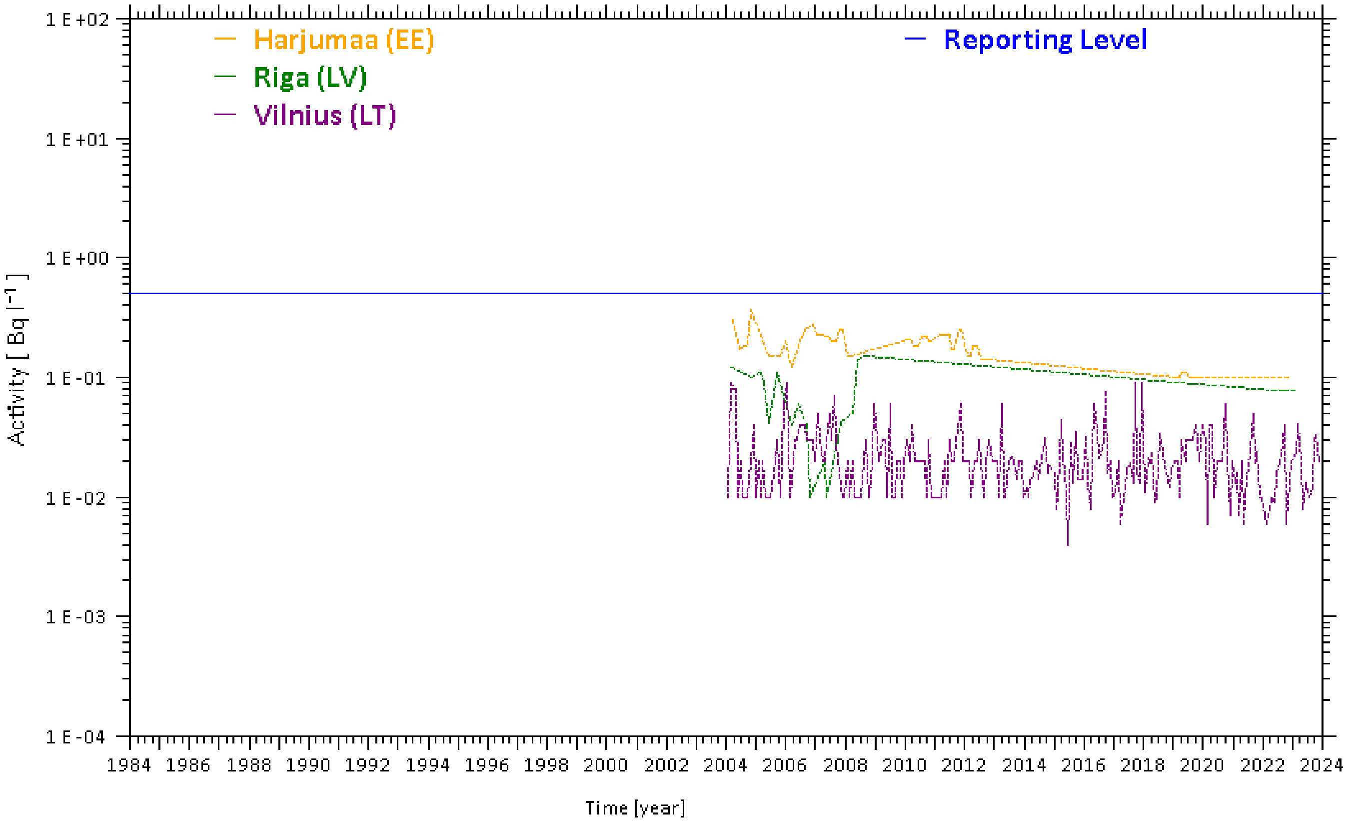
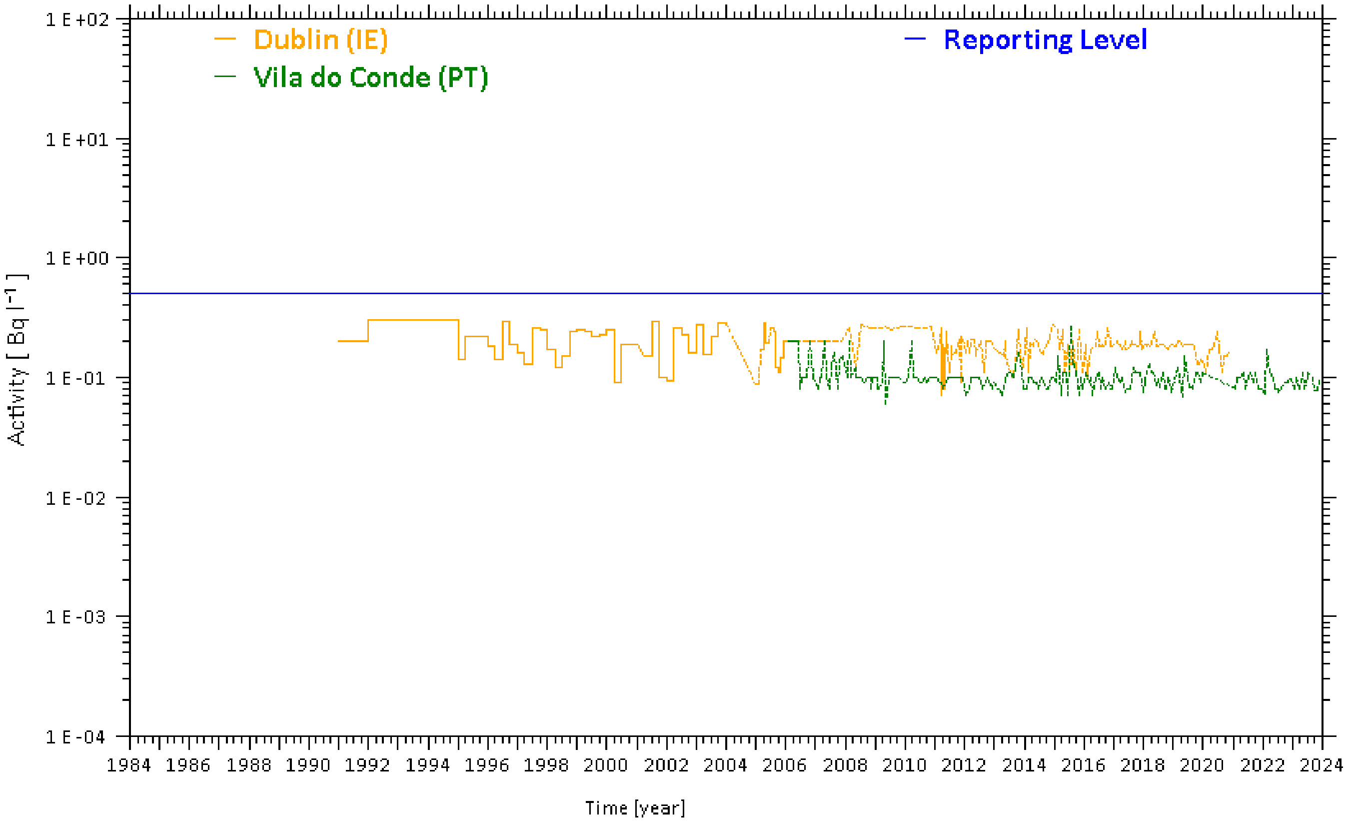


Fig. M21

Activity trends for ^{137}Cs in milk (Dublin and Vila do Conde)



Activity trends

SAMPLE TYPE	:	milk
NUCLIDE CATEGORY	:	caesium-137 (^{137}Cs)
MEASUREMENT UNIT	:	Bq l^{-1} (Bq per litre)

SPARSE

Fig. M22

Activity trends for ^{137}Cs in milk (Oldenburg and Hungen)

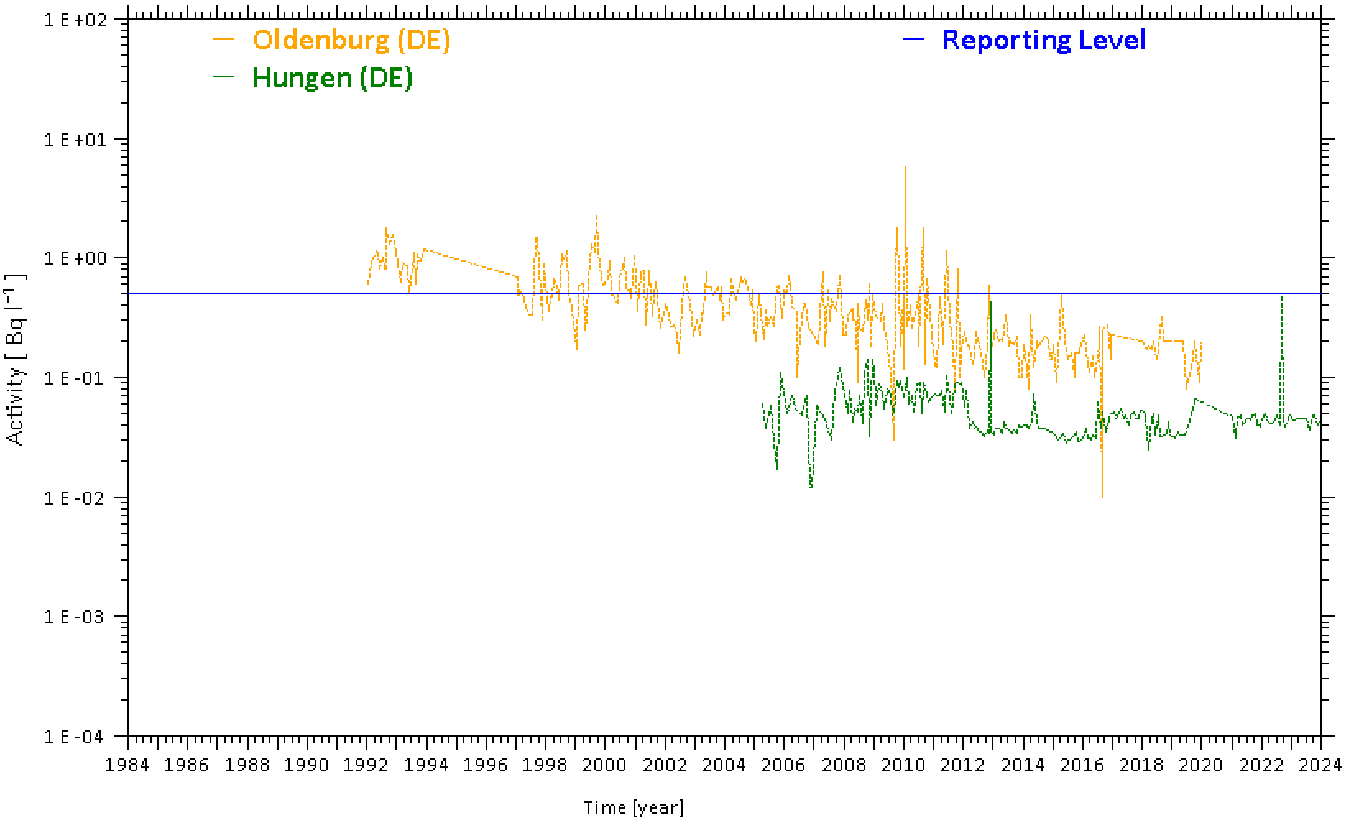
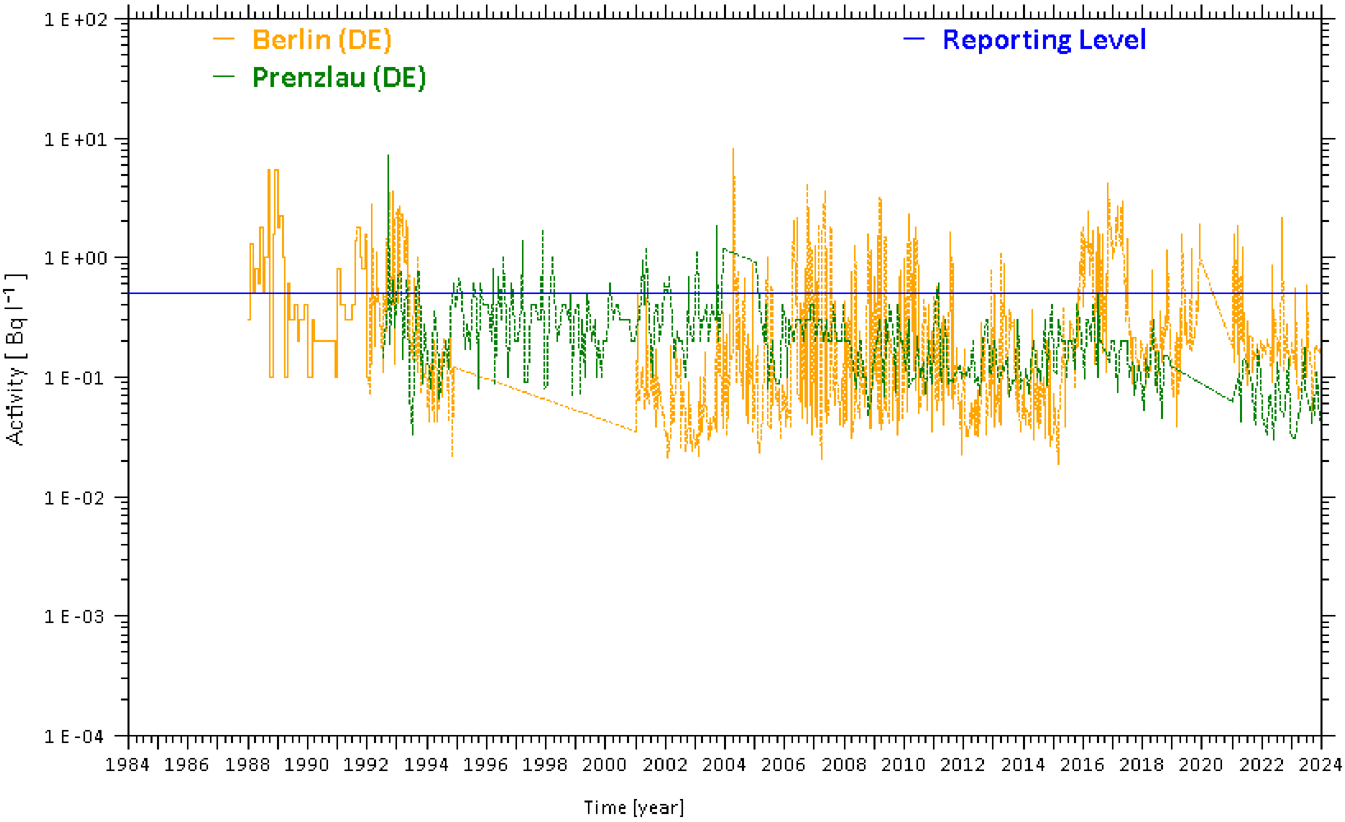


Fig. M23

Activity trends for ^{137}Cs in milk (Berlin and Prenzlau)



SPARSE

Activity trends

SAMPLE TYPE : **milk**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq l $^{-1}$** (Bq per litre)

Fig. M24

Activity trends for ^{137}Cs in milk (Białystok and Katowice)

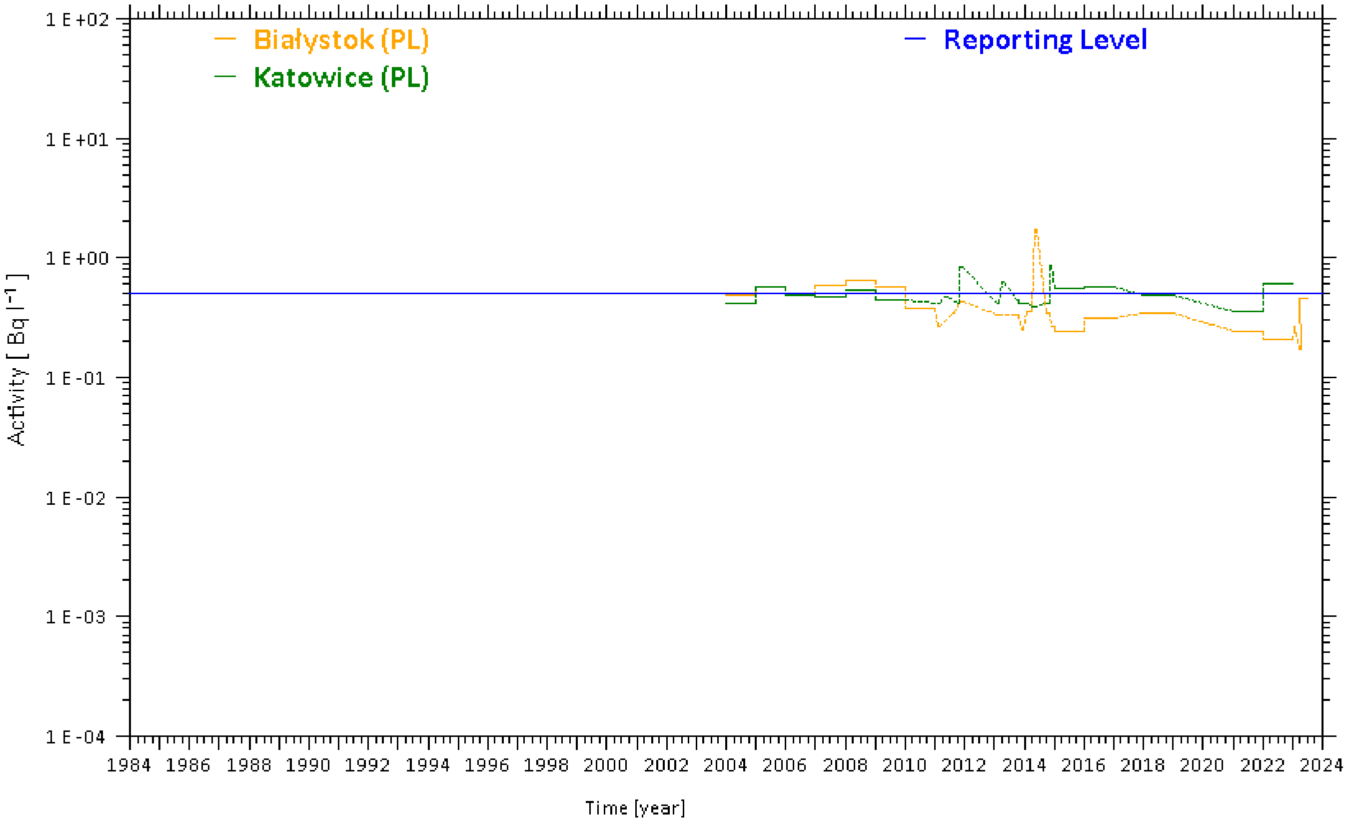
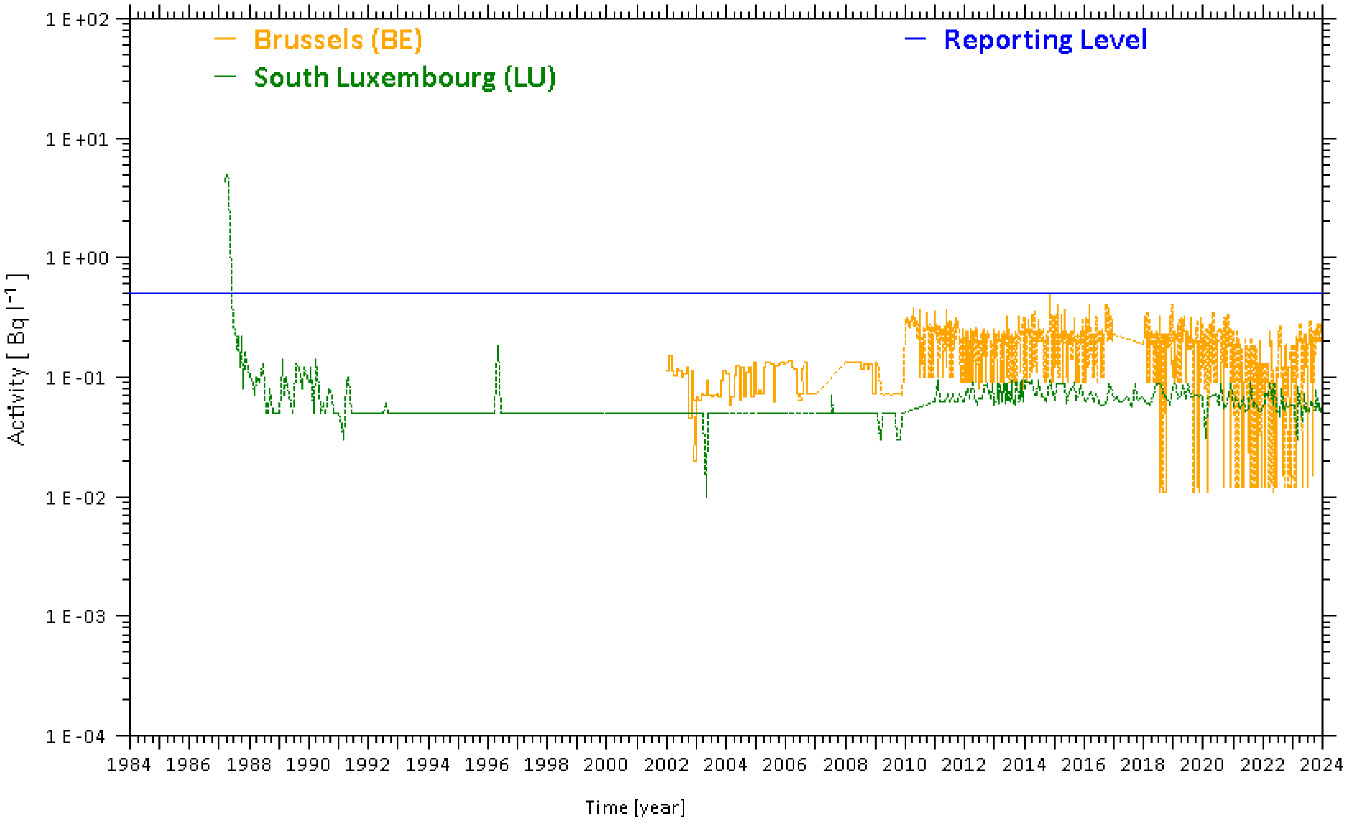


