



## JRC TECHNICAL REPORTS

# European data portal for radioactivity in the environment

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2016

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**JRC Science Hub**

<https://ec.europa.eu/jrc>

JRC105309

EUR 28429 EN

PDF	ISBN 978-92-79-65274-5	ISSN 1831-9424	doi:10.2760/697703
Print	ISBN 978-92-79-65275-2	ISSN 1018-5593	doi:10.2760/202581

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How to cite this report: Bogucarskis, K., De Felice, L., Cinelli, G. and Tollefsen, T., *European data portal for radioactivity in the environment*, EUR 28429 EN, Publications Office of the European Union, Luxembourg, 2016, ISBN 978-92-79-65274-5, doi:10.2760/697703, JRC105309.

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## **Foreword**

The environmental radioactivity monitoring data from EU Member States must be communicated to the European Commission so that it can carry out evaluations and compare radiation exposure of the population in different countries.

Commission Recommendation 2000/473/Euratom provides guidance to EU Member States on monitoring the levels of radioactivity in the environment for the purpose of assessing the exposure of the population as a whole.

## **Abstract**

Since 1987, the Radioactivity Environmental Monitoring group at the Joint Research Centre supports the European Commission in its responsibilities to provide qualified information to the European Commission, the European Parliament and the Member States on the levels of radioactive contamination of the various compartments of the environment.

Such a support is provided both for routine and emergency situations:

- In the case of a nuclear or radiological/nuclear emergency, real-time monitoring information collected from automatic surveillance systems in 39 European Countries by the European Radiological Data Exchange Platform (EURDEP) which further redistributes the data to the national and international competent authorities.
- Routine (off-line) measurements are managed in the REM database. This database contains qualified environmental radioactivity data from all EU Member States for the most relevant environmental compartments in the European Community since 1984.
- In addition and in collaboration with the relevant Competent Authorities, a European Atlas of Natural Radiation (EANR) is being developed.

The databases contain millions of measured and estimated data records which among other purposes are being used to familiarise the general public with the radioactive environment, to give a more balanced view of the annual dose that it may receive from natural radioactivity and to provide reference material and generate harmonised data for the scientific community.

# 1 Introduction

The goal of the European data centre for radioactivity in the environment is to provide a unique portal as the single point of access for all the data and products developed by the REM group at the JRC.

The portal offers geo referenced data in form of downloadable data and interactive maps, for general users, easy and straightforward.

