# ForM@Ter : a solid Earth thematic pole

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## Context

**- Europe:** **Over the last years, several notable initiatives have been developed to provide Solid Earth sciences with efficient research e-infrastructures:**

EPOS project was included in the EFSRI roadmap in 2008.

Virtual Earthquake and Seismology Research Community in Europe: an e-science environment funded by the 7th European frame program

GEO supports the development of the Geohazard SuperSites and Natural Laboratories portal

ESA SSEP project (SuperSites exploitation plateform): is developing as an Helix Nebula usecase.

Meanwhile, operational use of space data for emergency management is in constant progress, within the Copernicus services.

**- France:** **French infrastructures for data distribution are organized around:**

Wide research infrastructures such as the Réseau Sismologique et géodésique Français

National Observatory Services (in situ data). For example:

Scientific services participating to the International association of geodesy data centres

**Gaps between data availability and its scientific use**

Either for technical reasons (big data issues) or due to the need for a better support in term of expert knowledge on the data, of software availability, or of data cost.

**Need for thematic cooperative platforms**

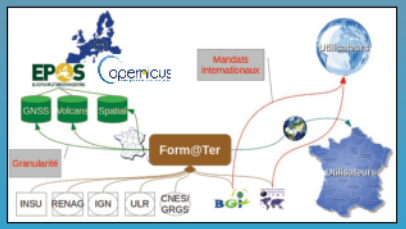
## Presentation

In 2009, after a scientific prospective of the French national space agency (CNES) it becomes clear the urgent need to create thematic centres designed to federate the scientific community of Earth observation. Four thematic data centres are currently developing in France in the field of ocean, atmosphere, land surfaces and solid Earth sciences.

For Solid Earth research, the project - named ForM@Ter - was initiated at the biginning of 2012 to design, with the scientific community, the perimeter, structure and functions of such a thematic centre. It was launched by the CNES and the National Centre for Scientific Research (CNRS), with the active participation of the National institute for geographical and forestry information (IGN). Currently, it relies on the contributions of scientists from more than 20 French Earth science laboratories.

## Challenge

Design a non redundant service based on interoperations with existing services, and cope with highly complex data flows due to the variety of data and associated knowledge.



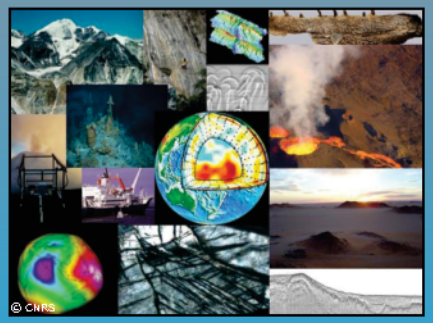

## Perimeter

**Shape and movements of the Earth's surface**

ForM@Ter = Formes et Mouvements de la Terre

- Federates a wide variety of scientific areas
- Offers interfaces with other thematics such as glaciology or snow evolution

This choice motivates the design of an ambitious data distribution scheme, including a wide variety of sources as well as complex processing techniques




**Thematics**

| | |
|---|---|
| Crust deformations | Mantle rheology |
| Earthquake cycle | Morphogenesis |
| Erosion dynamics | Tectonics |
| Geodesy | Volcanism |
| Gravity | |

**Data**

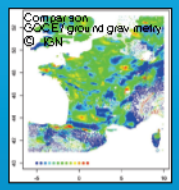
| - Satellite : | - In situ : |
|---|---|
| Optical imagery, | Inclinometers, |
| SAR, | Seismoters, |
| Gravity, | GNSS, |
| Altimetry | Topometry, etc. |

## Objectives

### Facilitate data access

**Centralize:** Development of a web portal referencing the available data and how to access them.

**Create a privileged acces point for researchers for spatial and in situ data**




**Data integration:**

Facilitate spatial and in situ data integration (georeferencing, spatial resolution...).

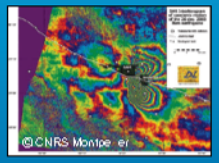
**Document**

Provide information on the precision, quality and reliability of available data.

**Data exploitation:**

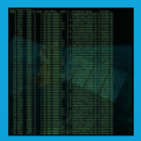
Proposition of elaborate products or computation services.

Big data processing.




### Distribute tools and software

**Data manipulation:** facilitate conversions, uses, processing...



**Basic tools:**

Reading/Writing used formats, conversion formats ...

Developing of missing tools and making it available.

**Tools and software access:**

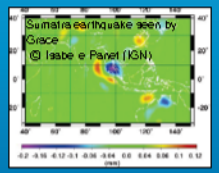
Referencing the access point of the softwares and available tools

Document their precision

**Transformation tools:**

Valorization, with laboratories collaboration, of methodologies developped by the research;

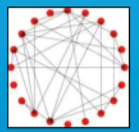
Sharing of advanced algorithms, routine processing.




### Provide a collaborative working environment

**Community tools:**

Promote the exchange of experience and information sharing through the implementation of discussion tools (blogs, forums ...).



**Making links:**

Referencing experts in the various scientific fields and on the various data.

Create links between the new users and the experienced users.

**Support for non-expert users: expanding the use of data**

**Supporting for purchase of data:**

Group purchasing data.


### Outreach


**Communicating:**

Presentations and making available informations about the data thematic pole.

**Supporting the formation of interest groups:**

Knowledge valorisation (scientific activities...).

Make available informations on scientific proposal calls.

**Training actions:**

Organization of training sessions around the use of data and softwares.

Developing of e-learning tools, extension materials.

Interactions with students.

## Contributors

**Holders of the study:** CNRS, CNES, IGN

**Contributing laboratories:** UJF Grenoble/ISTerre (UMR 5275), URL/LIENSs (UMR 7266), BRGM, CEREGE (UMR7330), ENSLyon /LGLTPE (UMR 5276), EOST et IPGS (UMR 7516), SHOM/Cellule géophysique, TELECOM Paris Tech/LTCI (UMR 5141), IGN/LAREG, IMCCE (UMR 8028), IPGP (UMR 7154), LGMT (UMR 8148), U. Nice/Géoazur (UMR 7329), OBSPM/SYRTE (UMR 8630), OMP/GET (UMR 5566), OMP/LEGOS (UMR 5566), UJF Grenoble/GIPSALab (UMR 5216), U. Montpellier II/GM (UMR 5243), U. Paris Sud/IDES (UMR 8148), U. Savoie/LISTIC (UMR EA3703), UBPClermont/OPGC/LMV (UMR 6524), ENSParis/Géologie (UMR 8538)