Fig. M25

Activity trends for ^{137}Cs in milk (Brussels and South Luxembourg)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

SPARSE

Fig. M26

Activity trends for ^{137}Cs in milk (Prague and Kunin)

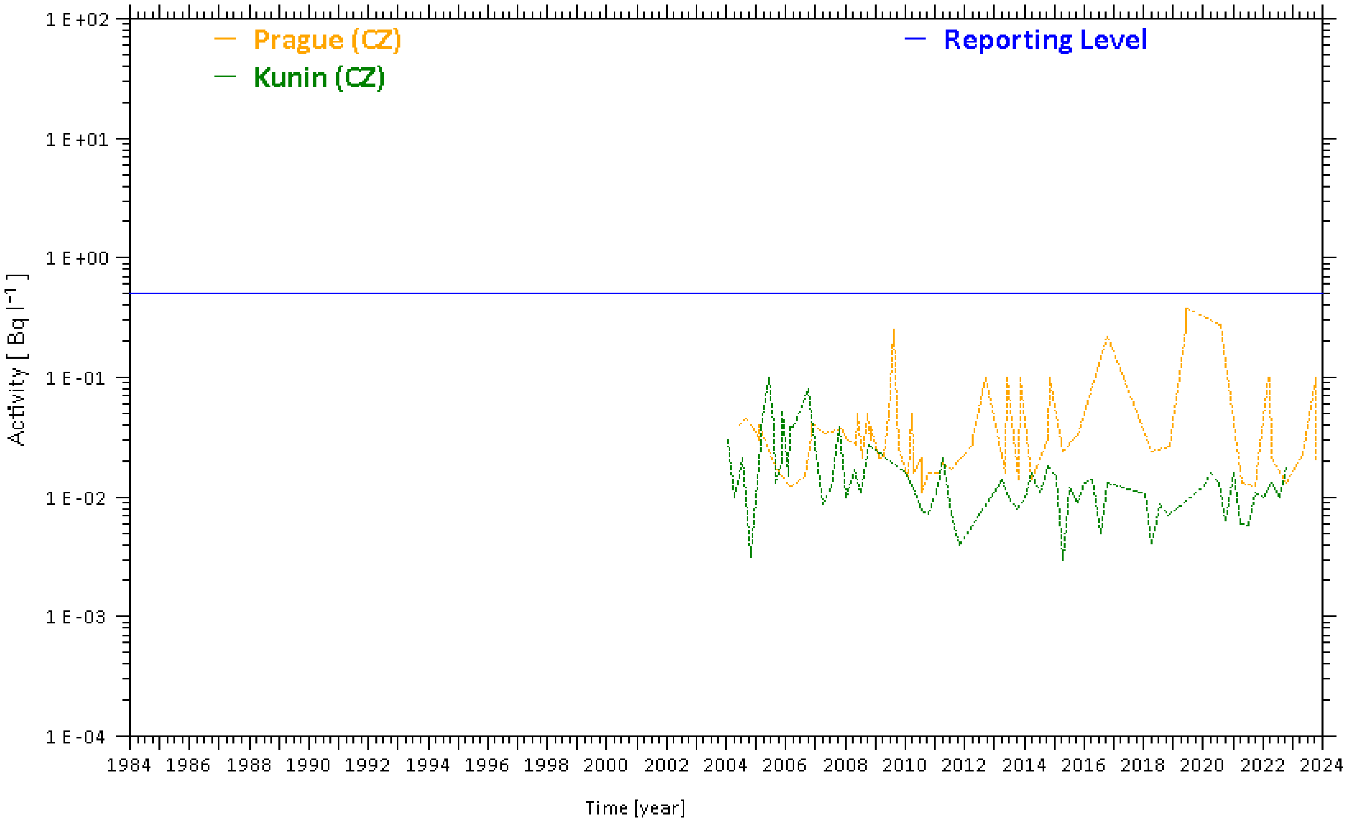
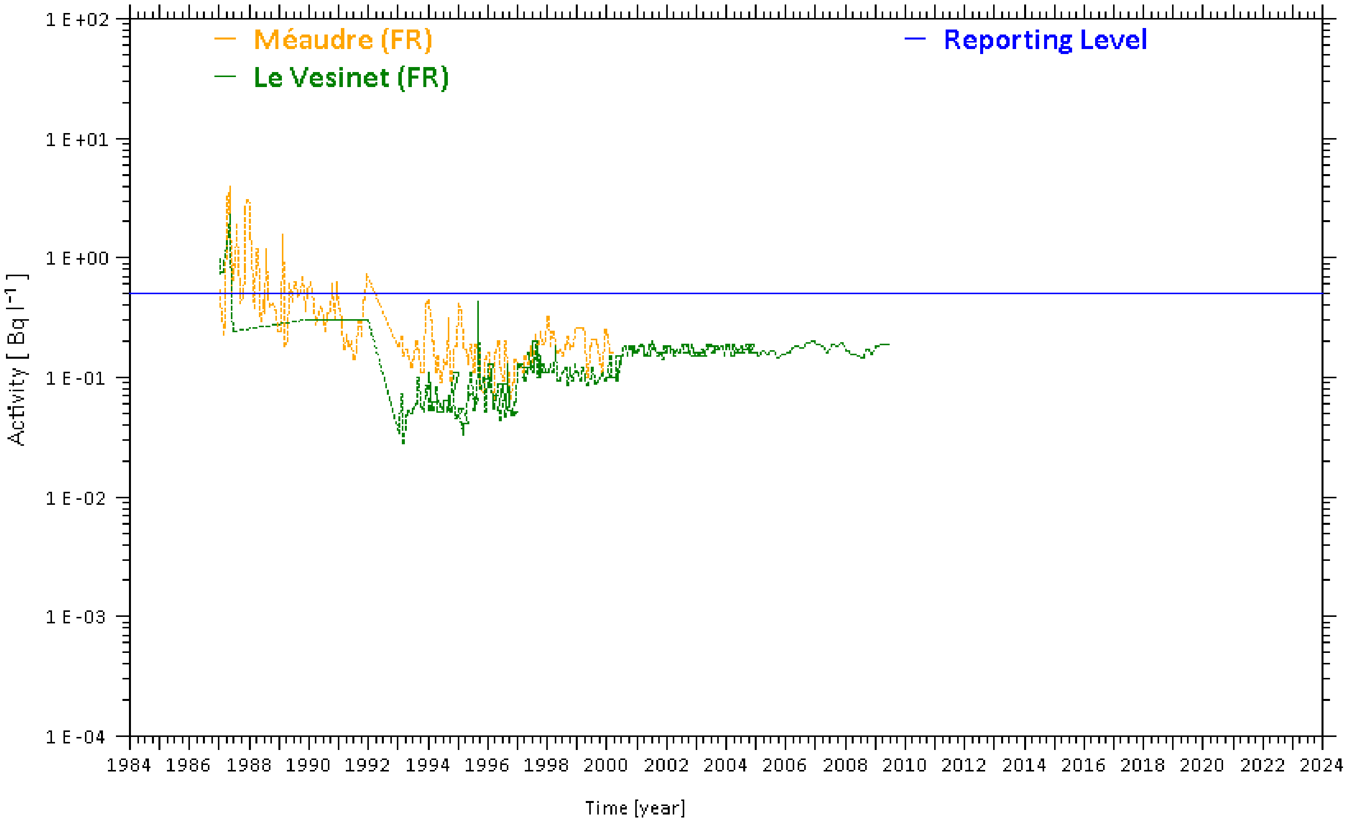


Fig. M27

Activity trends for ^{137}Cs in milk (Méaudre and Le Vesinet)



SPARSE

Activity trends

SAMPLE TYPE : milk

NUCLIDE CATEGORY : caesium-137 (^{137}Cs)

MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M28

Activity trends for ^{137}Cs in milk (Freiburg, Ljubljana and Budapest-Nrirr)

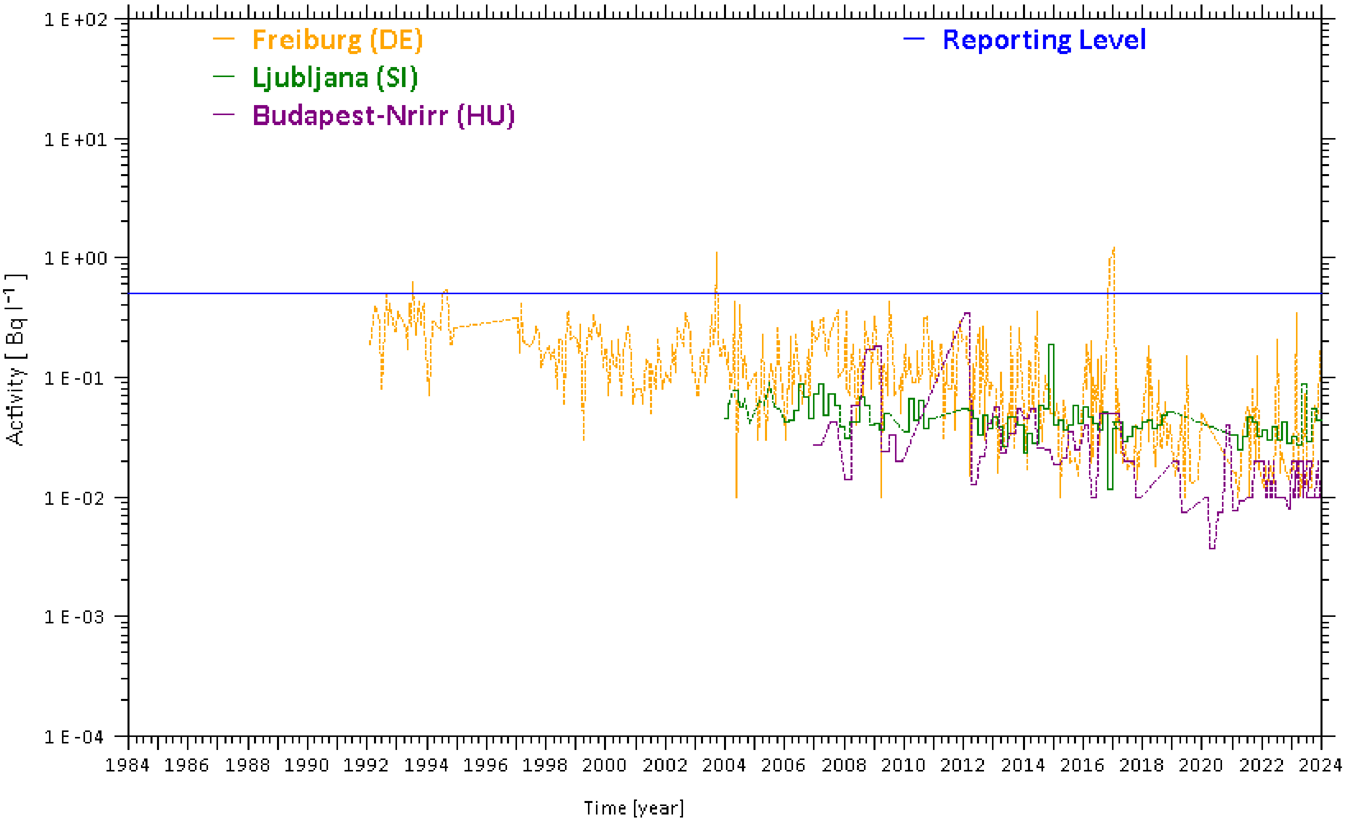
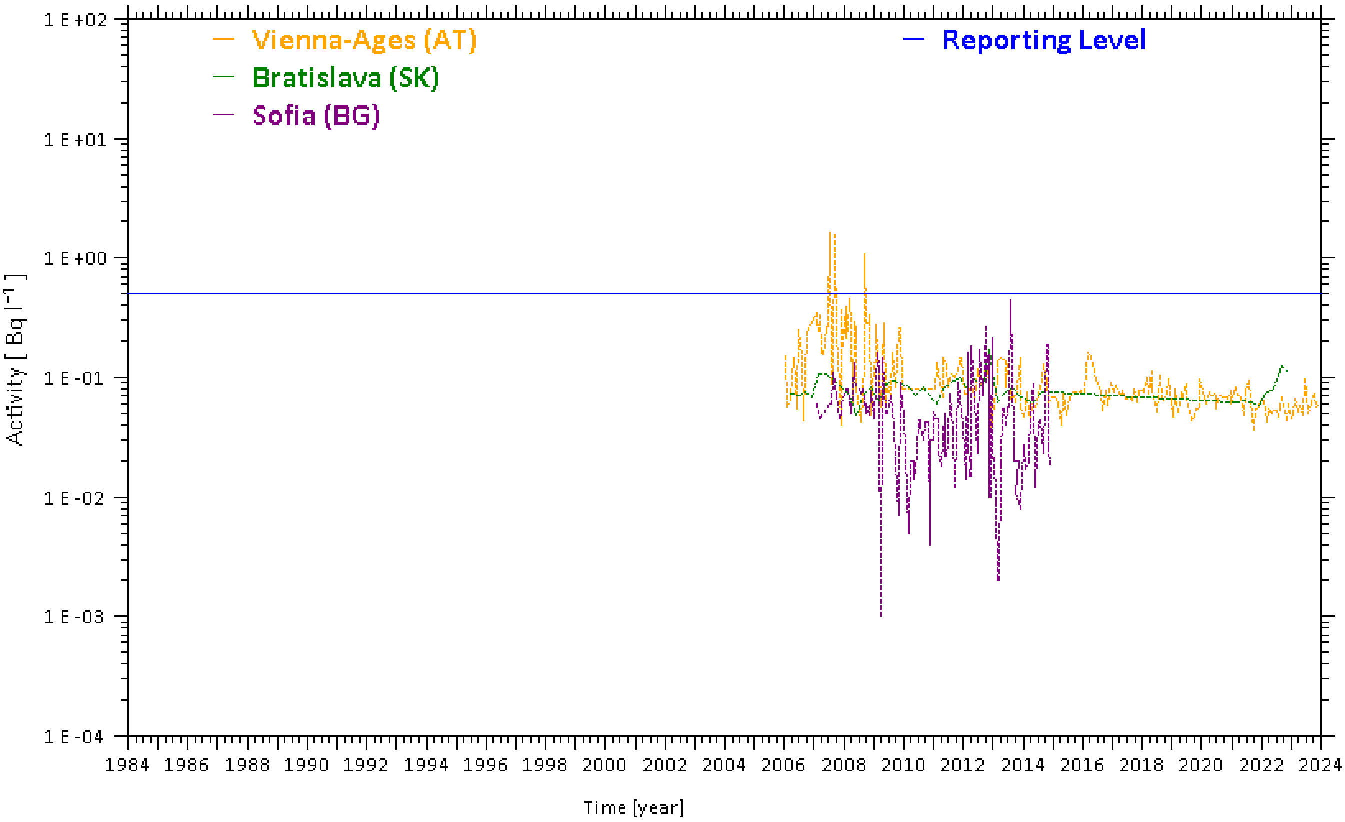


Fig. M29

Activity trends for ^{137}Cs in milk (Vienna-Ages, Bratislava and Sofia)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M30

Activity trends for ^{137}Cs in milk (Cantabria, Leon and Barcelona)