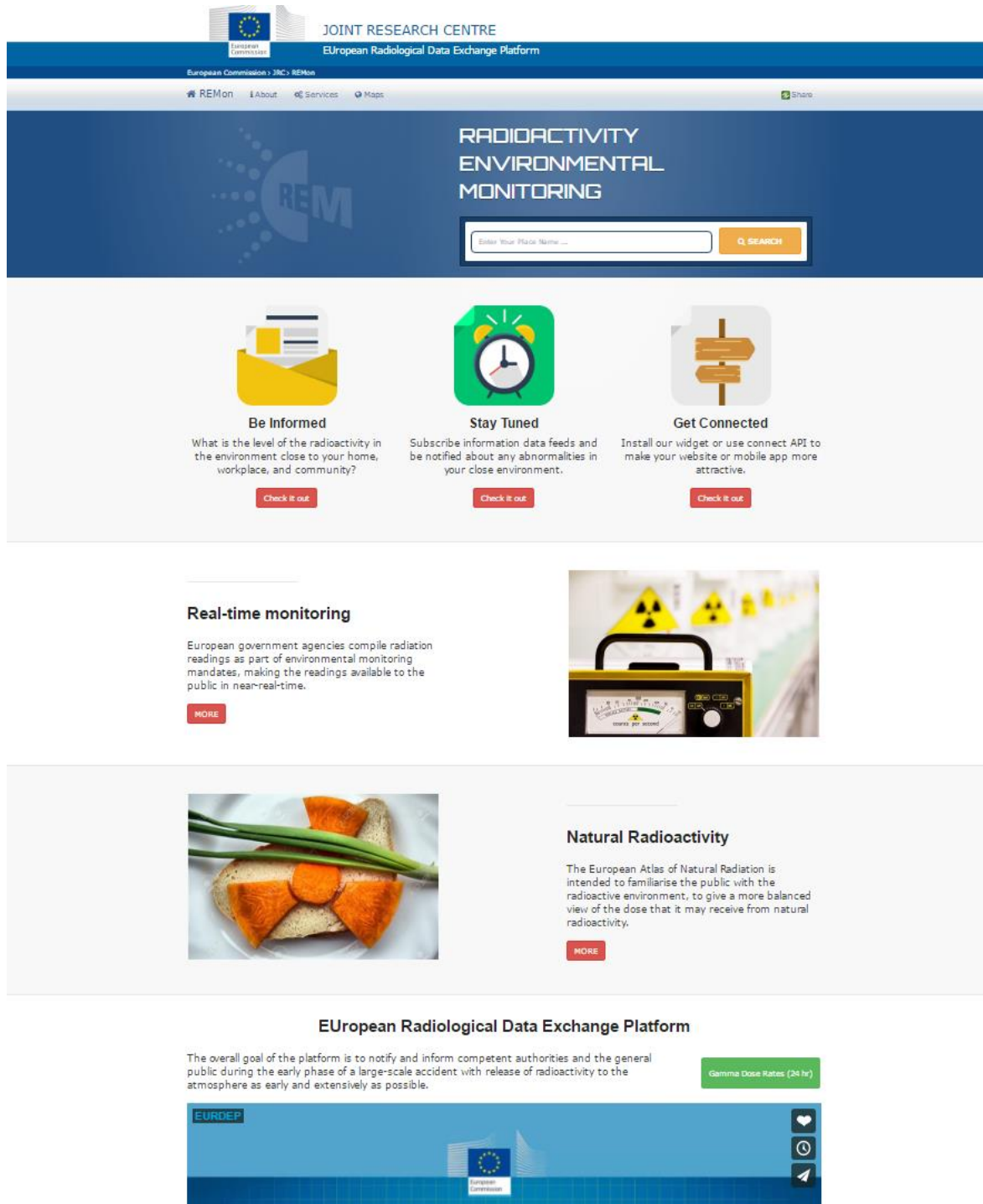
The following data and services will be made available via the portal:

- Real-time monitoring information collected from automatic surveillance systems in European Countries by the EURDEP system.
- Routine (off-line) measurements of radioactivity in air, water and mixed diet reported by the EU Member States according to their obligations defined in EURATOM Treaty art. 35-36.
- Information about national radioactivity in Europe through the European Atlas of Natural Radiation (EANR).

The portal contains the list of associated scientific publications as well as offers to the users a number of interactive tools which will help to improve understanding of the natural radioactivity by the general public.

## 2 The portal

The portal is hosted under the url <https://remon.jrc.ec.europa.eu>. Its home page is shown in figure 1.



**Figure 1.** The homepage layout.

This page offers direct navigation links to all main sections of the portal such as

- General information about activities e.g. Real-time monitoring, Natural Radioactivity, Publications.
- Data and services
- Contact and other related information

## 2.1 Real-time monitoring

Apart from general information about the European Radiological Data Exchange Platform (EURDEP) all the data providers are listed and referenced correctly.

Specially adapted tools to display complex radiological measurements to the general public are also available and explained in a simple, intuitive way, as shown in Figure 2.



**Figure 2.** Real-time monitoring pages.

A number of interactive services are offered for authorized users, such as real-time tracking for user's POI (point of interests), widgets etc.

