# INGV data management system in ARCA project

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## Abstract

ARCA (ARctic present Climate change and pAst extreme events) is a project supported by Italian Minister of Education and Research (MIUR). One of the aims of ARCA is to contribute to the digital infrastructure to manage different data sets, produced in the framework of the project, finding a common language for the interoperability. The infrastructure is based on the brokering approach, that simplifies the data search integration and interoperability [1]. In the framework of ARCA project INGV has realized a data management system integrated in the ARCA ITC infrastructure. By means of such data management system the user is able to upload and download data. Related metadata have been realized compliant with international standards. In this paper the data management system realized at INGV is presented and briefly discussed.

## General Infrastructure Description

The ARCA data and metadata infrastructure is composed by three logic components:

- **Node**, i.e. the server in which the data are stored and managed. Each research institution (i.e. CNR, INGV and OGS) manages its proper data node.
- **Brokering system**: this portal, called Global Earth Observation System of Systems (GEOSS) offers a single Internet access point for users seeking data, imagery and analytical software packages relevant to all parts of the globe. It connects users to existing data bases and portals and provides reliable, up-to-date and user friendly information.
- **IADC** (http://arcticnode.dta.cnr.it/iadc/gi-portal/index.jsp) is managed by CNR, it collects metadata catalog for GEOSS. it allows users to search data on all nodes, in a transparent way, by querying on the GEOSS site

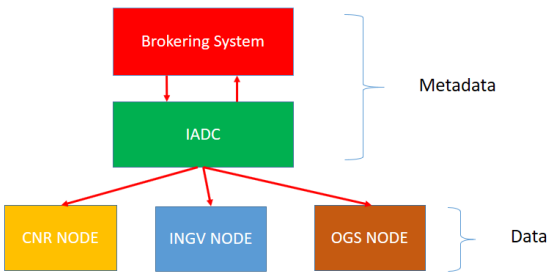


***Figure 1:*** *Data and metadata infrastructure*

## INGV Metadata Definition

Metadata field are compliant with ISO 19115 and INSPIRE METADATA "EC N ° 1205/2008 of 3 December 2008 for the implementation of the EC Directive 2007/2 of the European Parliament and of the Council as regards metadata". The DM 10 November 2011 Technical rules for the definition of the content of the National Directory of spatial data, and the ways in first constitution and updating has adopted to individuate metadata field definition with the recommendations of the EC N°1205/2008 regulation.

## INGV Data Management System

The INGV data management system (DMS) aims to host the data of the different research projects and allows the users to upload and download the data themselves.
DMS is accessible by the web interface at **http://arca.rm.ingv.it** (Figure 2). By means of the website the user could login as well as download and upload data.

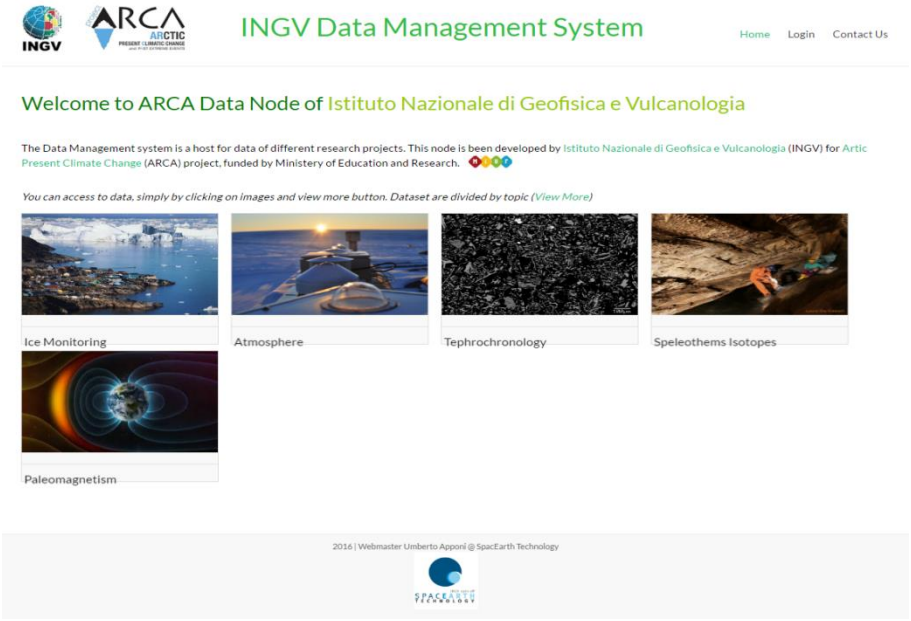


***Figure 2:*** *Home page of INGV Data management system @ http://www.arca.rm.ingv.it*

On the INGV Data Management System, dataset are divided by topic:

- **Ice Monitoring**: collection of elaborated satellite images showing the ice front variation observed at major outlet glaciers. Moreover there is a catalogue of calving events detected with the analysis of seismological data recorded by coastal broadband seismometers[2].
- **Atmosphere**: data from microwave spectrometers used to study atmospheric processes in the Arctic, and to remotely observe water vapour and ozone in the atmosphere [3][4].
- **Tephrochronology**: samples of marine sediments studied in order to identify tephra (volcanic particles) useful for stratigraphic and chronological information [5][6].
- **Speleothems Isotopes**: high-latitude Holocene paleoclimatic variations (in the medium-latitude paleoclimatic archives) identified from geochemical proxies from cave carbonate deposits (speleothems)[7][8].
- **Paleomagnetism**: data refers to the paleomagnetic and rock magnetic properties measured on three marine sedimentary cores retrieved from the upper slope between the northwestern Barents Sea and the southwestern Svalbard margin (Storfjorden and the Kveithola trough-mouth fans) [9][10].

INGV researchers have uploaded data (6 dataset) into the Data management system via FTP, together its metadata in IADC.

INGV researchers have uploaded data (6 dataset) into the Data management system by FTP and the related metadata are registered in IADC, following the scheme reported in Figure 3. Figure 3 shows that data are stored in a single local, each node is managed by a different research institution: INGV node manages data acquired by the activities lead by INGV Data Management System. All Metadata are included in the IADC system. The user can find data by visiting the IADC portal. IADC allows users to search data on all nodes, by making a query on the GEOSS site. GEOSS, in turn, replies to the user with an URL to physical node, in which data are stored. The features of the machine are reported in Table 1.

| | |
|---|---|
| CMS | Wordpress 4.3.2 |
| Processor | Intel Xeon E5-2620 |
| RAM | 8 GB |
| Operating System | Debian 3.16.7 |
| Storage | 100 GB |
| Webserver | Apache 2.4.2 |
| DB | MySQL |
| Services | FTP, SSH, Apache 2.4.2 |

***Table 1:****Hardware and Software characteristics of INGV data Management system*

## Conclusions

In this extended abstract we introduce the INGV data management system formulated for the ARCA project. To achieve the technical goals of ARCA project, it is needed a flexible, secure, reliable, data system layer to be aligned with the international data strategy and generate added value via operational excellence. The current development effort regarding the data system development is on the realization of meta-data repository, as well as on archiving of the necessary project-data, to be made accessible from scientific community as well as application developers

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