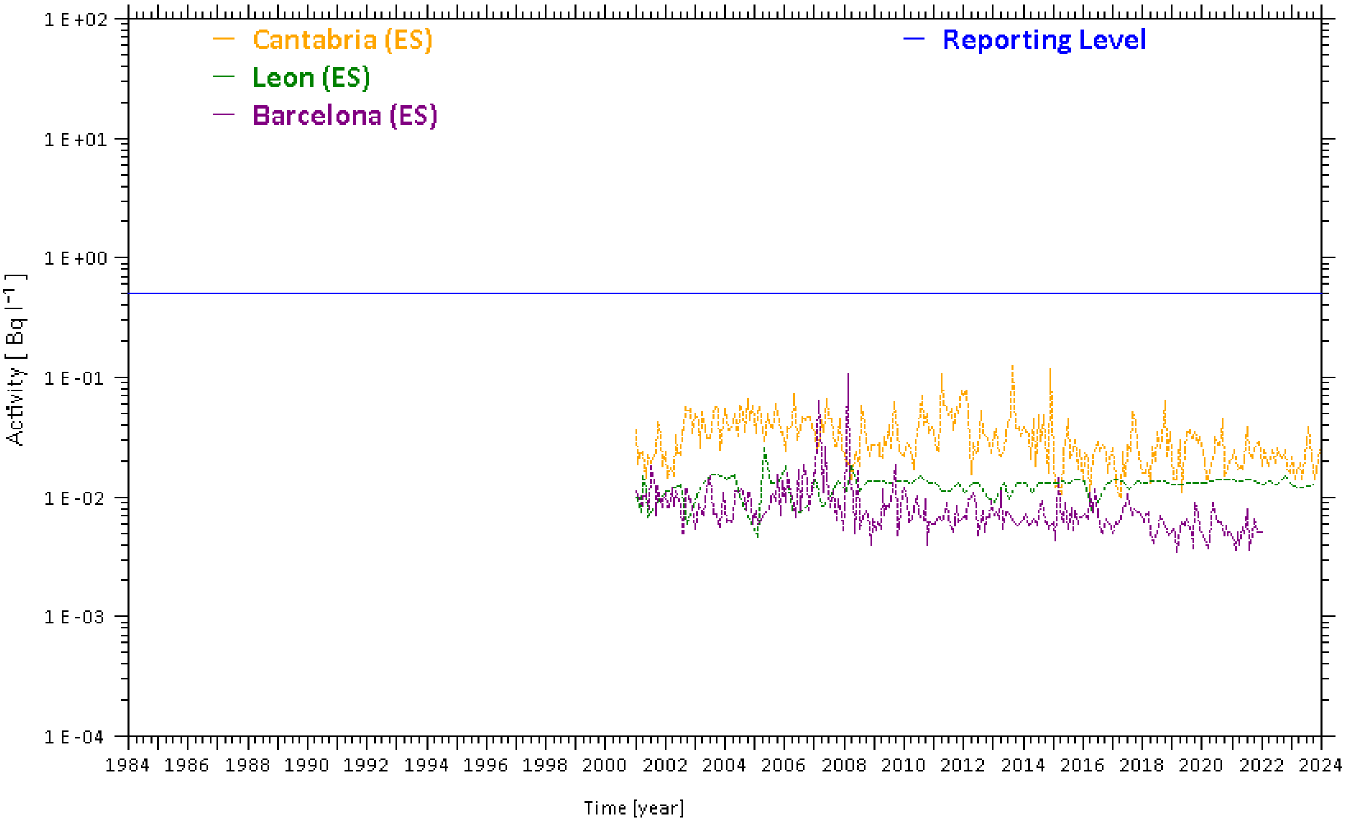
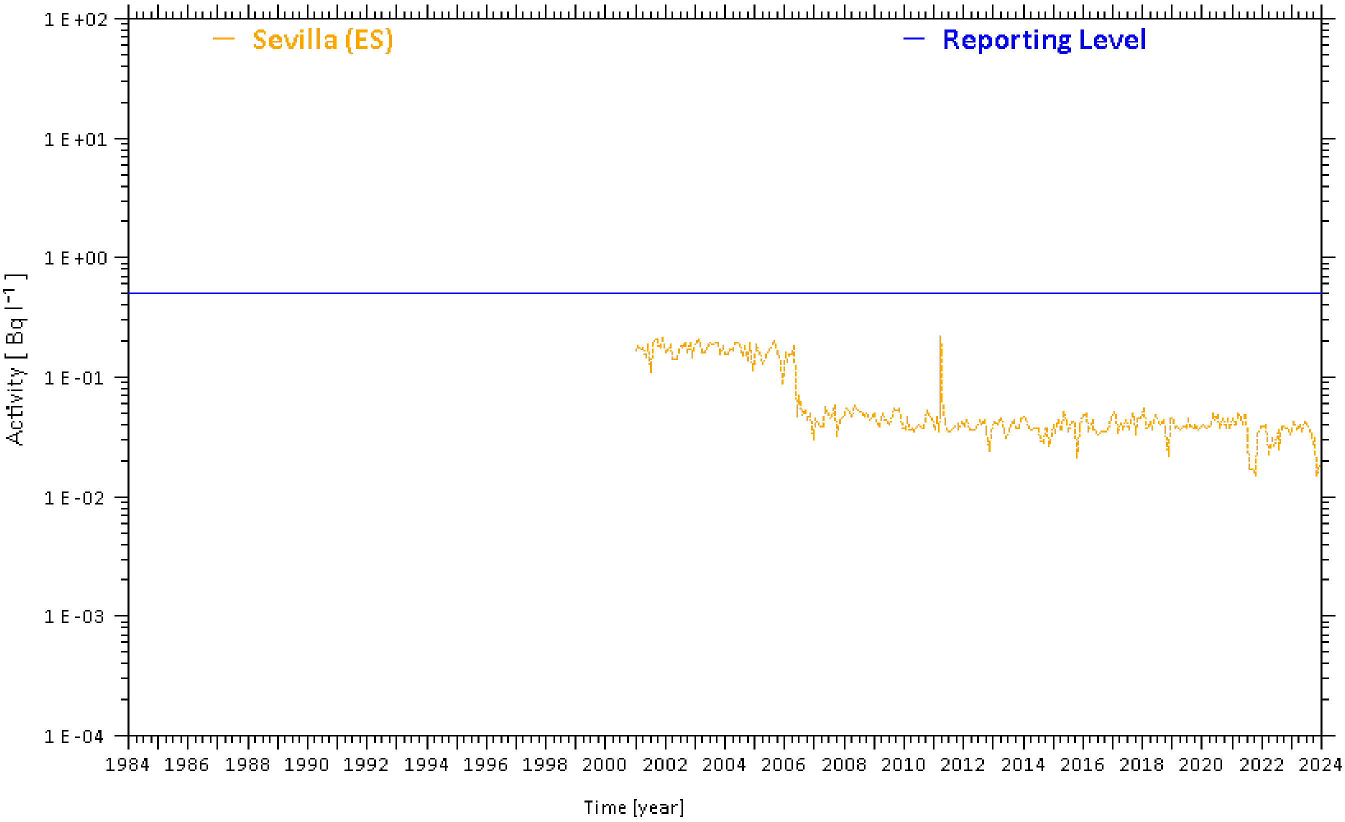


Fig. M31

Activity trends for ^{137}Cs in milk (Sevilla)



Activity trends

SAMPLE TYPE : milk
NUCLIDE CATEGORY : caesium-137 (^{137}Cs)
MEASUREMENT UNIT : Bq l $^{-1}$ (Bq per litre)

Fig. M32

Activity trends for ^{137}Cs in milk (Hamrun, Nicosia and Cluj)

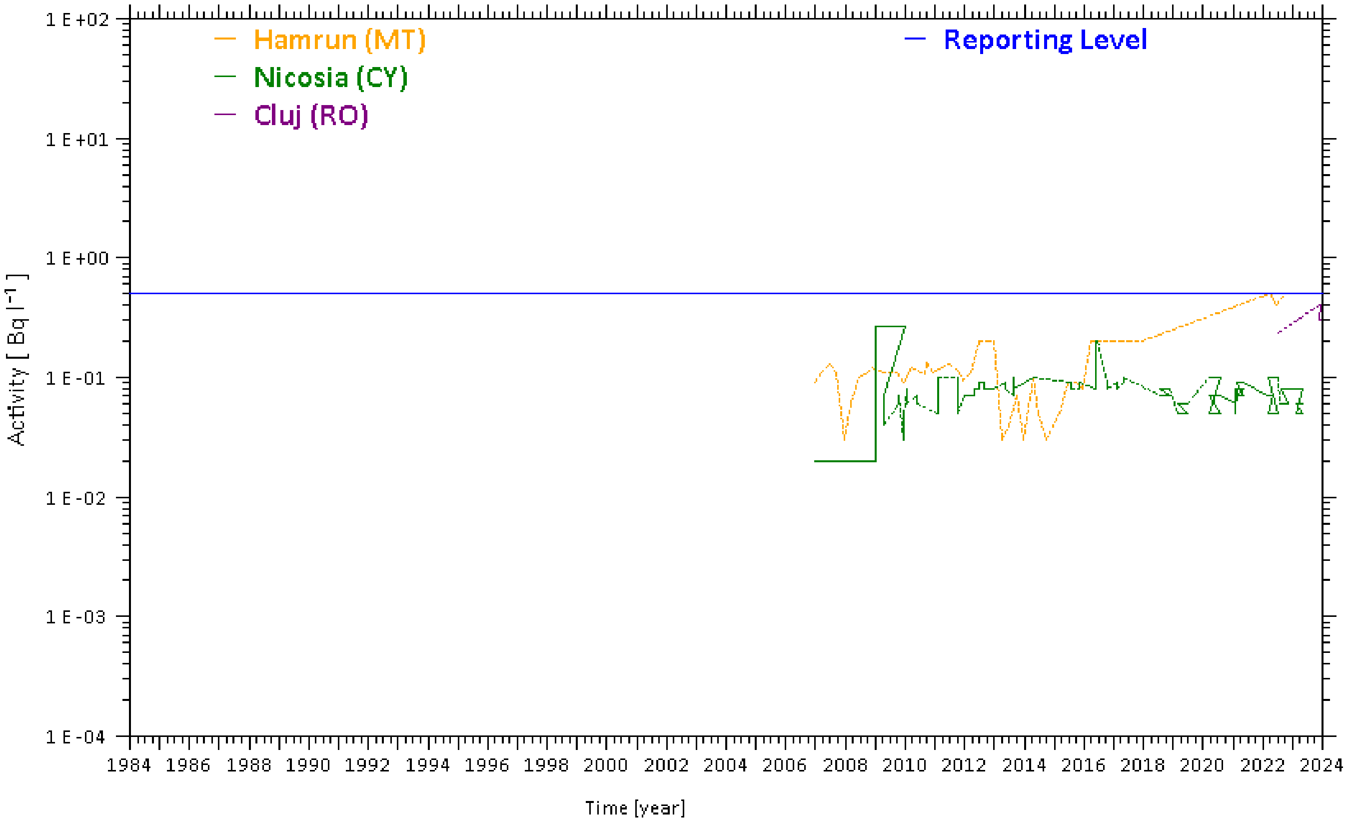
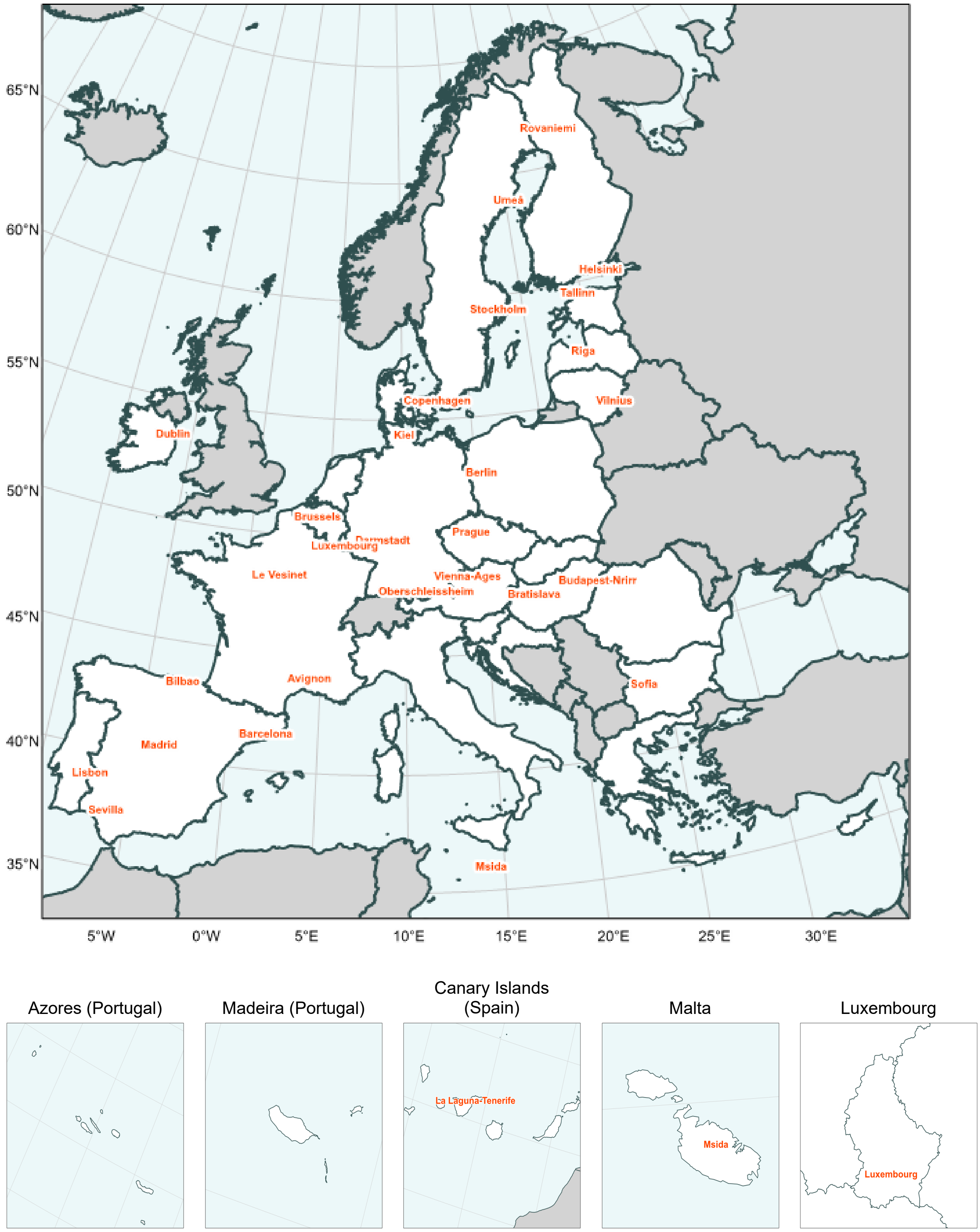


Fig. D3

Sampling locations for ^{90}Sr and ^{137}Cs in mixed diet considered in Figures D4 – D25



Activity trends

SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D4

Activity trends for ^{90}Sr in mixed diet (Helsinki and Rovaniemi)

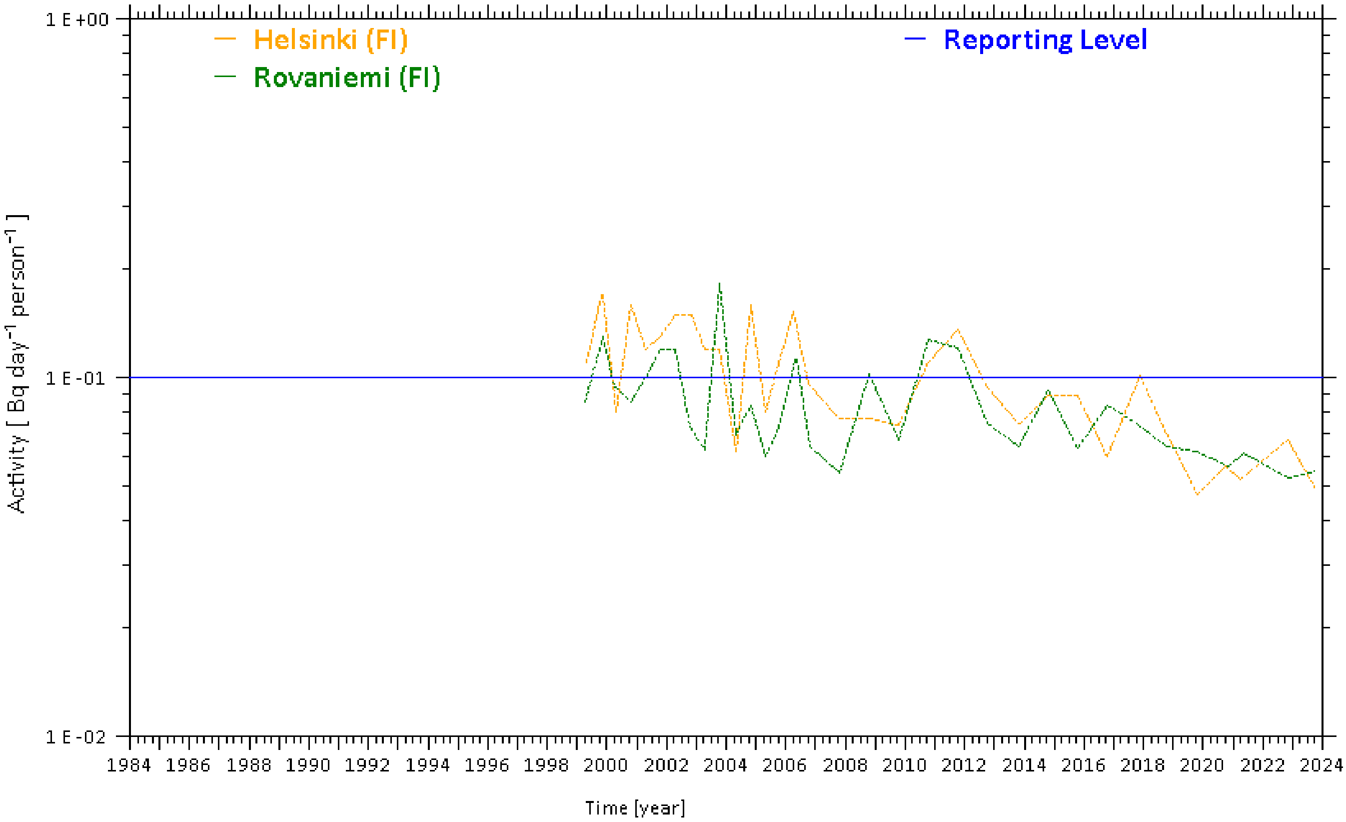
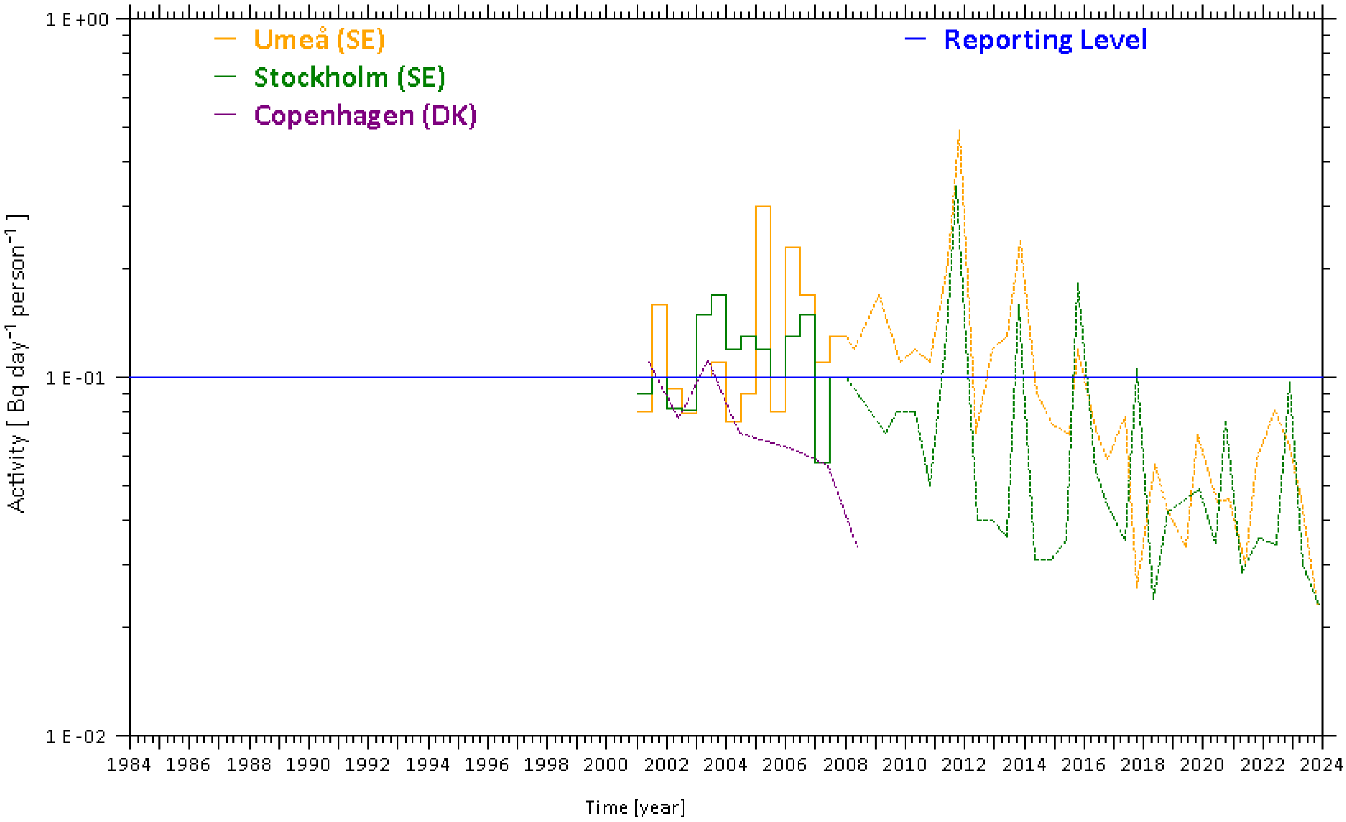


Fig. D5

Activity trends for ^{90}Sr in mixed diet (Umeå, Stockholm and Copenhagen)



Activity trends

SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **strontium-90 (^{90}Sr)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

SPARSE

Fig. D6

Activity trends for ^{90}Sr in mixed diet (Tallinn, Riga and Vilnius)