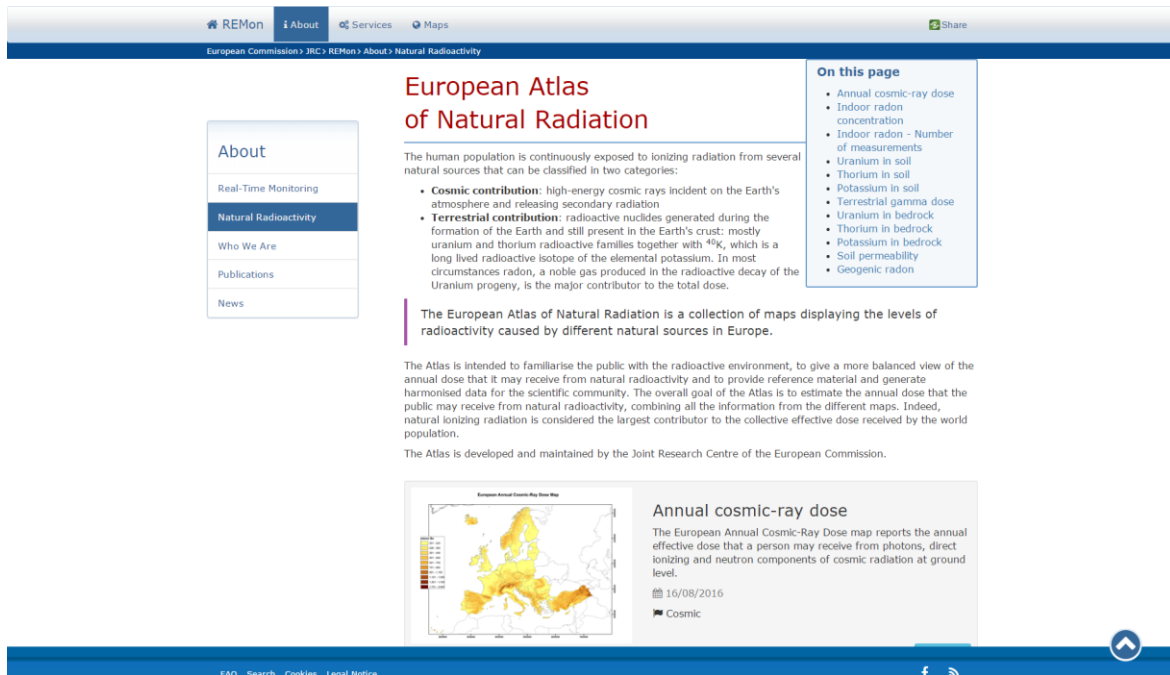
## 2.2 Natural Radioactivity

The European Atlas of Natural Radiation (EANR) is a collection of maps displaying the levels of radioactivity caused by different natural sources in Europe.

The Atlas is intended to familiarise the public with the radioactive environment, to give a more balanced view of the annual dose that it may receive from natural radioactivity and to provide reference material and generate harmonised data for the scientific community. The overall goal of the Atlas is to estimate the annual dose that the public may receive from natural radioactivity, combining all the information from the different maps. Indeed, natural ionizing radiation is considered the largest contributor to the collective effective dose received by the world population.

It has been implemented as a simple catalog of 11 maps, where each map is fully described, has a list of associated publications and contributors, as shown in Figure 3.





**Figure 3.** Natural radioactivity pages.

### 2.2.1 EANR datasets

The European Atlas of Natural Radiation (EANR) currently contains the following data themes:

- Annual cosmic-ray dose
- Indoor radon concentration
- Indoor radon - Number of measurements
- Uranium in soil
- Thorium in soil
- Potassium in soil
- Terrestrial gamma dose
- Uranium in bedrock
- Thorium in bedrock
- Potassium in bedrock
- Soil permeability
- Geogenic radon

Each data theme of the catalogue contains a brief teaser, date of the last update and a thumbnail image of the map, as shown in Figure 4.

