

S.I.R.I.A. - The Information System of Italian Research in Antarctica

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Abstract

Metadata provides descriptive information that characterizes a set of quantitative and/or qualitative measurements collected. It is the primary mechanism for documenting data and instruments involved in data collection. The paper explains the structure and the activity of *Information System Italian Research in Antarctica Project* (SIRIA) the Italian metadata project to collect and disseminate the information on Italian research in Antarctica.

Introduction

Metadata provides descriptive information that characterizes a set of quantitative and/or qualitative measurements collected. It is the primary mechanism for documenting data and instruments involved in data collection. The fundamental metadata parameters give information about *when, where, how* data have been obtained and *who* has collected data. Metadata or "data about data" describe the content, quality, condition, and other characteristics of data and constitute a resource for scientists and others with interest in sciences. Detailed descriptions of dataset are necessary to make data effectively usable by other scientists, worldwide located, also in the future; the metadata is considered to be a set of attributes that help users to determine if a data set meets their needs. All the scientific community of Italian National Programme Antarctic Research (PNRA) [1] participates in carry out the Italian Antarctic meta-database.

The paper explains the structure and the activity of *Information System Italian Research in Antarctica Project* (SIRIA) the Italian metadata project to collect and disseminate the information on Italian research in Antarctica. It is focused to preserve scientific data of PNRA and to recover scientific data of Antarctic expeditions, begun in the far 1985.

In addition, SIRIA constitutes the Italian contribution to the Antarctic Master Directory (AMD), the international record of Antarctic data set descriptions. Since the Antarctic Treaty System promotes scientific research and the exchange of data, the Scientific Committee on Antarctic Research (SCAR) [2] and the Council of Managers of National Antarctic Programs (COMNAP) [3] has established the Joint Committee on Antarctic Data Management (JCADM) [4]. It is responsible to develop the Antarctic Data Management System, including the AMD and the National Antarctic Data Centres (NADCs). A more task of SIRIA is to create the Italian NADC.

Structure of SIRIA project

The Italian researches in Antarctica involve several different scientific fields. So PNRA is divided in 11 scientific sectors: Biology and Medicine, Geodesy and Observatory, Geophysics, Geology, Glaciology, Physic and Chemistry of Atmosphere, Sun-Earth relationship and Astrophysics, Oceanography and Marine Ecology, Chemical Contamination, Legal Sciences and Technology. For each sector a stirring committee has been established to encourage scientists coordinate the project activity for each sector. In this configuration the SIRIA project is focused to collect metadata of all these disciplines.

To manage a so much amount of data a management structure has established. In fig. 1 a schematic diagram explains the SIRIA organisation.

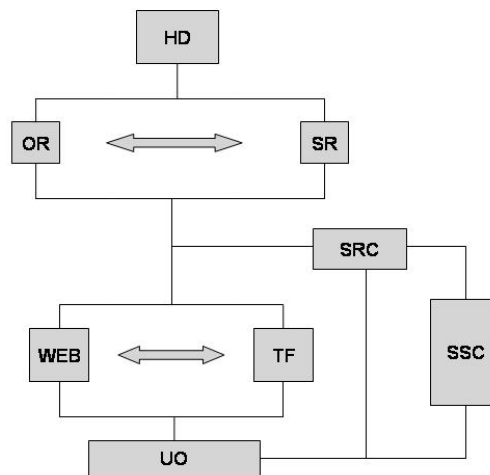


Fig. 1 – Schematic diagram of SIRIA organisation

On the top of the structure there is the PNRA Consortium as High Direction (HD). A Scientific Responsible (SR) of National Research Council (CNR) and an Operative Responsible (OR) of Italian National Agency for New Technologies (ENEA) are the leaders of the SIRIA project and together work with Scientific Referees Committee (SRC) representatives of the 11 sectors of PNRA. This validates scientifically the metadata and it authorizes the upload in AMD server. Moreover each sector with the Scientific Stirring Committee (SSC) coordinates the organization and the collection of his metadata. The WEB has developed the information system and it is responsible for metadata submission and management. A Task Force (TF) is devoted to give technical support to the PNRA researchers about metadata interpretation, filling and recovering scientific data of the past Antarctic expeditions. SIRIA activity is coordinated by a Technical Committee formed by the Scientific Responsible, Operative Responsible and Scientific Stirring Committee.

Metadata standard of SIRIA

An important topic in metadata realization is constituted by their standardization [5, 6]. In fact, using a standard format metadata describes datasets concisely and allows to easy comparing datasets of different scientific disciplines.

The standard endorsed by the SIRIA project is CEN/TC 287 (European Committee for Standardization / Technical Committee 287) [7]: it is a European pre-standard for geographic metadata. According to CEN/TC 287 the basic metadata elements include the following principal sections and a set of associated attributes (fields) [8, 9].

1. Dataset identification - this section gives information to clearly identify the dataset (title)
2. Dataset overview - this section gives information to present a comprehensive description of the dataset (abstract, purpose of production, references, related dataset)
3. Dataset quality elements - this section includes information about the data quality and accuracy; also the data elaboration techniques are described (spatial and temporal accuracy, completeness, data source)
4. Spatial reference system - this section collect information about the spatial distribution of geographical objects (type of reference system)

5. Extent - geographic datasets can be described by different extension types: planar, vertical and temporal extension. This section gives information about these different extension types (geographic extent, temporal extent)
6. Data definition - in this section the main characteristics of the geographic object are described in order to facilitate the comparison between two different datasets (object type, attribute type)
7. Classification - in this section some keywords can be reported (keywords)
8. Administrative metadata - this section gives administrative information to request the dataset: where it is preserved and how it can be ordered (information on organization, point of contact, data distribution)
9. Metadata reference – this section collect information about metadata (date of creation, update date)
10. Metadata language – in this section is indicated the language used to fill metadata fields.