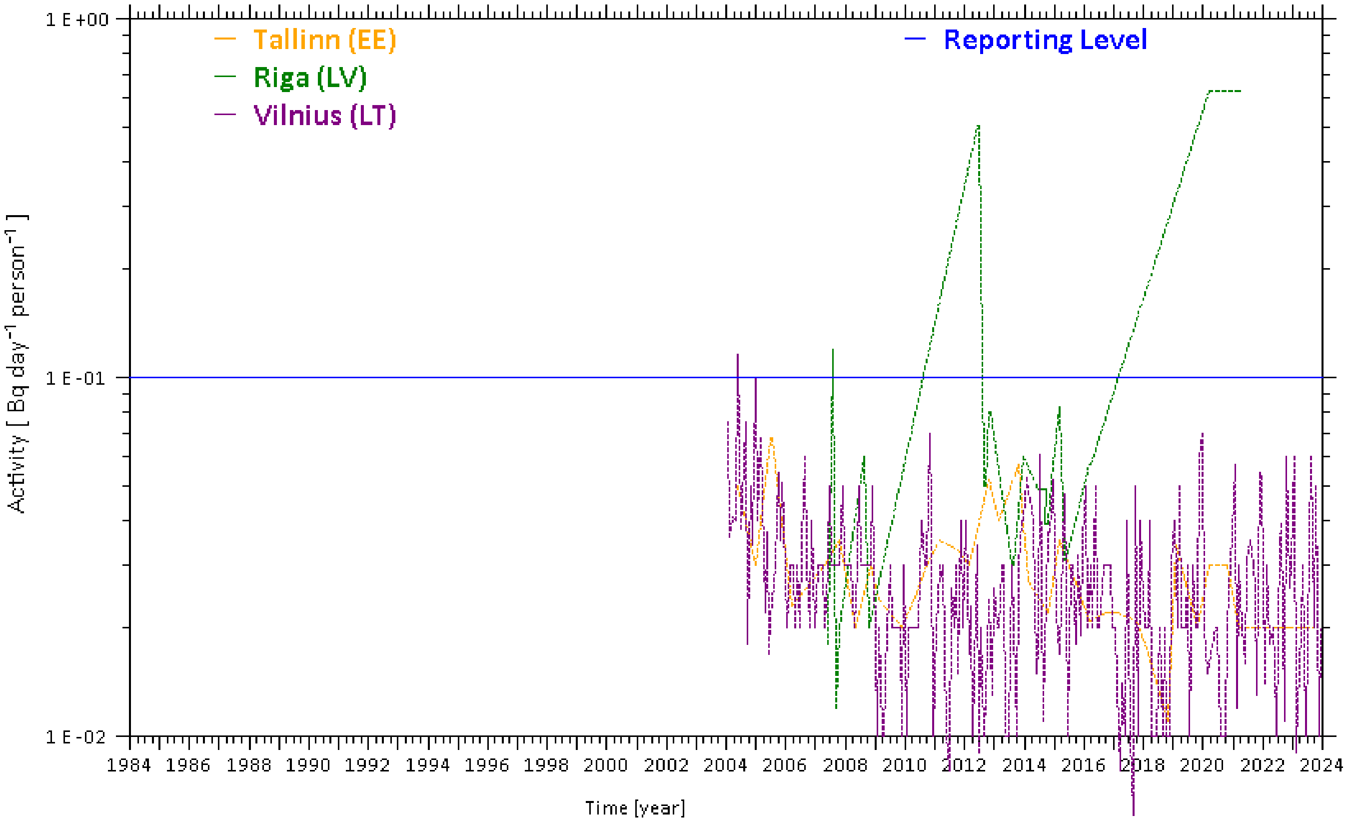
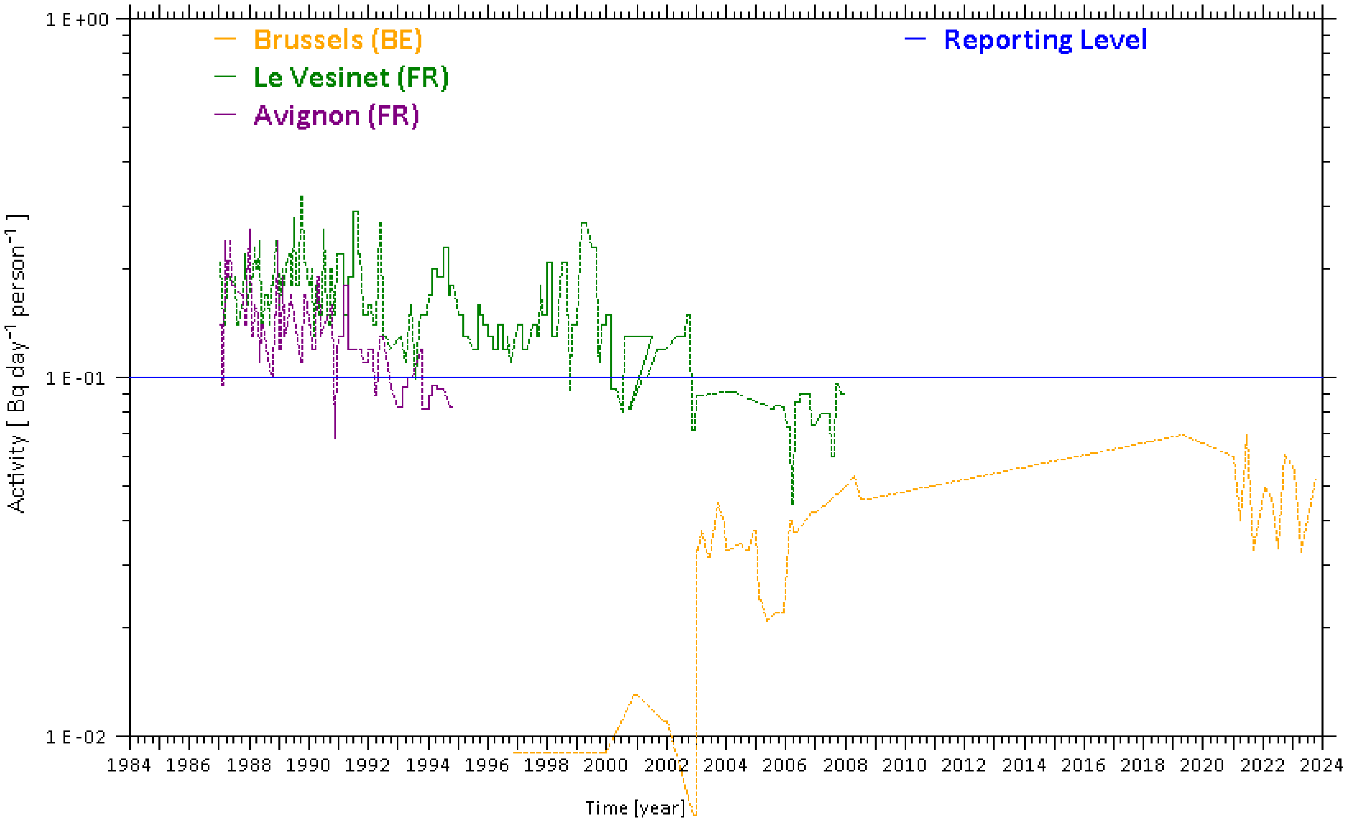


Fig. D7

Activity trends for ^{90}Sr in mixed diet (Brussels, Le Vesinet and Avignon)



SPARSE

Activity trends

SAMPLE TYPE : mixed diet

NUCLIDE CATEGORY : strontium-90 (^{90}Sr)

MEASUREMENT UNIT : Bq d^{-1} p^{-1} (Bq per day per person)

Fig. D8

Activity trends for ^{90}Sr in mixed diet (Kiel, Darmstadt and Berlin)

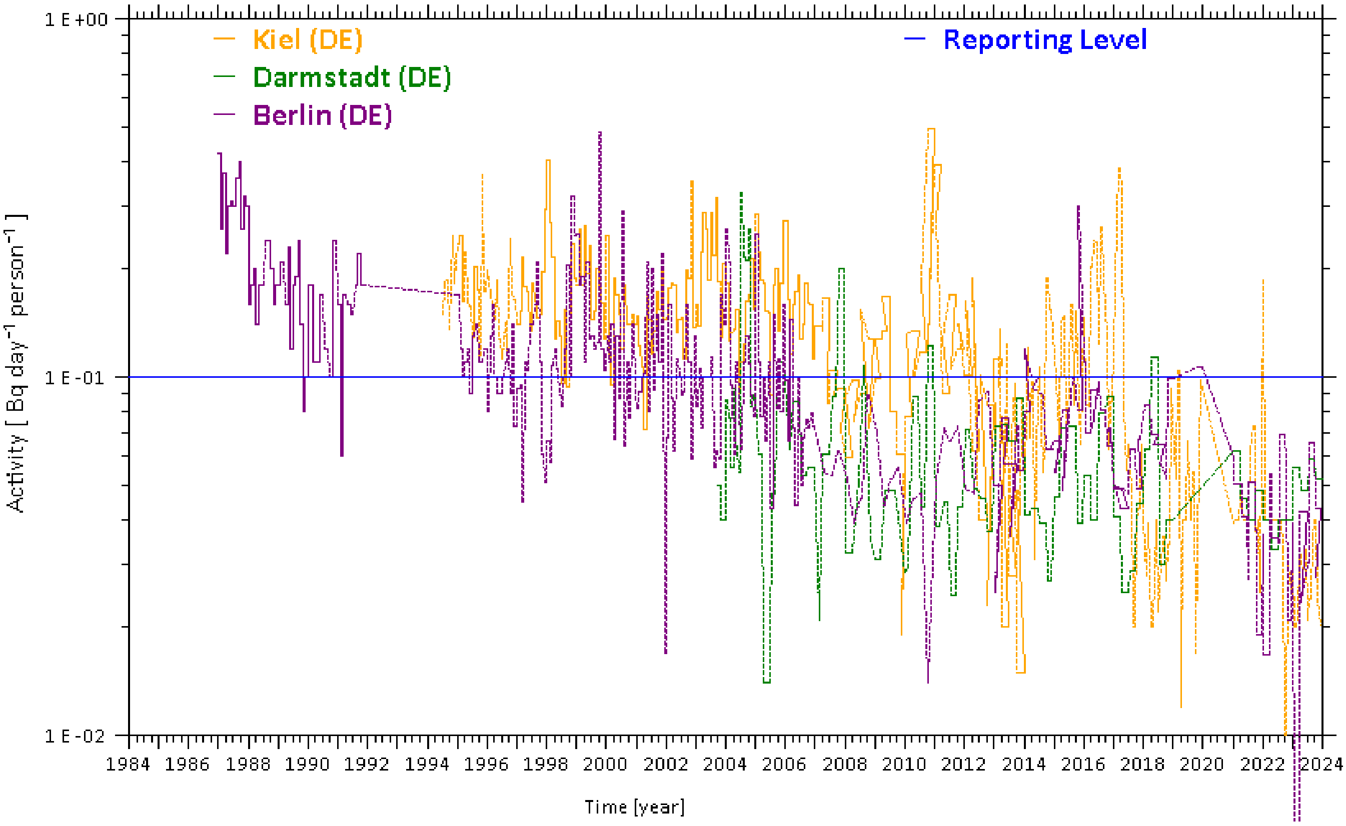
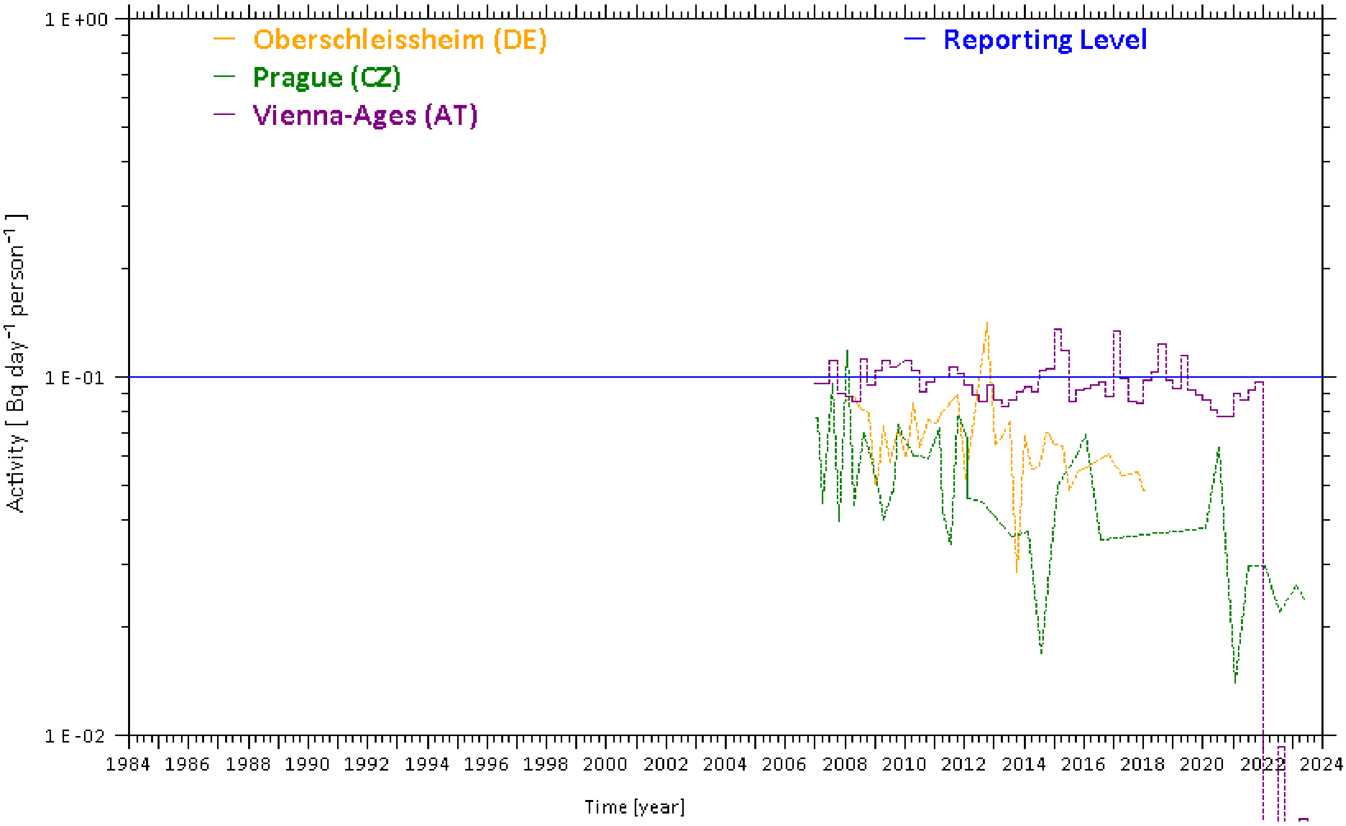


Fig. D9

Activity trends for ^{90}Sr in mixed diet (Oberschleissheim, Prague and Vienna-Ages)



Activity trends

SAMPLE TYPE : mixed diet
NUCLIDE CATEGORY : strontium-90 (^{90}Sr)
MEASUREMENT UNIT : Bq d^{-1} p^{-1} (Bq per day per person)

SPARSE

Fig. D10

Activity trends for ^{90}Sr in mixed diet (Bratislava, Budapest-Nrirr and Sofia)

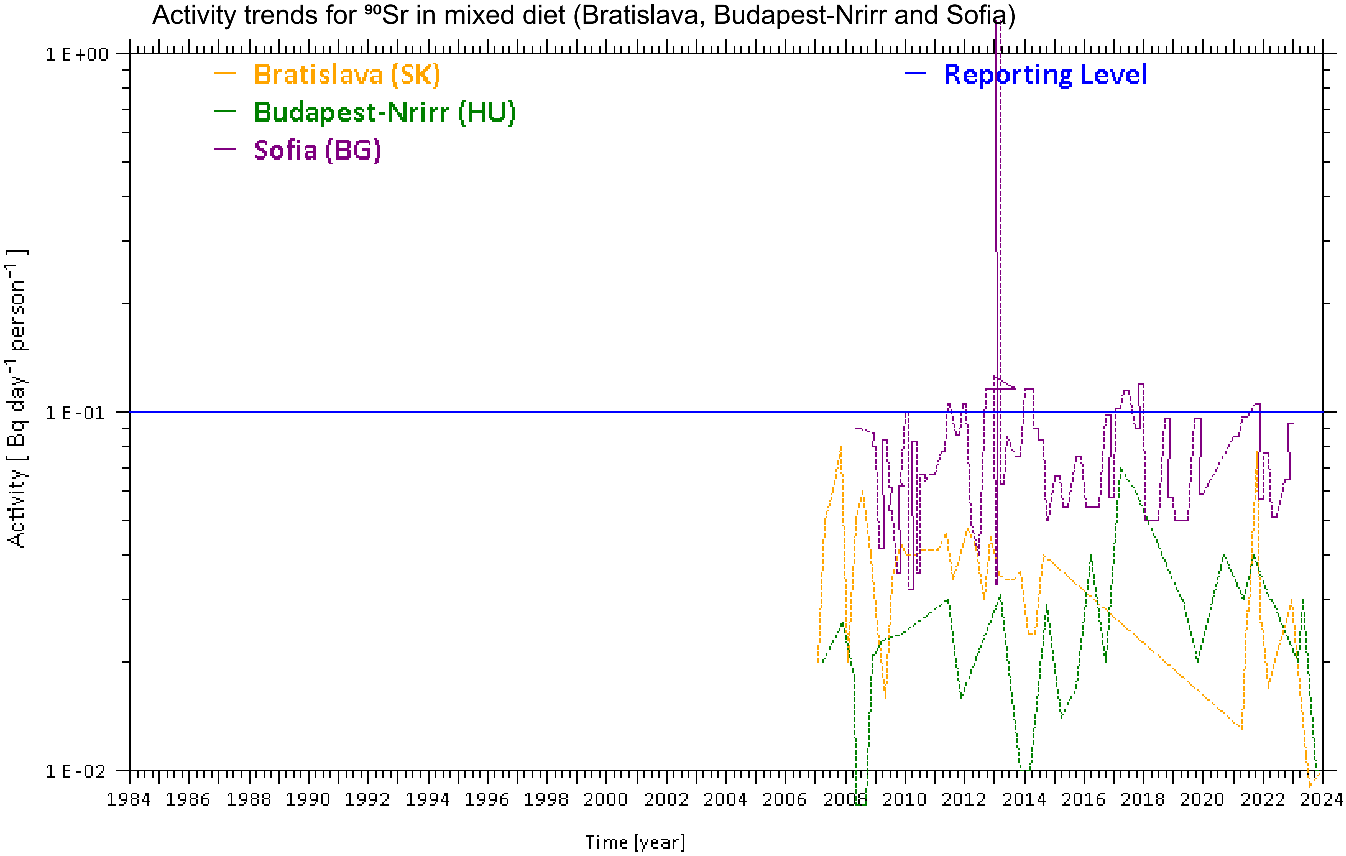
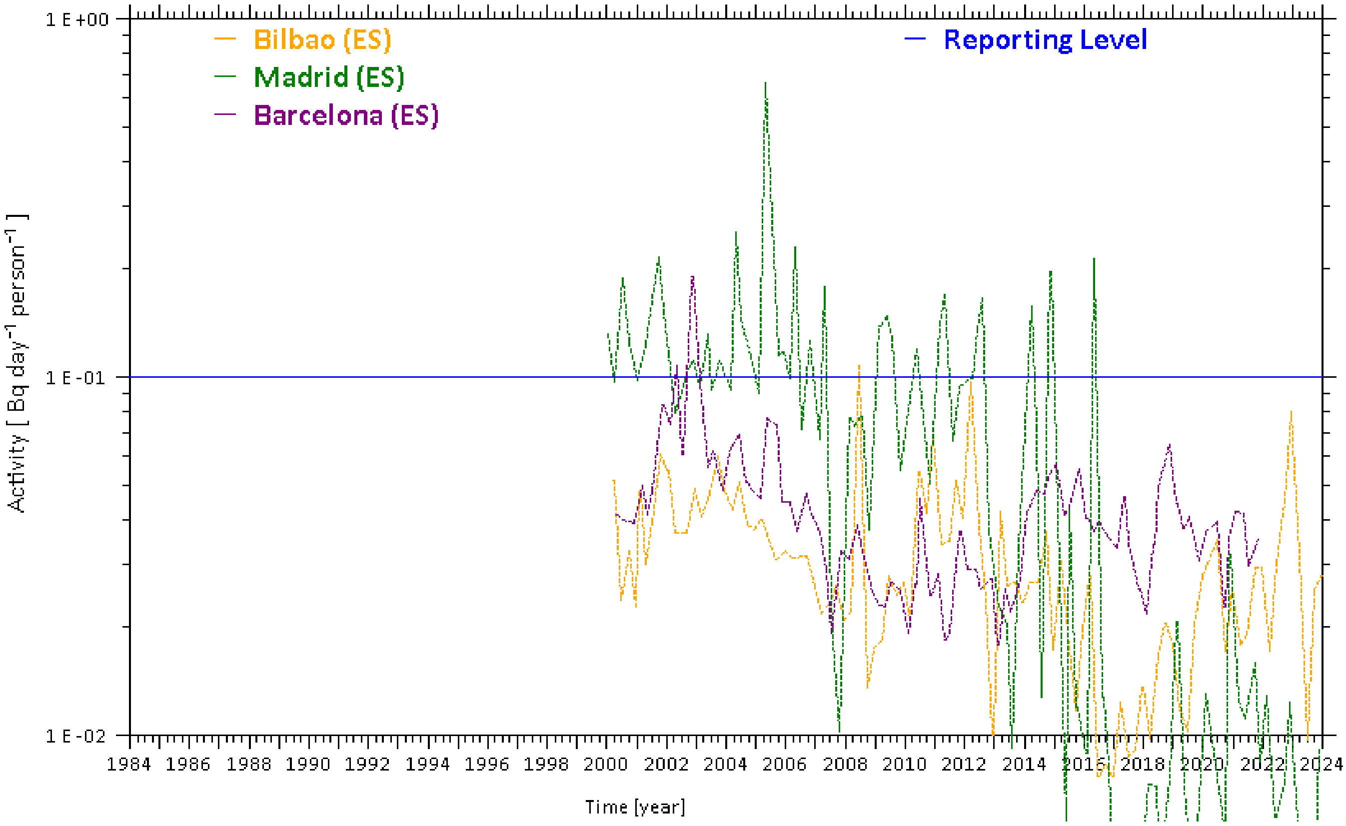