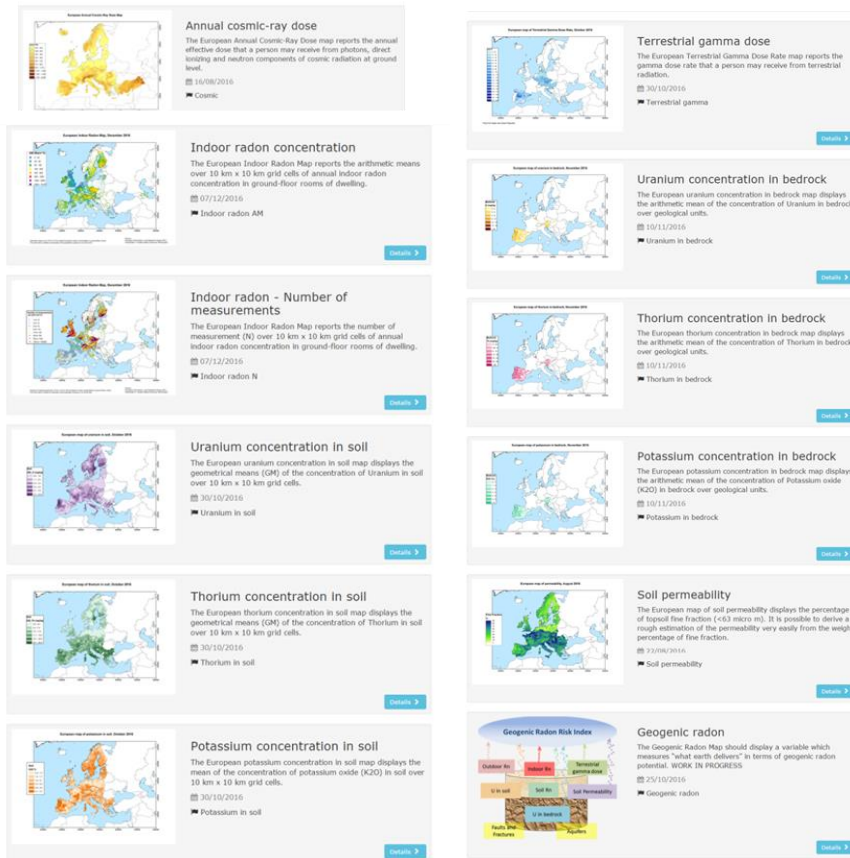


Figure 4. EANR catalogue

### 2.2.2 GIS visualization

All layers and maps were setup as Open Geospatial Consortium (OGC)-compliant web services and further visualized in a specially developed map viewer. Accurate legends have been produced for each layer. Each dataset on the atlas contains a link to the correspondent interactive map as shown on the Figure 5.

