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## Plan Overview

*A Data Management Plan created using DMPonline*

**Title:** Gamma radiation monitoring campaign at the Azores ENA-ARM station (Graciosa Island)

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**Template:** DCC Template

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### **Project abstract:**

This gamma radiation monitoring campaign focus on the study of the temporal variability of the concentration of the noble gas radon (Rn-222), aiming to examine how it's influenced by meteorological conditions, how it impacts the local atmospheric electric field, and its association with the atmosphere's ionization and aerosol's concentration.

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### **Copyright information:**

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# Gamma radiation monitoring campaign at the Azores ENA-ARM station (Graciosa Island)

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## Data Collection

### What data will you collect or create?

This project focuses on the study of the temporal variability of gamma radiation. During the project sensor data will be collected (gamma and temperature sensors), in various formats ASCII table; .txt format. The files size is expected to range between 10Kb and 10MB with a total volume of data of about 500 MB.

The project is implemented in 2 phases: the initially planned monitoring period of 3 years, from 1 April 2015 to 31 March 2018, followed by an extension of the project duration from 1 April 2018 until 15 May 2020. That is why the project will have 2 datasets: 1 - the data collected and prepared during phase 1 of the project; 2 - the data collected and prepared during the extension of the project. Each dataset will be deposited on repositories and interconnected with each other.

The data collected and produced during the project will be useful for decision-makers, governmental organizations, regional and local authorities, national environmental agencies and ministries, as well as for other researchers. In particular, all organizations related to environmental radioactivity surveillance and air pollution control services at national and European levels.

### How will the data be collected or created?

Gamma radiation will be measured at the ENA-ARM station, Graciosa Island, Azores (39 N, 28 W), with a NaI(Tl) scintillator (Scionix, Holland), equipped with an electronic total count Single Channel Analyzer (SCA) that detects gamma radiation in the energy range from 475 KeV to 3 MeV. Data will be collected from the sensor's datalogger on a weekly basis by the ENA staff at the ENA station. The new available data since the last collection will be copied from the instrument's datalogger and sent to the PI every week. Frequency: The measurements will be performed every 1-minute, and further averaged every 15-minutes or higher if deemed necessary. The 15-minute averaged version of the data is deposited on the repository. All 1-minute data is preserved on the external disk and will be available upon request.

Data acquisition methods are reused from previous campaigns. Both data and methods can be reused.

## Documentation and Metadata

### What documentation and metadata will accompany the data?

Metadata will be created using Dublin Core, by Dendro (specific descriptors created for specific needs) or directly during deposit stage on the data repository of INESC TEC and of the ARM Data Archive. The ARM Data Archive has specific descriptors, not metadata standards. Metadata about radioactivity sensors, or geographic location can be created automatically. Keywords are generic to domain and project, for example: atmosphere; environmental radioactivity; gamma radiation; radon.

## Ethics and Legal Compliance

### How will you manage any ethical issues?

The data don't have sensitive information, any ethical or legal issues.

### How will you manage copyright and Intellectual Property Rights (IPR) issues?

The Raw data will not be deposited on the repository but is preserved and available upon request. Copyright and IPR of the data (deposited and RAW) in this part belongs to the group. Moreover, for research and educational purposes, access to these data is unlimited and provided without charge. In all cases, an acknowledgment should be made to the owners according to the established license and to the project name when these data are used within a publication.

## Storage and Backup

### How will the data be stored and backed up during the research?

The data will be openly available and backed up on the research data repository of INESC TEC (<https://rdm.inesctec.pt/>) and ARM Archive (<http://www.archive.arm.gov/discovery/>), according to their configuration. Also, data can be stored in external disc. The data analysis can be carried out directly with support of any cvs-reading software including R, python, matlab. License for data reuse will be Share-Alike (<https://creativecommons.org/licenses/by-sa/4.0/>).

### How will you manage access and security?

Each deposited dataset of the project will have Digital Object Identifiers (DOIs) assigned by the ARM Archive or by the INESC TEC repository. DOI allows to identify and unify datasets. RAW data will not be deposited in the repository, but will be available to anyone upon request. There are no applicable limitations.

## Selection and Preservation

### Which data are of long-term value and should be retained, shared, and/or preserved?

There are not many data similar to these, so they are important for other researchers in the area of environmental radioactivity, and other domains including atmospheric and health physics as well as for educational purposes. That is why long-term preservation is required to ensure reuse of the data in multiple environmental domains and different applications. During the project 2 datasets will be deposited. The project started on April 1st 2015, with installation and set-up of the measurement system, but data acquisition only started on 7 May 2015, with the beginning of the routine measurements, that is why 1 dataset - from 7 May 2015 until 31 March 2018; 2 dataset - from 1 April 2018 until 15 May 2020.

Each dataset will be deposited on repositories: ARM Archive and INESC TEC and interconnected with each other.

### What is the long-term preservation plan for the dataset?

The data will be stored and backed-up on the ENA station facility and ARM Data Archive and on [rdm.inesctec.pt](https://rdm.inesctec.pt/) - INESC TEC research data repository.

## Data Sharing

### How will you share the data?

The data will start to be available during the campaign. The dataset will include pre-processed data after implementation of quality-control procedures for missing values and outliers. The quality control procedure consists in checking if times are contiguous. If not, the missing times are inserted and the corresponding measurement flagged as NA. The time series is further inspected for identification of potential outliers. These are in

general related to the first value measured after a data gap being too low, typically due to instrumental recover after a power shortage. These values are set as missing (set as NA) in the pro-processed data.

The pre-processed data will be available unlimited. The raw data will be available upon request.

Reporting and data submission is required 6 months after the campaign conclusion. The Data Management Plan will be revised periodically for update according to project changes. The first DMP follow-up happened 16.01.2019 and more information was added, namely about extension of the project. The next DMP follow-up will be on September 2019.

### **Are any restrictions on data sharing required?**

The data don't have any restrictions and will be available according license Share-Alike (<https://creativecommons.org/licenses/by-sa/4.0/>) with the following characteristics:

“You are free to:

Share — copy and redistribute the material in any medium or format

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits”.

## **Responsibilities and Resources**

### **Who will be responsible for data management?**

PI researcher is responsible for the data management activity. Also, PI is responsible for storage and backup of the data in external disc.

The data will be backed up according to configuration in INESC TEC research data repository. The system administrators of INESC TEC are responsible for storage and backup of the data.

### **What resources will you require to deliver your plan?**