Fig. D11

Activity trends for ^{90}Sr in mixed diet (Bilbao, Madrid and Barcelona)



SPARSE

Activity trends

SAMPLE TYPE	:	**mixed diet**
NUCLIDE CATEGORY	:	**strontium-90 (^{90}Sr)**
MEASUREMENT UNIT	:	**Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D12

Activity trends for ^{90}Sr in mixed diet (Sevilla and La Laguna-Tenerife)

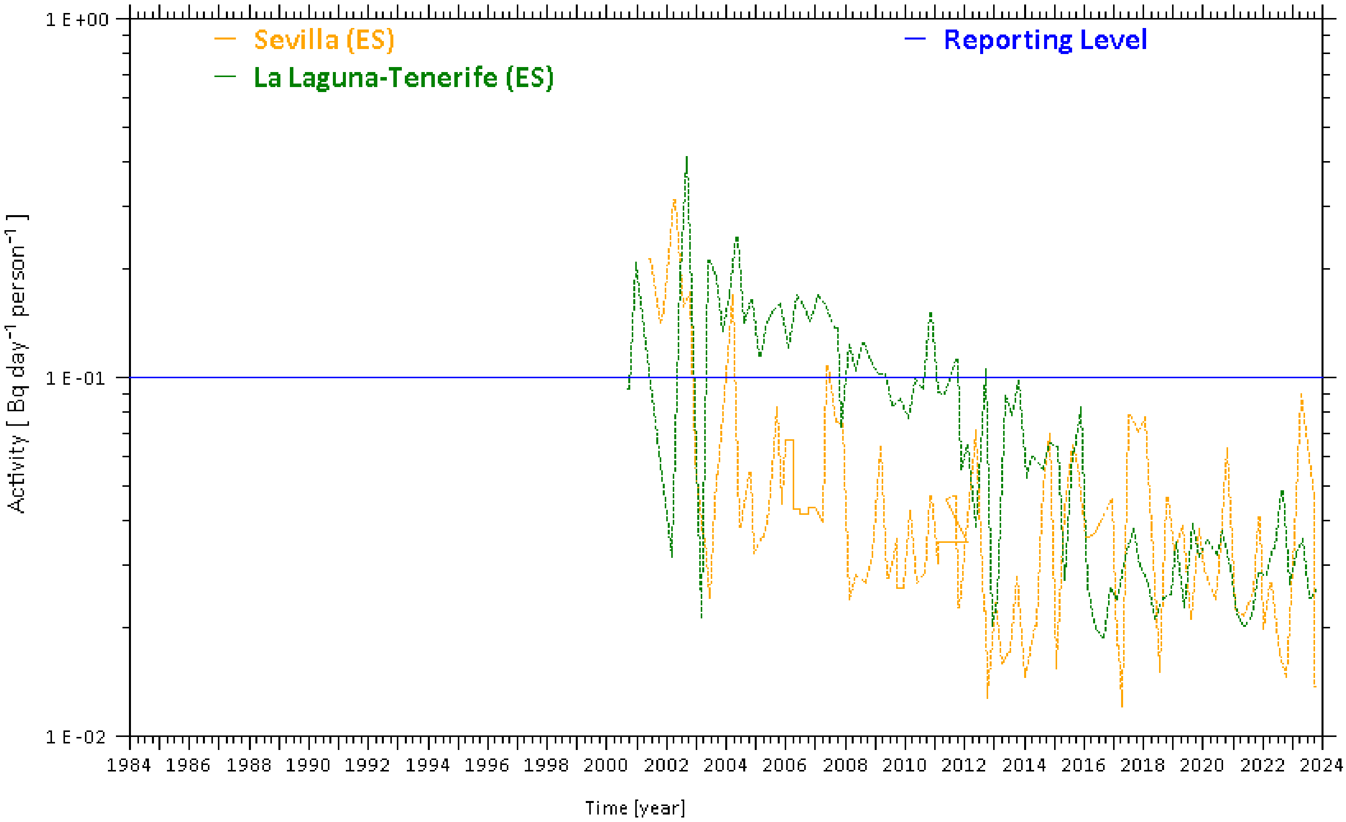
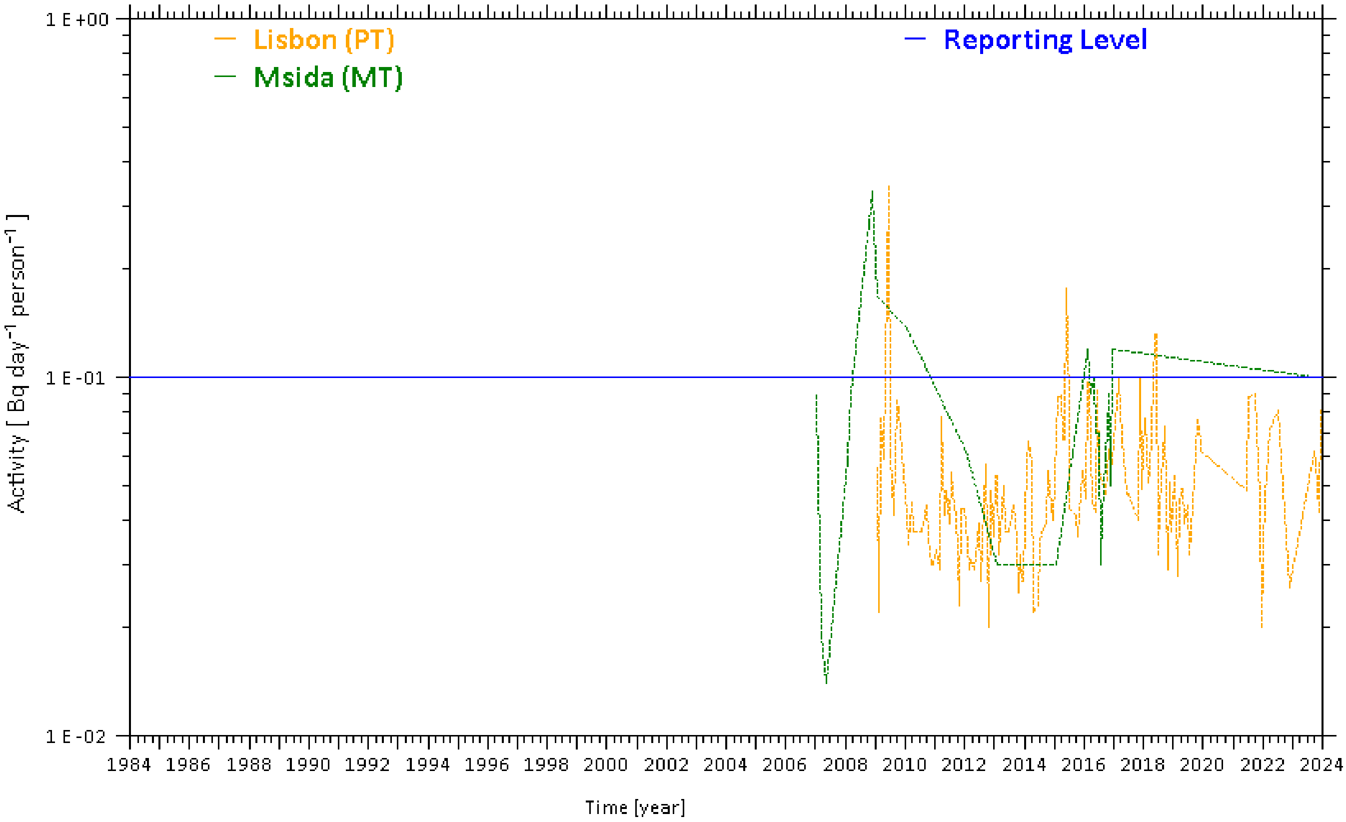


Fig. D13

Activity trends for ^{90}Sr in mixed diet (Lisbon and Msida)



Activity trends

SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D14

Activity trends for ^{137}Cs in mixed diet (Helsinki, Rovaniemi and Umeå)

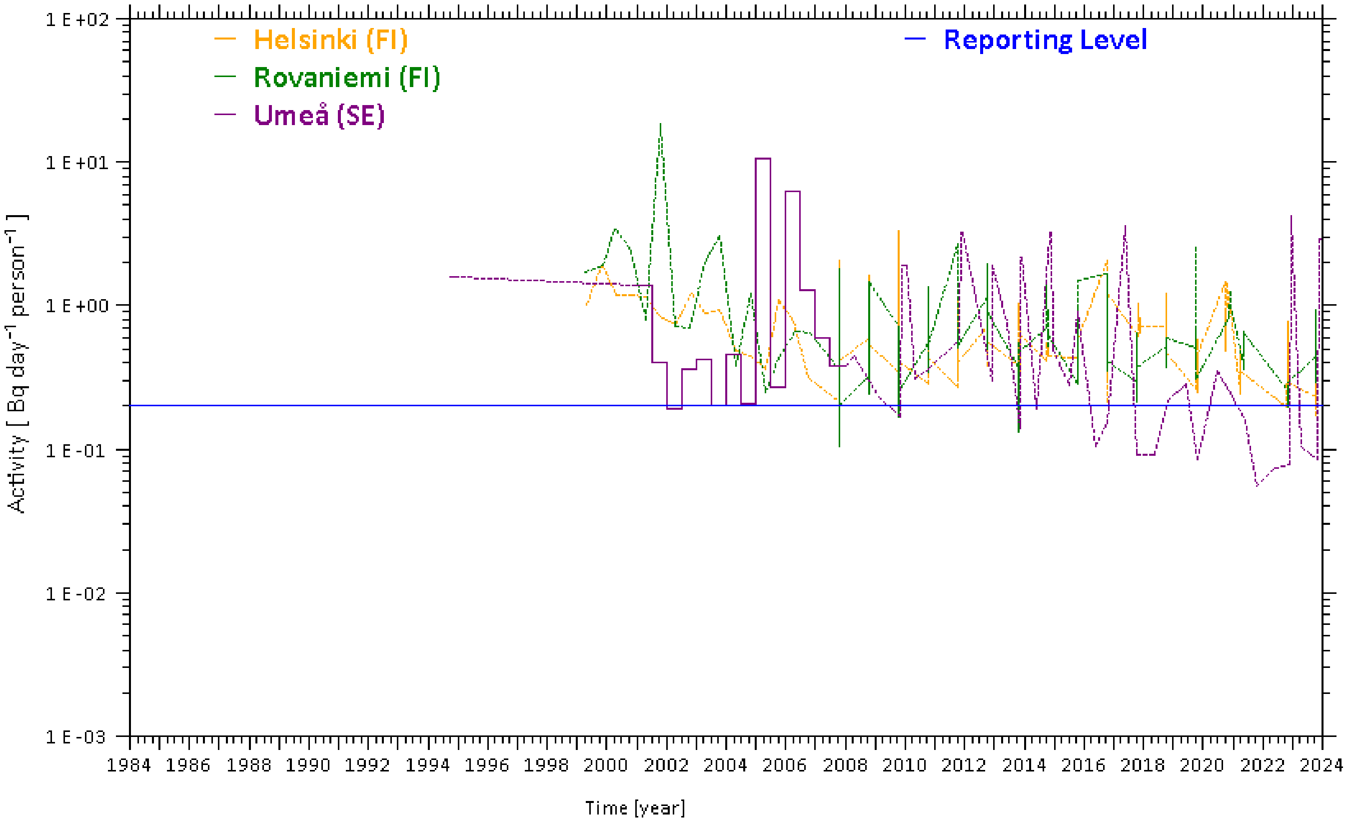
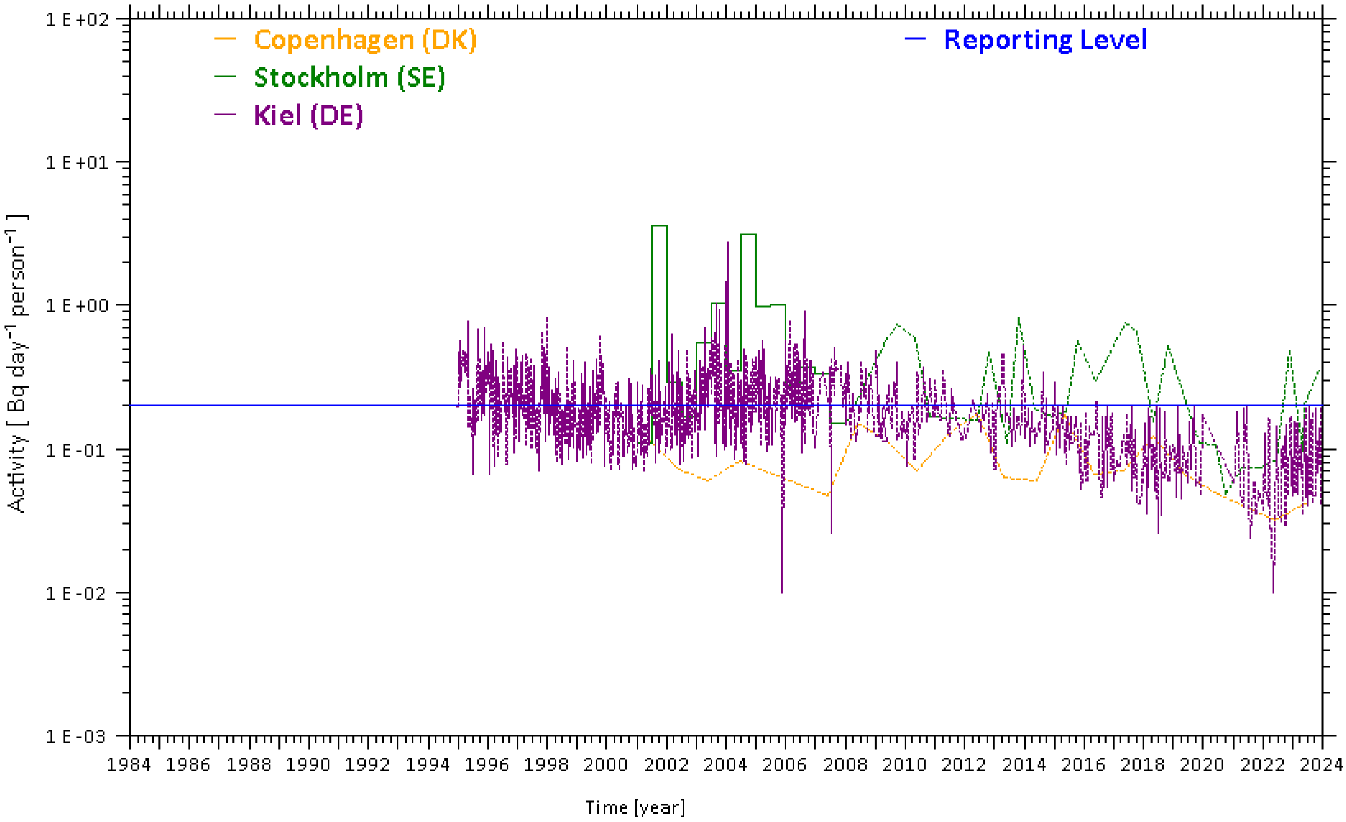


Fig. D15

Activity trends for ^{137}Cs in mixed diet (Copenhagen, Stockholm and Kiel)



SPARSE

Activity trends

SAMPLE TYPE	:	**mixed diet**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D16

Activity trends for ^{137}Cs in mixed diet (Riga, Tallinn and Vilnius)

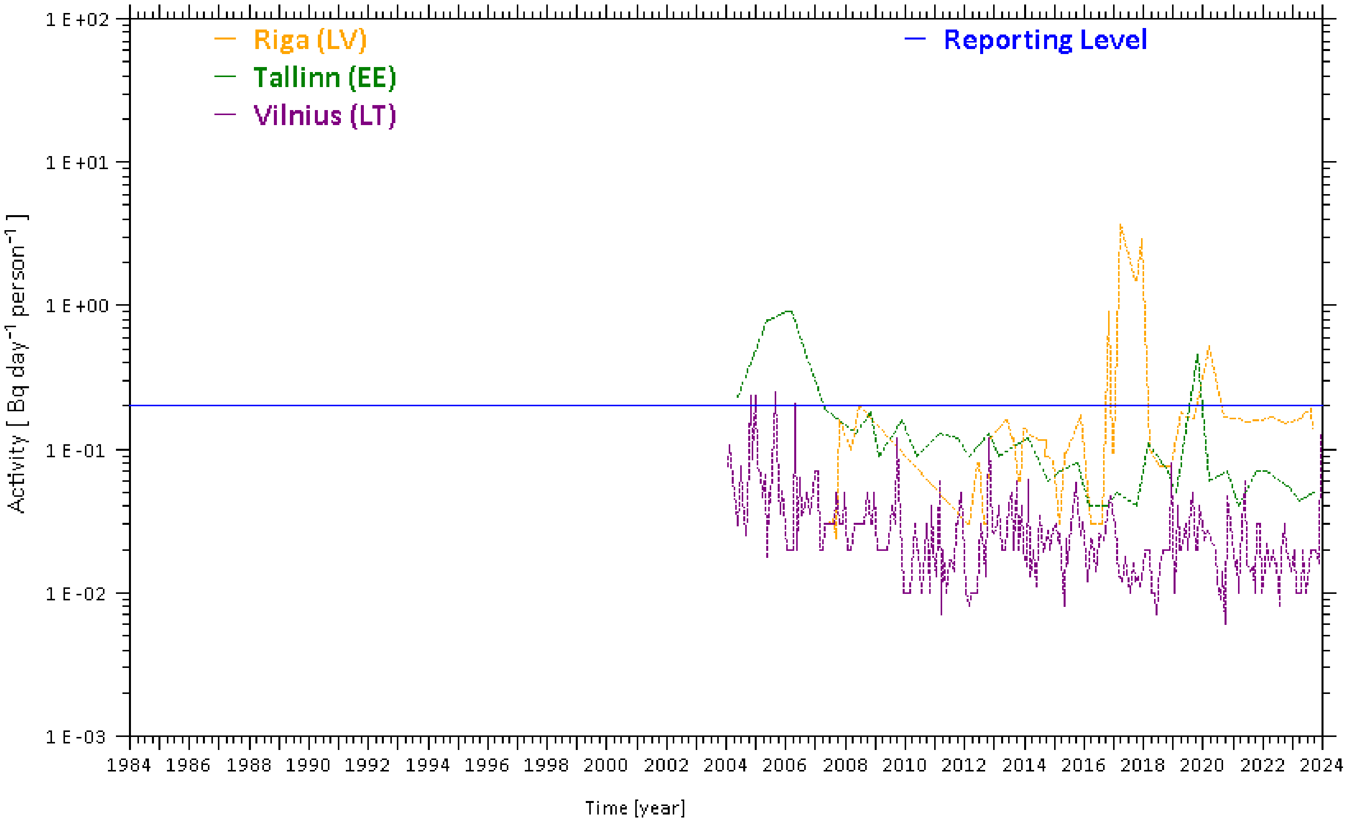
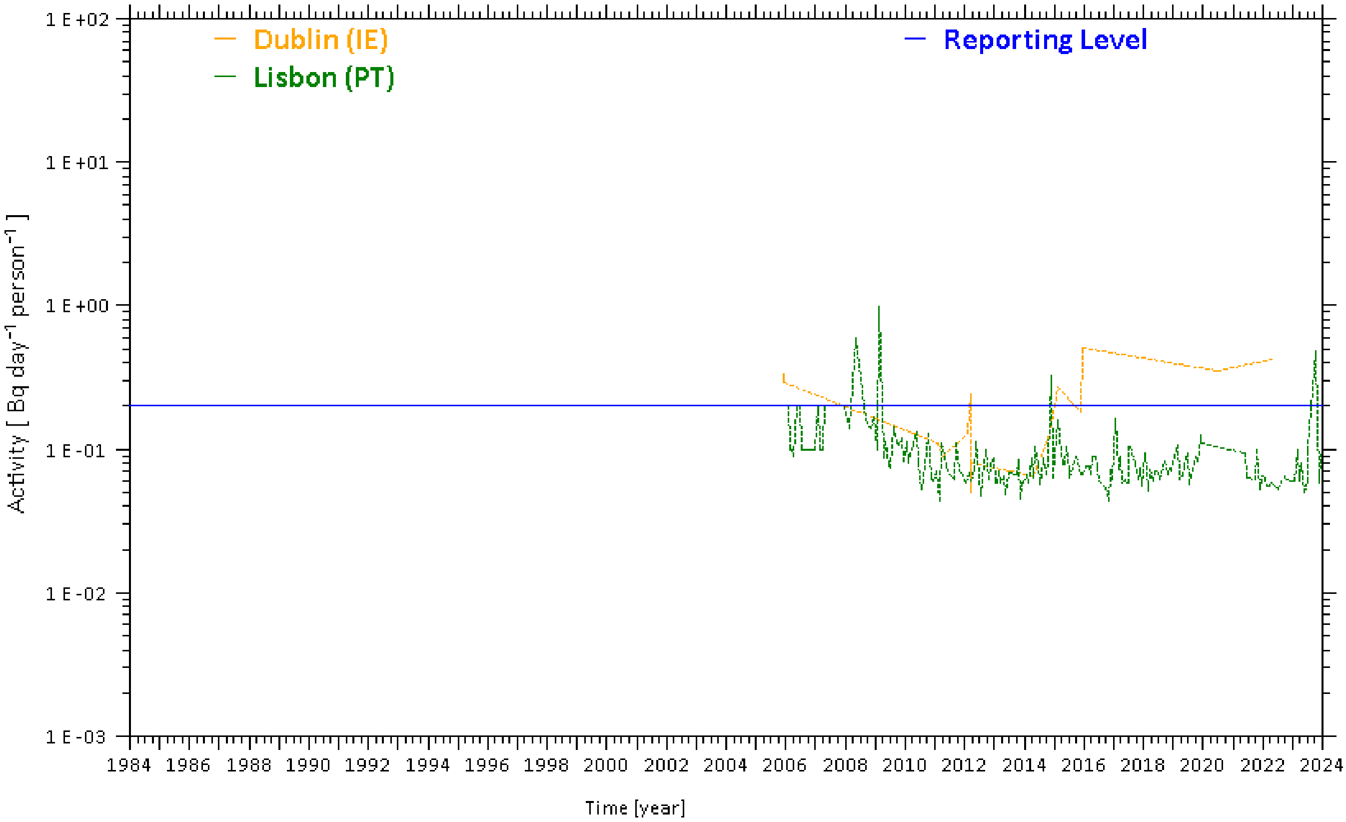