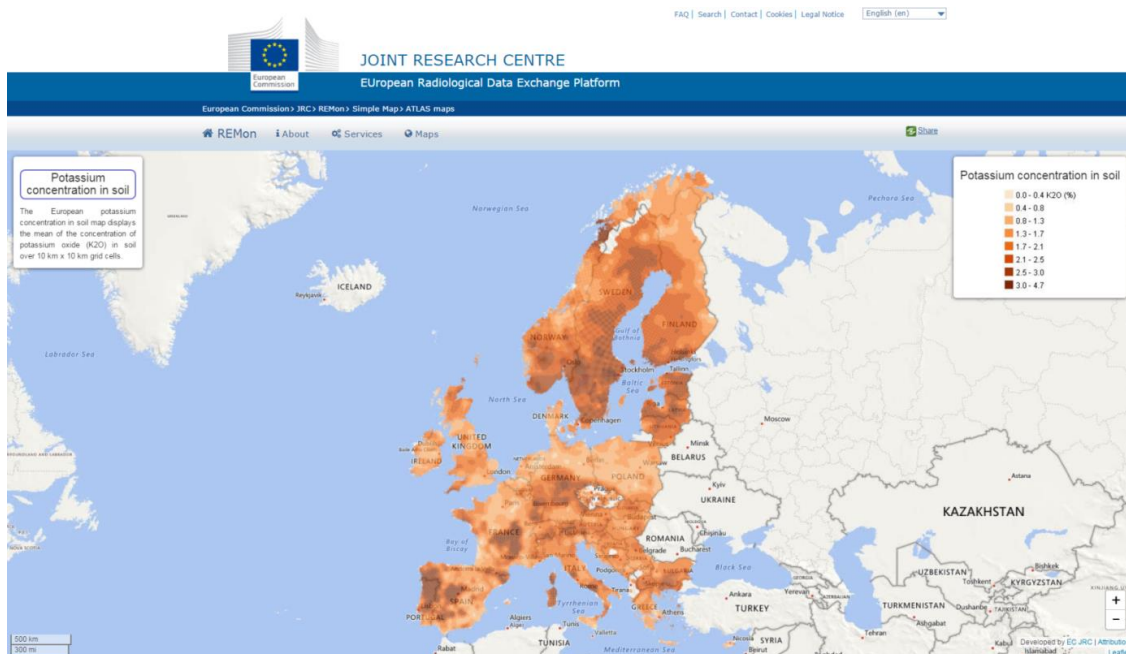
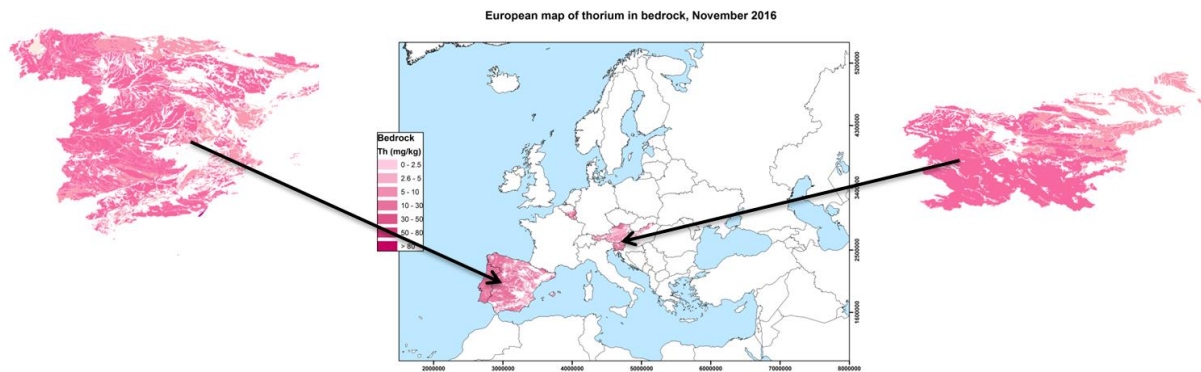


Figure 5. EANR dataset as an interactive map.

Some layers have been published as aggregations of layers, i.e. country-based, which facilitates possible update procedures for each country layer, as shown in Figure 6.



**Figure 6.** Aggregated national datasets in the European map.

The Geoserver open source software has been used to implement Open Geospatial Consortium's specifications for Web Feature Service (WFS) and Web Coverage Service (WCS) with an integrated Web Map Service (WMS). The Geoserver software is also INSPIRE-compliant and can store metadata.

In the future the GeoNetwork open source software will be used to manage the metadata and its INSPIRE compliance. To ensure this compliance, data layers will be cleaned of all unnecessary info, datasets will be reported in several projected coordinate systems and each layer will be described through metadata.

### 3 Conclusions

The portal offers geo-referenced data in the form of downloadable data and interactive maps for general users, in an easy and straightforward way.

The following data and services are made available via the portal:

- Real-time monitoring information collected from automatic surveillance systems in European Countries by the EURDEP system.
- Routine measurements of radioactivity in air, water and mixed diet reported by the EU Member states according to their obligations defined in the EURATOM Treaty art. 35-36.
- Information about national radioactivity in Europe through the European Atlas of Natural Radiation (EANR).

The portal contains a list of associated scientific publications and offers the users a number of interactive tools which will help them to improve their understanding of natural radioactivity.

The following steps have been foreseen to improve this portal:

- REM database reporting tools will be incorporated into the portal. These are currently published separately under another website.
- Design a common GIS visualization platform, harmonization of all data layers and map legends.
- Introduce the public API giving authorized access to the data.
- INSPIRE compliance to improve the data interoperability.

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