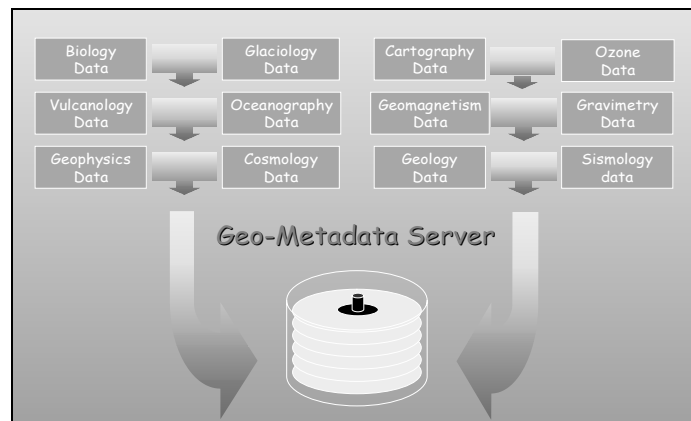


Fig.2 – Scientific data of the geo-metadata server

Metadata submission and management

The SIRIA project, of course, privileges the internet access for a better collaboration and also provides international exposure for scientists and their organisations. For this reason, the development of a metadata information system like SIRIA is particularly important in Antarctic science, which has inter-disciplinary character and international relevance. The information system of Italian research in Antarctica has been developed to manage and disseminate data collected during the measurements campaigns of PNRA and it includes the results of a past work named *Geo-metadata Server* developed for geophysical subjects. The fig.2 is a schematic view of data stored in the geo-metadata server.

In fig. 3 the home page of SIRIA project is shown. It gives different information about SIRIA: aims

and history of the project, staff, useful links etc. It is also possible and to enter in the geo-metadata server page for consultation and submit metadata. “Metadata Entry” tool is available, actually, at the address: <http://pc-eneasrv.iei.pi.cnr.it:8080/index.html>.

Metadata submission, in a buffer archive, is possible after registration. Then metadata are validated by a Referee Committee before to be included in the geo-metadata server.

The standard CEN/TC 287 endorsed by SIRIA has been developed

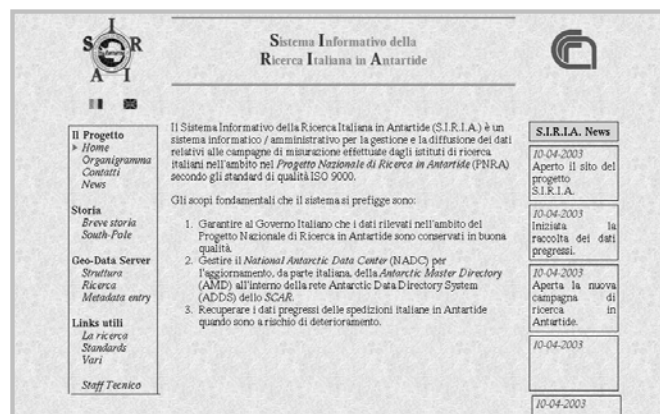


Fig. 3 – SIRIA Home page of web site

for geographic metadata. However, some scientific data of PNRA don't have a geographic reference. So it is difficult to describe these data using CEN/TC 287. For each PNRA sector, a customize interface has been realized by the reference researcher for metadata. It takes into account the specific needs of the relative scientific discipline. After the log-in in the "metadata entry" tool, one of the eleven interfaces can be chosen to submit metadata, as shown in fig. 4.

In Fig. 5 the first page of the standard CEN/TC 287 is shown. It represents the "dataset identification" section with the relative fields: "file title", "dataset title", etc. In the left column the complete list of CEN sections is reported. On the right side it is available an on-line help for each field.

In addition an *help desk* can be used for any problem or information:

Metadati-PNRA@isac.cnr.it for help or suggestions about dataset identification and in general about metadata filling, instead Maria.Grazia.Dibono@isti.cnr.it or Massimo.Martinelli@isti.cnr.it for software and technical problems.

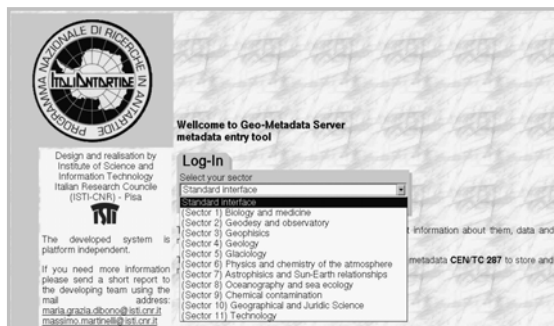


Fig. 4 – Metadata Entry: home page

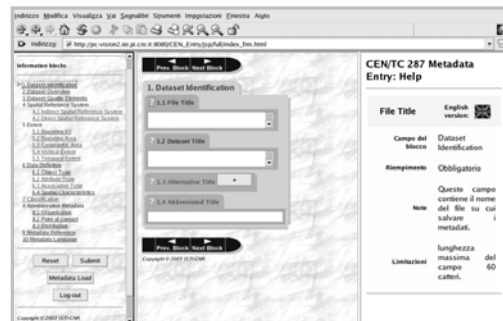


Fig. 5 – Metadata Entry: dataset identification

Concluding remarks

This work presents the activity of the SIRIA project, the metadata Information System of Italian Research in Antarctica.

In the first year of activity a first period was spent to test all system and in according to the specific needs of researchers some variations have been performed to the information system. In a second one, 5 sectors will fill the archive in operative way. The others sectors will be operative during the second year of work.

Acknowledgments

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References

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