Fig. D17

Activity trends for ^{137}Cs in mixed diet (Dublin and Lisbon)



Activity trends

SAMPLE TYPE	:	**mixed diet**
NUCLIDE CATEGORY	:	**caesium-137 (^{137}Cs)**
MEASUREMENT UNIT	:	**Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D18

Activity trends for ^{137}Cs in mixed diet (Brussels and Luxembourg)

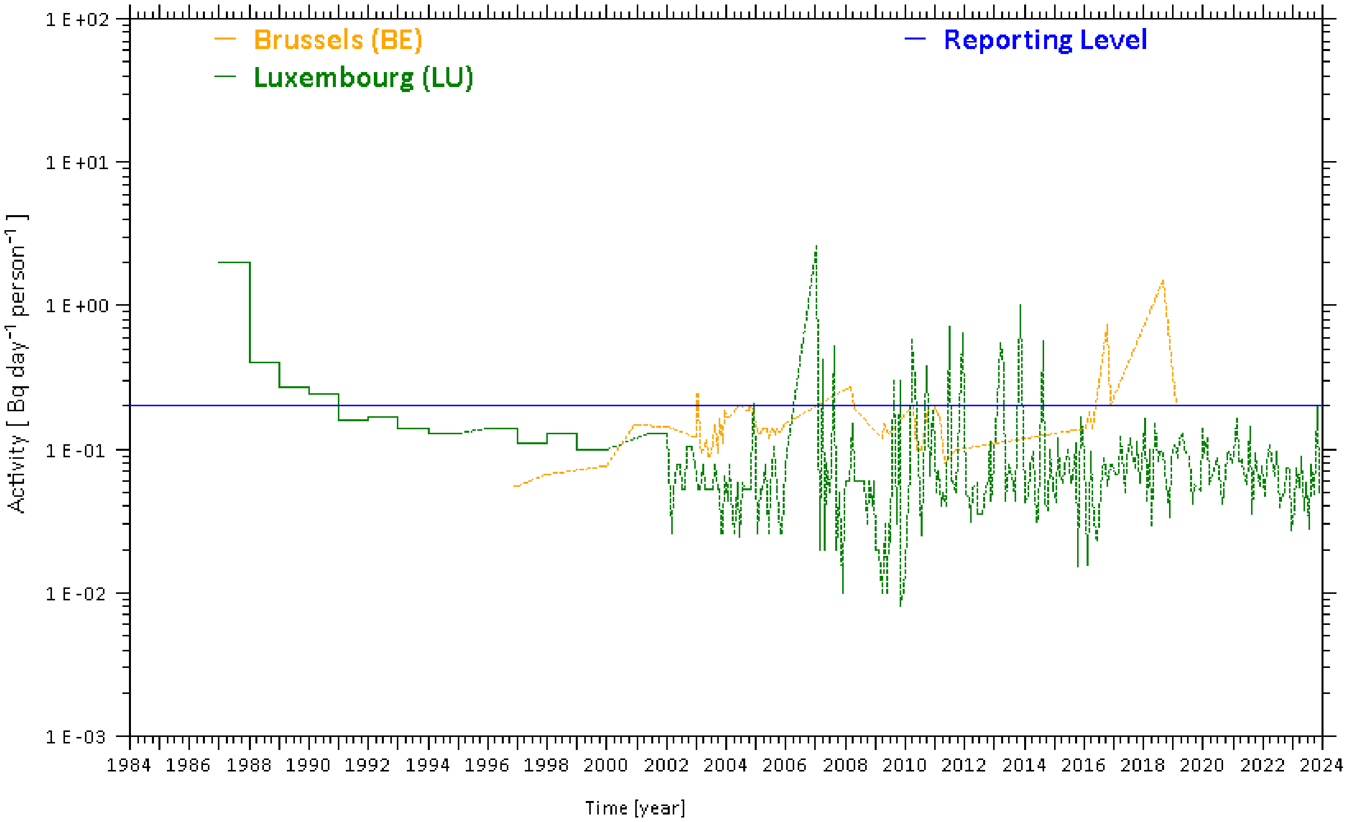
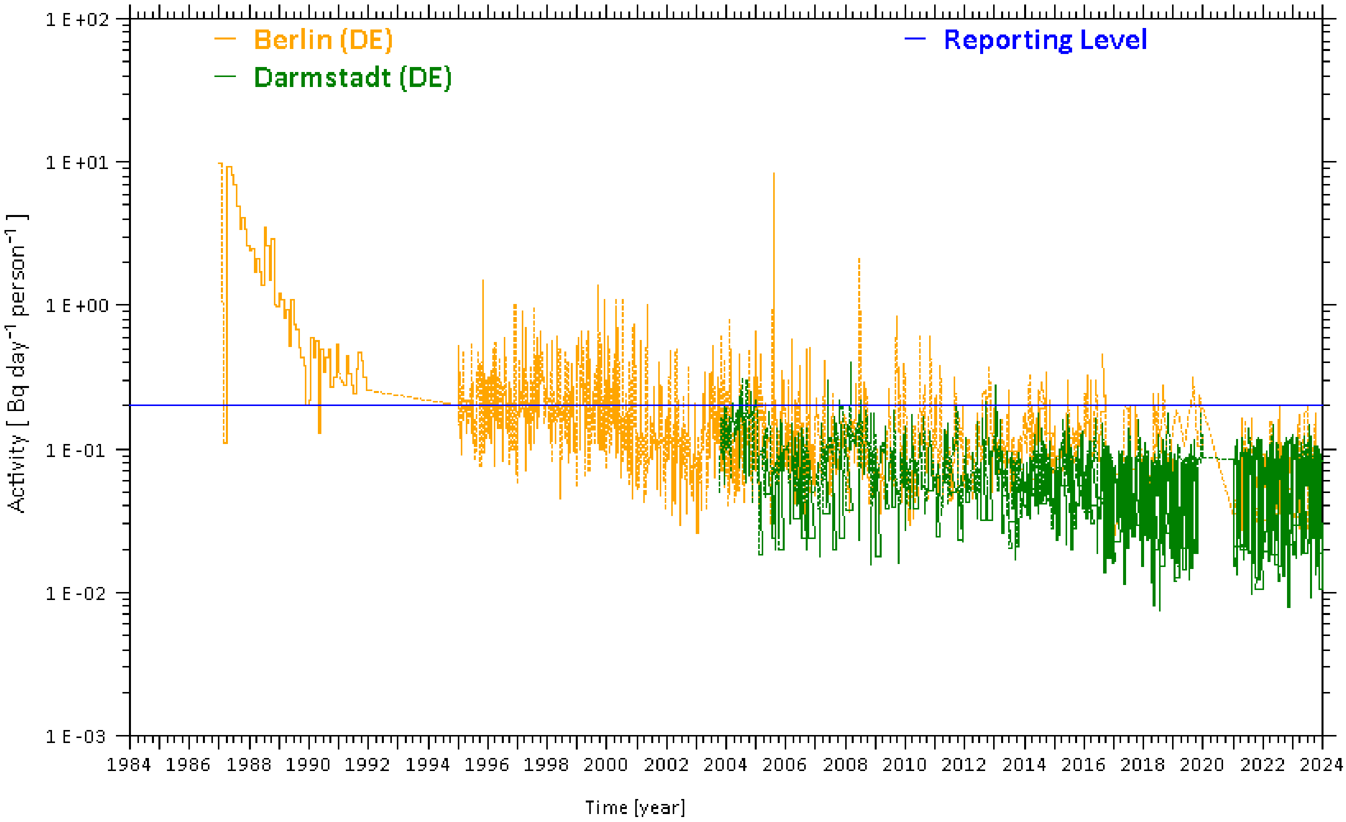


Fig. D19

Activity trends for ^{137}Cs in mixed diet (Berlin and Darmstadt)



SPARSE

Activity trends

SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D20

Activity trends for ^{137}Cs in mixed diet (Oberschleissheim, Prague and Vienna-Ages)

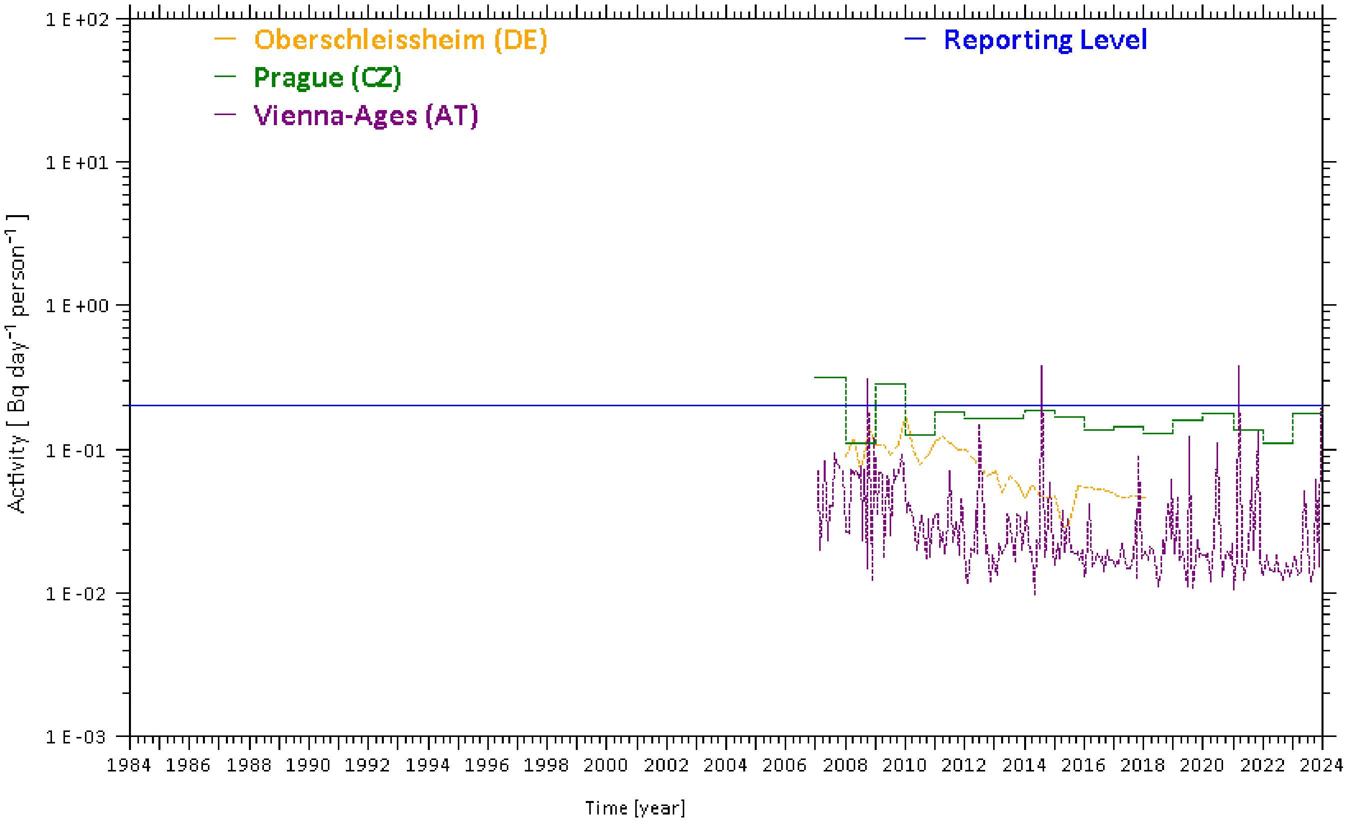
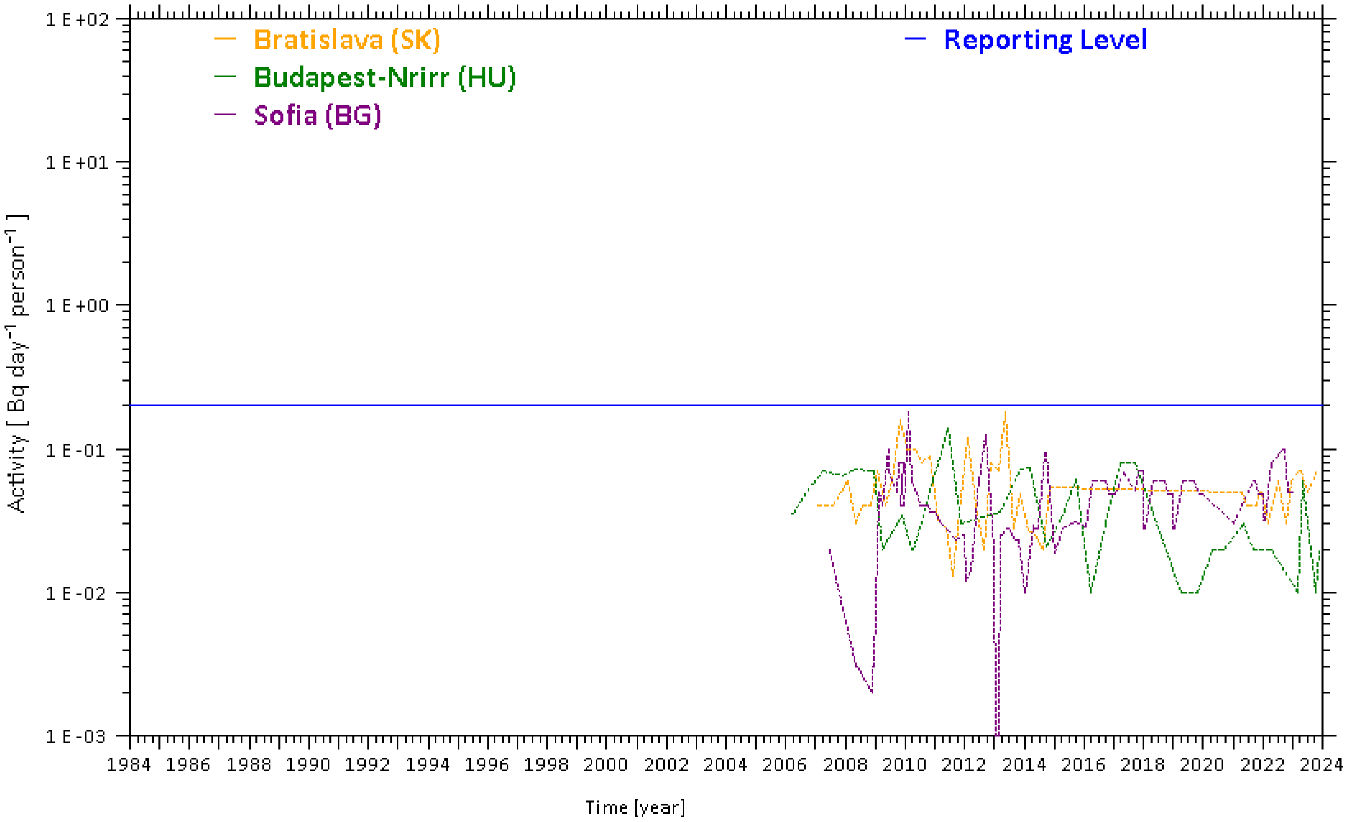


Fig. D21

Activity trends for ^{137}Cs in mixed diet (Bratislava, Budapest-Nrirr and Sofia)



Activity trends

SAMPLE TYPE : **mixed diet**

NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**

MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

SPARSE

Fig. D22

Activity trends for ^{137}Cs in mixed diet (Le Vesinet and Avignon)

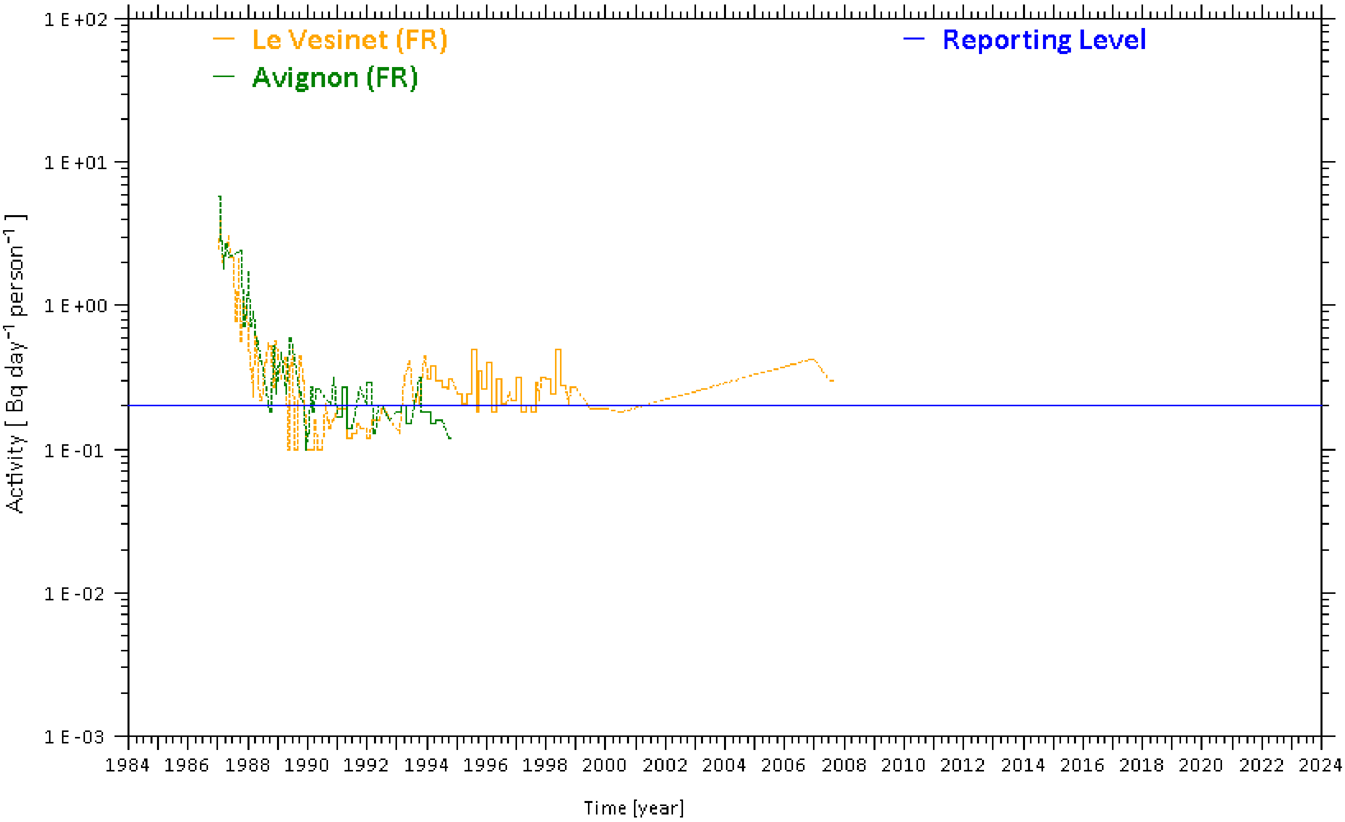
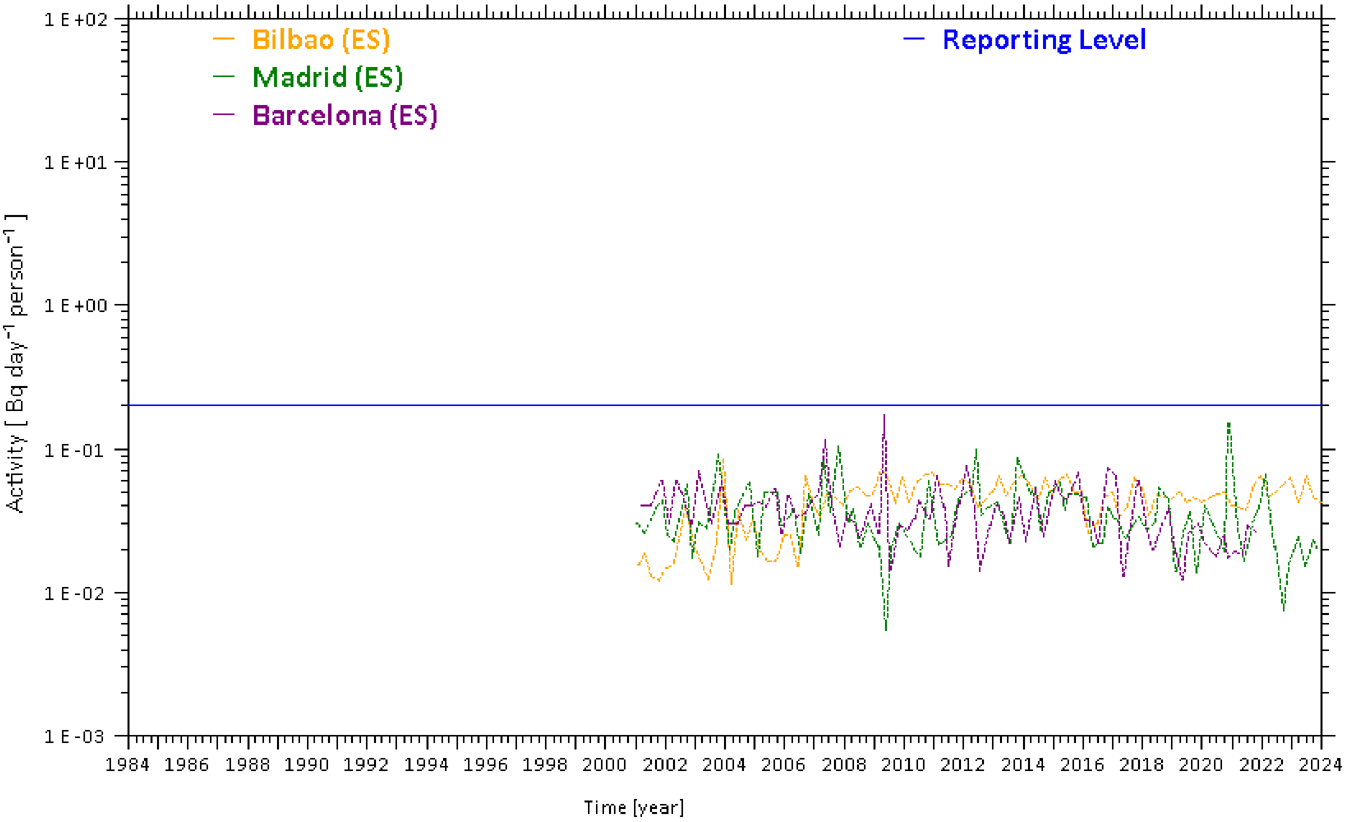


Fig. D23

Activity trends for ^{137}Cs in mixed diet (Bilbao, Madrid and Barcelona)



SPARSE

Activity trends

SAMPLE TYPE : **mixed diet**
NUCLIDE CATEGORY : **caesium-137 (^{137}Cs)**
MEASUREMENT UNIT : **Bq d^{-1} p^{-1}** (Bq per day per person)

Fig. D24

Activity trends for ^{137}Cs in mixed diet (Sevilla and La Laguna-Tenerife)

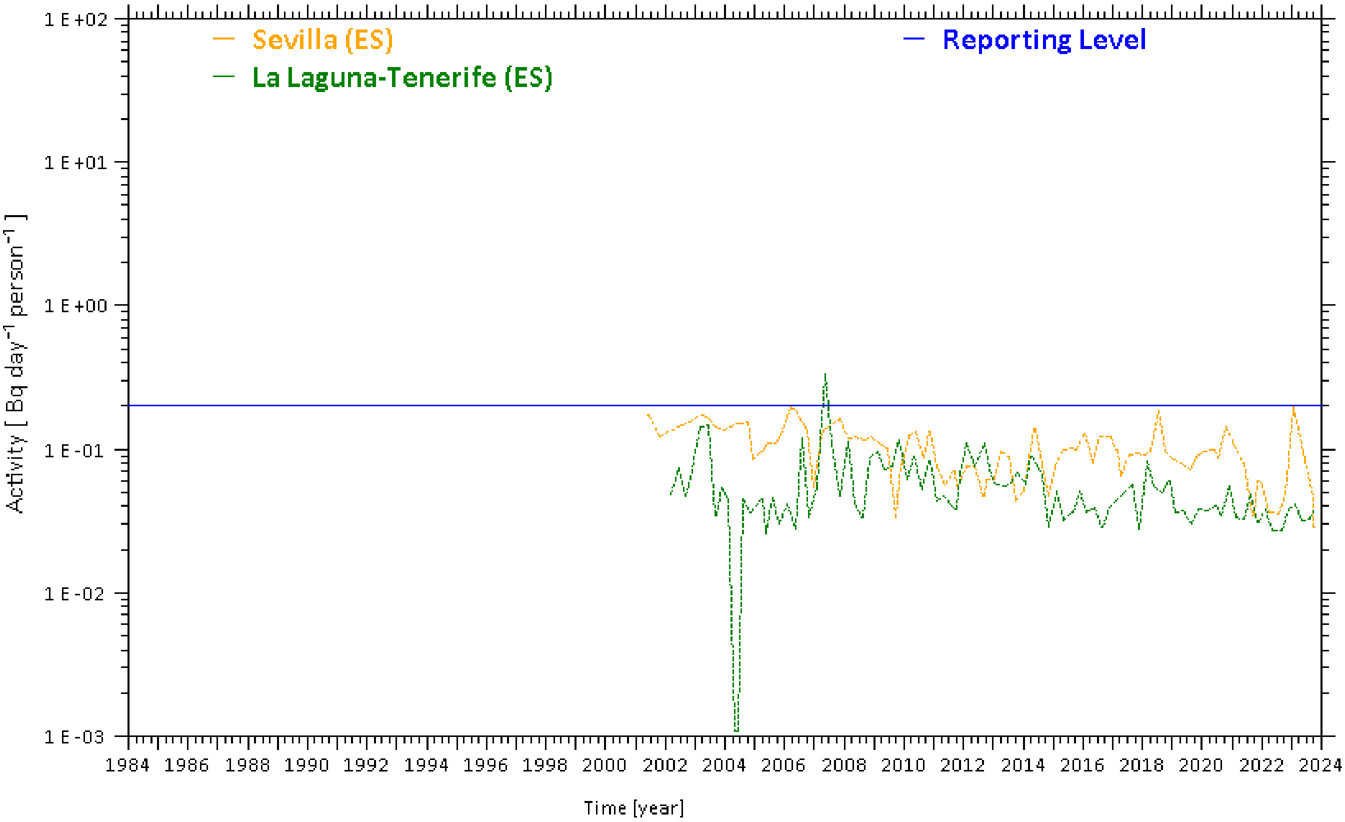
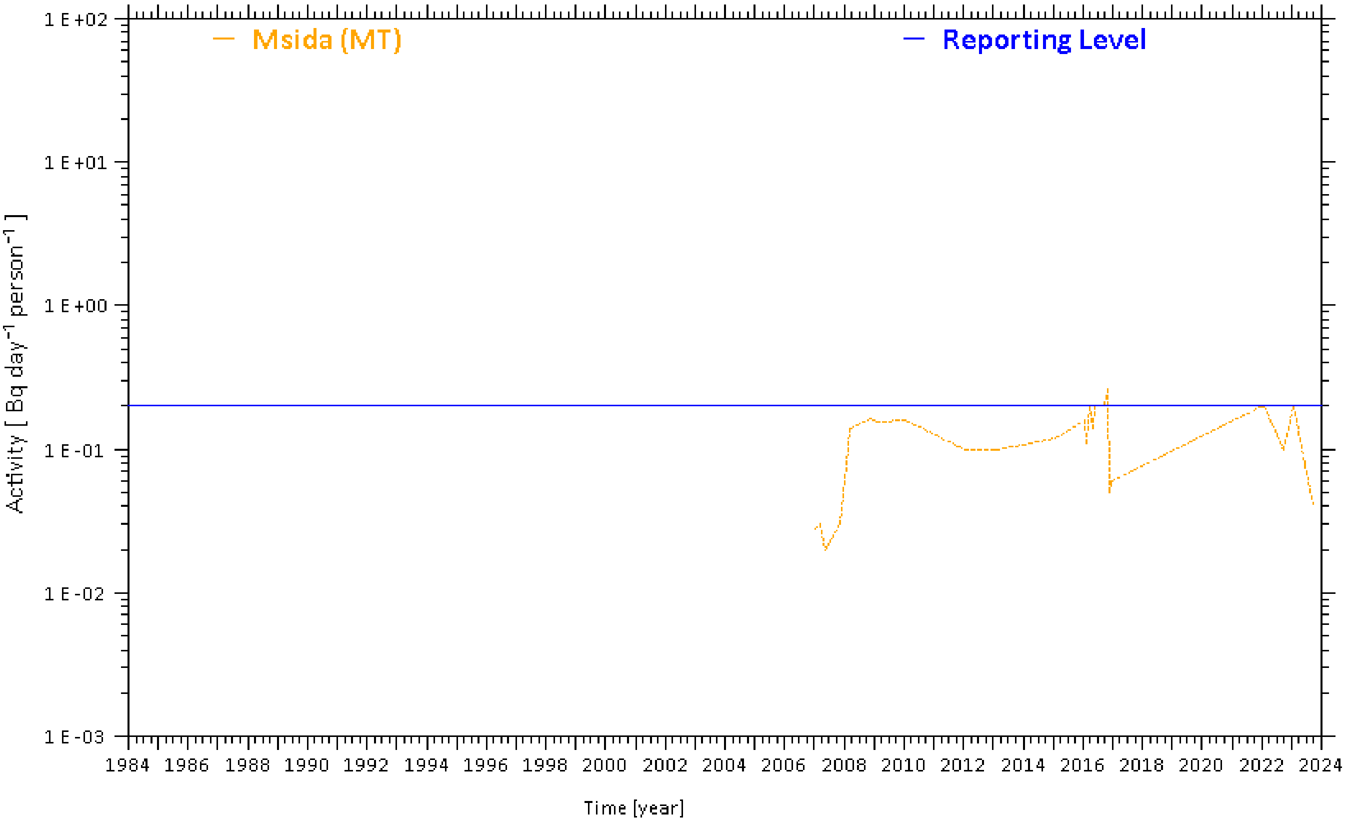


Fig. D25

Activity trends for ^{137}Cs in mixed diet (Msida)



Appendix A

Origins and contents of Articles 35 and 36

The treaty establishing the European Atomic Energy Community (EURATOM) was signed in Rome on 25 March 1957. Title 2 of the Euratom Treaty sets out provisions for the encouragement of progress in the fields of nuclear energy.

Chapter III of Title 2 deals with Health and Safety matters.

Article 35 states: *"Each Member State shall establish the facilities necessary to carry out continuous monitoring of the levels of radioactivity in the air, water and soil and to ensure compliance with the basic standards. The Community shall have the right of access to such facilities so that it may verify their operation and efficiency"*.

Article 36 states: *"The appropriate authorities shall periodically communicate information on the checks referred to in Article 35 to the Community so that it is kept informed of the level of radioactivity to which the public is exposed"*.

The Commission Recommendations to Article 36 of the Euratom Treaty (2000/473/Euratom)

In addition to articles 35 and 36 of the Euratom Treaty, a Commission Recommendation (2000/473/Euratom) has been published (OJ L191 of 27.7.2000) in view of providing more detailed information on which sample types and radionuclide categories EU Member States should report to the Commission. In addition, more practical information is provided on recommended procedures and the time frame in which this data transfer has to be done.

The Commission Recommendation provides supplementary information on the sampling locations and of the recommended sample types and radionuclide categories on which information should be transmitted. This is summarised in the two tables below.

Sample type	Sampling locations	Additional information requested
Airborne particulates	Vicinity of densely populated areas ensuring adequate geographical coverage	
Surface water	Major inland waters at places for which flow rate information is available and, if relevant, from coastal waters	Average flow rate during which the sample was taken
Drinking water	Compliant with the drinking water directive (98/83/EC) Major ground or surface water supplies and for water distribution networks	Annual water volume distributed or produced
Milk	Dairies, sufficiently spread to ensure a representative average	Production rate
Mixed diet	Separate ingredients from market places or local distribution centres	Composition of mixed diet
	Complete meals from large consumption centres (canteens, restaurants,...)	

Media	Measurement category	
	Dense network	Sparse network
Airborne particulates	^{137}Cs, gross beta	^{137}Cs, ^{7}Be
Surface water	^{137}Cs, residual beta	^{137}Cs
Drinking water	^{3}H, ^{90}Sr, ^{137}Cs	^{3}H, ^{90}Sr, ^{137}Cs
Milk	^{90}Sr, ^{137}Cs	^{90}Sr, ^{137}Cs
Mixed diet	^{90}Sr, ^{137}Cs	^{90}Sr, ^{137}Cs

Appendix B

Method for calculating the reporting levels

Reporting levels were used in the report with the aim to improve transparency when bringing together measurements as significant values and as constraint values. Uniform constraint levels have been defined on the basis of their significance from the health point of view, irrespective of the detection limits applied by the different laboratories. Although the calculation is based on a reference annual dose, it needs to be emphasized that the reporting levels are only meant to be a tool for transparent reporting and should not be confused with maximum permitted levels of radioactive contamination. The reporting level RL for artificial nuclides is derived as:

$$RL = \frac{DL}{RF.EDC.CF} \qquad (1)$$

where: DL = annual dose limit, taken to be 1 millisievert [1]
RF = reduction factor of the dose limit, taken to 1000
EDC = effective dose coefficient in Sv/Bq
CF = annual consumption per person

The basic annual dose limit for the public equals 1 millisievert. This limit, decreased by a factor of thousand, i.e. 1 microsievert, can be regarded as having no radiological significance. Using a nominal probability coefficient of stochastic effects for the whole population of 5.10^{-2} per sievert [1], taking only fatal cancers into consideration, this dose represents a radiological risk of 5.10^{-8} per year.

^{7}Be acts as a marker for the quality of the air concentration measurements, and hence is only illustrative. An indicative RL of 8 Bq/m3 is displayed in the sparse graphs.

The values for the effective dose coefficient (values for adults were considered), the annual consumption and the rounded values of the reporting levels obtained by applying equation 1 are given in the table below.

Sample type	Radionuclide category	EDC [2] (Sv/Bq)	Annual consumption	Reporting level (rounded values)
Airborne particulates	gross ß (based on ^{90}Sr)	2.4 10^{-8}	8030 m^3 [3]	5.10^{-3} Bq m^{-3}
	^{137}Cs	4.6 10^{-9}	8030 m^3 [3]	3.10^{-2} Bq m^{-3}
Surface water	residual ß (based on ^{90}Sr)	2.8 10^{-8}	60 l *	6.10^{-1} Bq l^{-1}
	^{137}Cs	1.3 10^{-8}	60 l *	1.10^{0} Bq l^{-1}
Drinking water	^{3}H	1.8 10^{-11}	600 l [4]	1.10^{+2} Bq l^{-1}
	^{90}Sr	2.8 10^{-8}	600 l [4]	6.10^{-2} Bq l^{-1}
	^{137}Cs	1.3 10^{-8}	600 l [4]	1.10^{-1} Bq l^{-1}
Milk	^{90}Sr	2.8 10^{-8}	200 l [4]	2.10^{-1} Bq l^{-1}
	^{137}Cs	1.3 10^{-8}	200 l [4]	5.10^{-1} Bq l^{-1}
Mixed diet	^{90}Sr	2.8 10^{-8}	365 d	1.10^{-1} Bq d^{-1} p^{-1}
	^{137}Cs	1.3 10^{-8}	365 d	2.10^{-1} Bq d^{-1} p^{-1}

* assumed to 10 % of the annual drinking water consumption

[1] ICRP publication 60 : 1990 Recommendations of the ICRP, Pergamon Press (1991)
[2] Basic Safety Standards (96/29/Euratom, Tables A and B)
[3] ICRP publication 23 : Reference man: Anatomical, Physiological and Metabolic Characteristics, Pergamon Press (1975)
[4] Commission of the European Communities, Post-Chernobyl Action 5, Underlying data for Derived Intervention Levels, EUR 12553 (1990)

Appendix C

Methods for calculating time and geographical averages

Throughout the report average values were calculated as arithmetic averages with the calculating methods described below.

Airborne particulates [Bq/m^3]

The average concentration A over a period T and within a geographical area G is calculated as follows:

$$\overline{A} = \frac{1}{N_l}\sum_{l=1}^{N_l}\left(\frac{\sum_{i=1}^{N_{ml}} a_{i,l}\Delta t_{i,l}}{\sum_{i=1}^{N_{ml}}\Delta t_{i,l}}\right) \qquad (1)$$

where: $a_{i,l}$ = the value of the i^{-th} measurement with duration $\Delta t_{i,l}$ at location l within G
N_l = the number of locations within G
N_{ml} = number of measurements at location l during T

Surface water [Bq/l]

Only time averages for specific locations over a period T are taken. The following formula is used for each location:

$$\overline{S} = \frac{\sum_{i=1}^{N} s_i\,\Delta t_i}{\sum_{i=1}^{N}\Delta t_i} \qquad (2)$$

where: s_i = value of the i^{-th} measurement with duration Δt_i
N = number of measurements during T

Drinking Water [Bq/l]

The average concentration W over a period T and within a geographical area G is calculated as follows:

$$\overline{W} = \frac{1}{N_l}\sum_{l=1}^{N_l}\left(\frac{\sum_{i=1}^{N_{ml}} w_{i,l}\Delta t_{i,l}}{\sum_{i=1}^{N_{ml}}\Delta t_{i,l}}\right) \qquad (3)$$

where: $w_{i,l}$ = the value of the i^{-th} measurement with duration $\Delta t_{i,l}$ at location l within G
N_l = the number of locations within G
N_{ml} = number of measurements at location l during T

Milk [Bq/l]

The average concentration M over a period T and within a geographical area G is calculated as follows:

$$\overline{M} = \frac{1}{N_l}\sum_{l=1}^{N_l}\left(\frac{\sum_{i=1}^{N_{ml}} m_{i,l}\Delta t_{i,l}}{\sum_{i=1}^{N_{ml}}\Delta t_{i,l}}\right) \qquad (4)$$

where: $m_{i,l}$ = the value of the i^{-th} measurement with duration $\Delta t_{i,l}$ at location l within G
N_l = the number of locations within G
N_{ml} = number of measurements at location l during T

Mixed diet [Bq/day.person]

The average mixed diet concentration D over a period of time T and within a geographical area G is calculated as follows:

$$\overline{D} = \frac{1}{N_l}\sum_{l=1}^{N_l}\left(\frac{\sum_{i=1}^{N_{ml}} d_{i,l}\Delta t_{i,l}}{\sum_{i=1}^{N_{ml}}\Delta t_{i,l}}\right) \qquad (5)$$

where: $d_{i,l}$ = the value of the i^{-th} measurement with duration $\Delta t_{i,l}$ at location l within G
N_l = the number of locations within G
N_{ml} = number of measurements at location l during T

Comments

In this report the basic period T is taken to be one month. Quarterly averages were obtained by averaging the corresponding monthly averages. When the available data do not allow the calculation of quarterly averages, semestrial or annual averages are taken.

In most cases data are taken from national reports where, very often, time or space averages are already given. Hence the quantities a, s, w, m and d are sometimes averages themselves, and the calculated averages A, S, W, M and D may only be an approximation of the true average values.

Since the number of measurements per month or region is not always the same, to avoid untoward biases, quarterly and annual regional averages are taken as the mean of the corresponding monthly and quarterly averages respectively. National averages are obtained in the same way starting from the mean of the corresponding monthly regional averages.

Appendix D

Addresses of national competent authorities and main laboratories

Austria

Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft
Abteilung V/7 Strahlenschutz
Radetzkystraße 2
A-1031 Wien
www.bmifuw.at

Bundesministerium für Gesundheit
Abteilung III Strahlenschutz
Radetzkystraße 2
A-1031 Wien
www. bmg.gv.at

Österreichische Agentur für Gesundheit und Ernährungssicherheit
Kompetenzzentrum für Strahlenschutz und Radiochemie
Spargelfeldstraße 191
A-1226 Wien
www.ages.at

Belgium

Federal Agency for Nuclear Control (FANC)
Markies Street 1 bus 6A
B - 1000 Brussels
Belgium
www.fanc.fgov.be

SCK.CEN
Boeretang 200
B - 2400 MOL
www.sckcen.be

IRE
Industrial Zone
Avenue de l'Esperance 1
B - 6220 FLEURUS
www.ire.eu

Bulgaria

Executive Environment Agency
136, Tsar Boris III blvd
1618 Sofia

National Center of Radiobiology and Radiation Protection
3, Georgi Sofiiski Blvd
1606 Sofia
http://www.ncrrp.org

Croatia

Ministry of the Interior, Civil Protection Directorate
Nehajska 5
HR-10000 Zagreb, CROATIA
https://civilna-zastita.gov.hr/

Institute for Medical Research and Occupational Health
Ksaverska cesta 2, POB 291
HR-10001 Zagreb, CROATIA
https://www.imi.hr/en/

Cyprus

Radiation Inspection and Control Service
Department of Labour Inspection
12, Apellis Street
1493 Nicosia
www.mlsi.gov.cy/dli

State General Laboratory
44, Kimonos Street
1451 Nicosia
www.moh.gov.cy/sgl

Czech Republic

Státní úřad pro jadernou bezpečnost
Senovážné nám. 9
CZ-11000 Praha 1
www.sujb.cz

Státní ústav radiační ochrany
Bartoškova 28
CZ-14000 Praha 4
www.suro.cz

Denmark

National Institute of Radiation Protection
Knapholm 7
DK - 2730 Herlev
www.sundhedsstyrelsen.dk

Technical University of Denmark
DTU Sustain
Radioecology and Tracer Studies Group
Waste, Climate and Monitoring
Frederiksborgvej 399, Building 201
4000 Roskilde
www.dtu.dk

Estonia

Environmental Board
Roheline 64
80010 Pärnu
https://keskkonnaamet.ee/en

Finland

Radiation and Nuclear Safety Authority (STUK)
Jokiniemenkuja 1
FI-01370 Vantaa
www.stuk.fi

France

Authority for Nuclear Safety and Radiation Protection Authority (ASNR)
15 rue Louis-Lejeune, 92120 Montrouge, France
(Postal address: ASNR, BP 17, 92262 Fontenay-aux-Roses cedex, France)
www.asnr.fr

Germany

Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz
Referat S II 5
Postfach 120 629
D - 53048 Bonn
www.bmuv.de

Deutscher Wetterdienst - Zentrale
Frankfurter Straße 135
D - 63067 Offenbach am Main
www.dwd.de

Bundesamt für Strahlenschutz
Referat PB 3
Ingolstädter Landstraße 1
D - 85764 Oberschleißheim
www.bfs.de

Greece

Greek Atomic Energy Commission
PO Box 60092
GR - 15341 Aghia Paraskevi, Attiki
www.eeae.gr

Environmental Radioactivity Laboratory
Institute of Nuclear Technology - Radiation Protection
NCSR "Demokritos"
GR - 15310 Aghia Paraskevi, Attiki
www.ipta.demokritos.gr

Hungary

Baranya County Government Office, Department of Public Health, Laboratory Section, Radiological Laboratory
Szabadság út 7
H-7623 Pécs
https://kormanyhivatalok.hu/kormanyhivatalok/baranya/megye/szervezet/nepegeszsegugyi-foosztaly

Ministry of Interior (BM)
National Center for Public Health and Pharmacy - Department of Radiobiology and Radiohygiene (NNGyK SSF)
Anna u. 5.
H-1221 Budapest
https://www.nnk.gov.hu/index.php/sugaregeszsegugy/foosztaly-kezdolapja.html

Ministry of Interior (BM)
National Center for Public Health and Pharmacy (NNGyK)
Albert Flórián út 2-6
H-1097 Budapest
https://nngyk.gov.hu/hu/

Ministry of Agriculture
National Food Chain Safety Office, Food Chain Safety Laboratory Directorate
Radioanalytical Reference Laboratory
Fogoly utca 13-15
H-1182 Budapest
https://www.nebih.gov.hu/en

Hungarian Atomic Energy Authority
Fényes Adolf utca 4
H-1036 Budapest
www.haea.hu

Nuclear Power Plant Paks
H-7031 Paks, P.O.B.: 71
http://www.atomeromu.hu/hu/Lapok/default.aspx

Ireland

Environment Protection Agency
Johnstown Castle Estate
Wexford, Y35 W821
Ireland
www.epa.ie

Italy

ISPRA - Institute for Environmental Protection and Research
Via Vitaliano Brancati 48
I - 00144 Roma-EUR
http://www.isprambiente.gov.it

ISIN - National Inspectorate for Nuclear Safety and Radiation Protection
Via Capitan Bavastro 116
I - 00154 Roma
https://www.isinucleare.it

Latvia

Latvian Environment, Geology and Meteorology Centre
Latgales 165,
Riga, LV-1019

https://videscentrs.lvgmc.lv

Food and Veterinary Service
Peldu 30
Riga, LV-1050
www.pvd.gov.lv

Institute of Food Safety, Animal Health and Environment "BIOR"
Lejupes 3
Riga, LV-1076
www.bior.lv

Lithuania

Radiation Protection Center
Department of Expertise and Exposure Monitoring
Division of Public Exposure Monitoring
Kalvariju153
LT-08352, Vilnius
www.rsc.lt

Luxembourg

Direction de la Santé - Division de la Radioprotection
6b, rue Nicolas-Ernest Barblé
L-1210 Luxembourg
Luxembourg
www.radioprotection.lu

Malta

Radiation Protection Commission
Unit F22
Mosta Technopark
Mosta
MST 3000
https://rpc.gov.mt/

the Netherlands

Autoriteit Nucleaire Veiligheid en Stralingsbescherming (ANVS)
Koningskade 4
2596 AA Den Haag
Netherlands
https://www.autoriteitnvs.nl/

National Institute for Health and the Environment (RIVM) - Centrum Veiligheid
Postbus 1
NL - 3720 BA Bilthoven
www.rivm.nl

Rijkswaterstaat Centrale Informatievoorziening (RWS CIV)
Afdeling Laboratorium
Postbus 2232
3500 GE UTRECHT
Netherlands
https://www.rijkswaterstaat.nl/water/waterdata-en-waterberichtgeving/waterdata

Wageningen Food Safety Research (WFSR)
Akkermaalsbos 2
6708 WB Wageningen
Netherlands
https://www.wur.nl/

Poland

Central Laboratory for Radiological Protection
7, Konwaliowa Str.
03-194 Warsaw
www.clor.waw.pl

National Atomic Energy Agency
17, Nowy Swiat 6/12
00-400 Warsaw
https://www.gov.pl/web/paa/

Portugal

Instituto Tecnológico e Nuclear (ITN)
Unidade de Protecção e Segurança Radiológica (UPSR)
Estrada Nacional 10, Apartado 21
P - 2686 Sacavém
www.itn.pt

Instituto Superior Técnico
Campus Tecnológico e Nuclear
Laboratório de Proteção e Segurança Radiológica
Estrada Nacional 10 (km 139.7)
2695-066 Bobadela LRS
www.itn.pt

Agência Portuguesa do Ambiente
Rua da Murgueira, 9
Zambujal – Alfragide
2610-124 Amadora PORTUGAL
www.apambiente.pt

Laboratório de Radioatividade Natural
Departamento de Ciências da Terra
Edifício Central da Faculdade de Ciências e Tecnologia, Bloco C, 4.º Piso
Rua Sílvio Lima, S/N, Polo II
3030-790 Coimbra PORTUGAL

Romania

Ministry of Environmental, Water and Forest, National Environmental Protection Agency, National Reference Radioactivity Laboratory
294 Splaiul Independentei, Sector 6, Bucharest, Romania
www.anpm.ro

Ministry of Health, National Institute of Public Health

5Th District
1-3 Dr. Leonte Anastasievici Street
Romania
https://insp.gov.ro

Slovak Republic

Public Health Authority of the Slovak republic
Trnavska 52,
P.O.BOX 45
826 45 Bratislava
www.uvzsr.sk

Regional Public Health Authority based in Košice
Ipeľská 1
040 11 Košice
www.ruvzke.sk

Regional Public Health Authority based in Banská Bystrica
Cesta k nemocnici 1
975 56 Banská Bystrica
www.vzbb.sk

Slovenia

Uprava Republike Slovenije za jedrsko varnost
(Slovenian Nuclear Safety Administration)
Litostrojska cesta 54
SI-1000 Ljubljana
www.ursjv.gov.si

Uprava Republike Slovenije za varstvo pred sevanji
(Slovenian Radiation Protection Administration)
Ajdovščina 4
SI-1000 Ljubljana
www.uvps.gov.si

Institut Jožef Stefan (Jožef Stefan Institute)
Jamova cesta 39
SI-1000 Ljubljana
www.ijs.si

Zavod za varstvo pri delu (Institute of Occupational Safety)
Pot k izviru 6
SI-1260 Ljubljana-Polje
www.zvd.si

Spain

Consejo de Seguridad Nuclear
Pedro Justo Dorado Dellmans, 11
E - 28040 Madrid
www.csn.es/kprgisweb2/

Ministerio de Fomento
Centro de Estudios y Experimentación de Obras Públicas (CEDEX)
Alfonso XII, 3
E - 28014 Madrid
www.cedex.es

Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)
Avenida Complutense, 40
E- 28040 Madrid
www.ciemat.es

Sweden

Swedish Defense Research Agency
S-164 90 Stockholm
www.foi.se

Swedish Radiation Safety Authority
S-171 16 Stockholm
www.ssm.se

Appendix E

Bibliography - data sources (for 2023)

Austria

Chr. Katzlberger and M. Korner, AGES, CC Strahlenschutz und Radiochemie, Vienna (personal communications)

Belgium

Jurgen CLAES and Sylvain NOOTENS Federal Agency for Nuclear Control (FANC) Unit Surveillance of the Territory and Natural Radiation (personal communication)

https://fanc.fgov.be/

All annual reports on radiological surveillance can be consulted on the FANC website

(link)

Bulgaria

S.Stoyanova (Executive Environment Agency) - Ministry of Environment and Waters, Sofia; R. Totzeva, National Center of Radiobiology and Radiation Protection, Public Exposure Monitoring Laboratory, Sofia (personal communications)

Croatia

Praćenje stanja radioaktivnosti u okolišu u Republici Hrvatskoj, Izvještaj za 2023. godinu, IMI-CRZ-104

Annual reports from the Croatian National Monitoring Programme are available on the website of the Civil Protection Directorate, Ministry of the Interior (in Croatian):

https://civilna-zastita.gov.hr/mjerenja-radioaktivnosti-u-okolisu/4743

Cyprus

Radiation Inspection and Control Service, Department of Labour Inspection, Ministry of Labour and Social Insurance, Environmental Radioactivity Measurements in Cyprus 2004 - 2009, Lefkosia (Nicosia), 2010 (ISBN 978-9963-38-791-1)

A. Sisou and M. Tzortzis, Radiation Inspection and Control Service, Nicosia (personal communications)

Czech Republic

V. Starostová, Státní úřad pro jadernou bezpečnost, Prague ; I. Češpírová and M. Hýža, Státní ústav radiační ochrany (personal communications)

Denmark

K. G. Andersson and S. P. Nielsen, Risø National Laboratory for Sustainable Energy (personal communications)

Estonia

A. Polt, Environmental Board, Climate and Radiation Department (personal communications)

Finland

E. Kostiainen and K. Vesterbacka, Radiation and Nuclear Safety Authority, Research and Environmental Surveillance, Helsinki (personal communications)

Aleksi Mattila and Samu Inkinen – Radiation and Nuclear Safety Authority, STUK, Environmental Radiation Monitoring in Finland: Annual report 2020, STUK-B 268/ 2021

Karhunen, Tero; Kojo, Katja; Kurttio, Päivi; Mattila, Aleksi; Paatero, Jussi; Peltonen, Tuomas; Perälä, Marjo; Simola, Reko; Torvela, Tiina; Turunen, Jani; Vartti, Vesa-Pekka; Virtanen, Sinikka – Radiation and Nuclear Safety Authority, STUK, Environmental Radiation Monitoring in Finland: Annual report 2021, STUK-B 284/2022

Kaipiainen, Maria; Karhunen, Tero; Kojo, Katja; Kurttio, Päivi; Laine, Jussi-Pekka; Mattila, Aleksi; Paatero, Jussi; Peltonen, Tuomas; Simola, Reko; Torvela, Tiina; Turunen, Jani; Vartti, Vesa-Pekka – Radiation and Nuclear Safety Authority, STUK, Environmental Radiation Monitoring in Finland: Annual report 2022, STUK-B 304/2023

Karhunen, Tero; Mattila, Aleksi; Paatero, Jussi; Peltonen, Tuomas; Simola, Reko; Torvela, Tiina; Turunen, Jani; Vartti, Vesa-Pekka; Virtanen, Sinikka – Radiation and Nuclear Safety Authority, STUK, Environmental Radiation Monitoring in Finland: Annual report 2023, STUK-B 321/2024

France

Institut de Radioprotection et de Sûreté Nucléaire, Bilan de l'état radiologique de l'environnement français en 2007

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APPENDIX F

The REM Data bank

After the accident at Chernobyl, a task Force was created by the relevant Directorates of the European Commission (EC) to re-examine all aspects of nuclear safety. The necessity of interpreting a large number of data on environmental radioactivity led to the creation of the REM (Radioactivity Environmental Monitoring) data bank at the Joint Research Centre, Ispra in Italy for holding data on the contamination resulting from the Chernobyl accident.

At a meeting with Member State representatives for the purposes of Articles 35 and 36 of the Euratom Treaty (Luxembourg, October 1987), it was decided to take advantage of the informatic structure of the REM data bank to streamline the various formats adopted in the EU for reporting routine environmental measurements and to prepare the EC report concerning these data in a more systematic way.

The information in REM largely concerns radioactivity levels in Europe of air, deposition, water, milk, meat, crops and vegetables from 1.1.1984 and is continuously being updated. Each data record contains information describing the sample measurement (value, nuclide, etc.), the sample type, location and date of sampling and source of the data.

The REM Data bank contains more than 5,600,000 data records as of January 2025.

For further information please contact:
JRC-REMDBSUPPORT@EC.EUROPA.EU

Appendix G

List of Figures and Tables

Introduction

Dense network results (2023-2023)

Sparse network results (1984-2023)

Glossary

ABSORBED DOSE	The amount of energy imparted by the ionising radiation to unit mass of absorbing material. It is expressed in gray, Gy. (1 Gy = 1 Joule per kilogram).
ACTIVITY	The amount of a radionuclide at a given time. It expresses the rate at which radioactive transformations occur. The unit of measurement is the becquerel, Bq. (1 Bq = one transformation per second).
ALPHA PARTICLE	A particle, consisting of two protons and two neutrons, which is emitted from the nucleus of certain radionuclides.
ATOM	The smallest portion of an element that can combine chemically with other atoms.
BECQUEREL	see Activity.
BETA PARTICLE	High energy electron which is emitted from the nucleus of certain radionuclides.
CONSTRAINT VALUE	Activity value known to be less than a certain value.
COSMIC RAYS	High energy ionising radiation from outer space.
DOSE	The term used either for individual absorbed dose or effective dose.
DOSE LIMIT	Recommended by the ICRP and authorised by regulatory authorities to apply to occupational and public exposure.
EFFECTIVE DOSE	Weighted sum of the equivalent doses to the various organs or tissues. The weighing factors are derived from the risk of stochastic effect to the individual tissue or organ. The unit of measurement is the sievert, Sv.
ENVIRONMENTAL MONITORING	The application of automatic or mobile equipment to measure the activity in the environment of a release of radioactivity. The parameters usually include the activity of air, ground deposition, river water, drinking water and milk.
EQUIVALENT DOSE	The quantity obtained by multiplying the absorbed dose by a factor to take into account the relative harmfulness of the various types of ionising radiations. The unit is the sievert, Sv. One sievert produces the same biological effect irrespective of the type of radiation.
GAMMA RAY	A quantity of ionising electromagnetic radiation which is emitted by certain radionuclides.
GRAY	See Absorbed Dose.
GROSS BETA	The total measured beta activity in a sample. Depending on the measurement methodology it may exclude tritium and/or radon.
HALF-LIFE	The time taken for the activity of a radionuclide to lose half of its value by decay. Also referred to as “physical half-life”.
ICRP	The International Commission on Radiological Protection is a non-governmental scientific organisation which publishes recommendations on radiation protection.
IONISING RADIATION	Radiation which has sufficient energy to produce ionisation in matter; includes alpha particles, beta particles, gamma rays, X-rays and neutrons (neutrons cause ionisation indirectly).
ISOTOPE	Nuclides of the same element but with different number of neutrons.
NATURAL BACKGROUND	The radiation field due to naturally occurring radioactivity. It includes radiation arising from the presence of long-lived radionuclides and their daughters in the earth’s crust, atmosphere and cosmic radiation.
NEUTRON	An elementary particle with no electric charge which combines with protons to form an atomic nucleus.
PROTON	An elementary particle with positive electric charge. The amount of protons in an atomic nucleus determines the chemical element.
RADIOACTIVE CONTAMINATION	The undesirable presence of unsealed radioactive materials on surfaces, in air or in water.
RADIOACTIVE DECAY	The decay of a radionuclide by the spontaneous transformation of the nuclides, at a rate represented by the half-life. The rate is expressed as the activity in becquerel, Bq, indicating the number of transformations per second.
RADIONUCLIDE	A species of atom characterised by the number of protons and neutrons (and sometimes by the energy state of the nucleus), and which emits ionising radiation. It is described by the element and the total amount of protons and neutrons (eg caesium-137).
RADON	A naturally occurring radioactive element and the heaviest noble gas. Radon-222 and Radon-220 (also called thoron) are the most important isotopes.
REPORTING LEVEL	Value below which average Activity levels are not quoted exactly in this Monitoring Report.
RESIDUAL BETA	Gross beta activity minus potassium-40 (^{40}K), which is the major natural beta emitting component in surface water.
SIEVERT	See equivalent Dose and Effective Dose.

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