



**GENESI-DEC**

**INFRA-2010-1.2.3 : Virtual Research Communities**

# *European Network for Earth Science Interoperations - Digital Earth Communities*

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with input from  
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ESA



EC Grant Agreement no. 261623

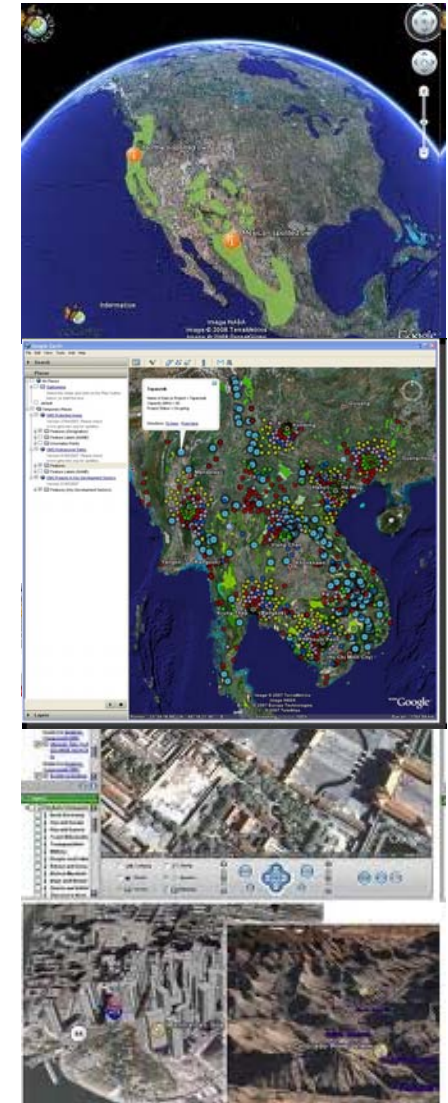


- **Digital Earth** is the name given to a visionary concept by former US vice president [Al Gore](#) in 1998: representation of the Earth by worldwide interconnected digital knowledge archives.
- Excerpt from the [Beijing Declaration on Digital Earth](#), ratified September 12, 2009 at the 6th International Symposium on Digital Earth in Beijing:
  - *"Digital Earth should play a strategic and sustainable role in addressing such challenges to human society as natural resource depletion, food and water insecurity, energy shortages, environmental degradation, natural disasters response, population explosion, and, in particular, global climate change."*

# Characteristics of Digital Earth

## Digital Earth:

- **Connects infrastructures addressing the needs of different audiences: citizens, communities, policymakers, scientists, educationalists.**
- **Is problem oriented: e.g. environment, health, societal benefit areas, and transparent on the impacts of technologies on the environment**
- **Enables access to data, information, services, and models: from a single access point (GENESIS-DEC Portal).**
- **Is based on open access (interoperability standard)**
- **Is a tool for exploration, learning and multidisciplinary education and science.**



A single access point to Earth Science data

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Digital Earth Communities

# Digital Earth community's needs



## INTERNATIONAL CHARTER SPACE AND MAJOR DISASTERS

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### Volcanic eruption in Iceland

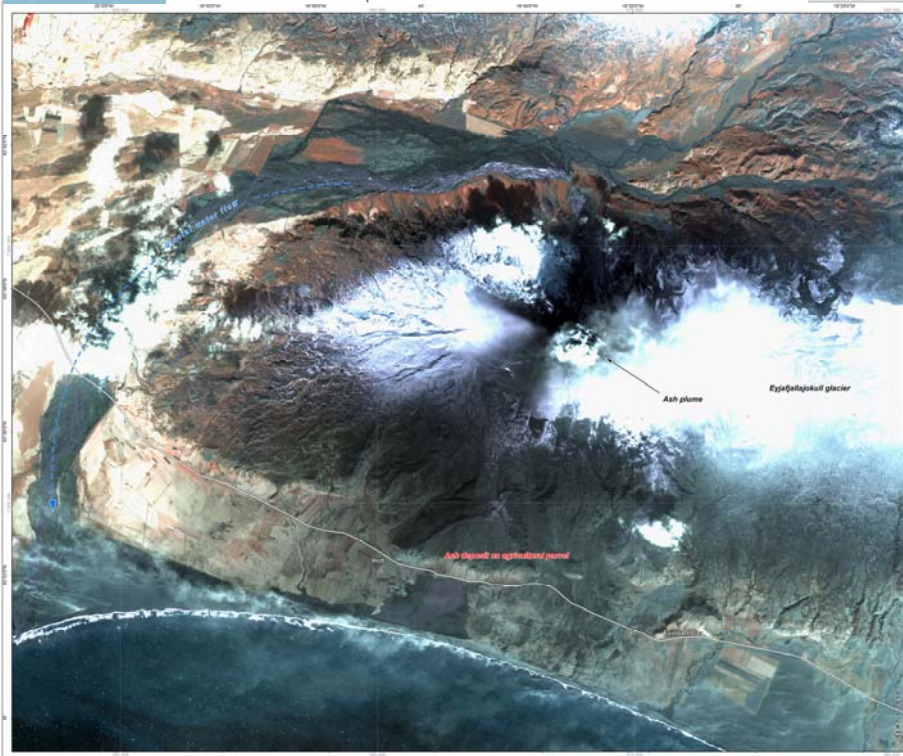
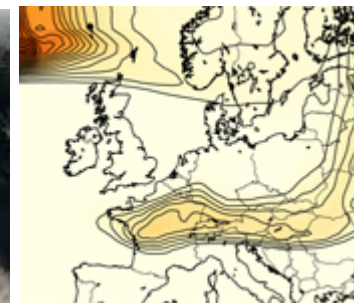
Back to Charter Activations



Type of Event	Volcano
Location of Event	Iceland
Date of Charter Activation	20/04/2010
Charter Requestor	Ministry of the Interior - Direction de la Sécurité Civile - SDGIC
Project Management	ENES in collaboration with the SAFER project in the framework of the GMES initiative

#### Description of the Event

A volcanic eruption in Iceland spread black smoke and white steam into the air and partly melted a glacier; 700 people have been evacuated. As a consequence of the smoke cloud, most of the European airspace has been progressively closed.



Charter Call 071 and 0035 SAFER Activated 04/20/2010 19:00 UTC

### Iceland

#### Volcanic eruption of Eyjafjöll

Ash plume observed the 24th of April 2010

Location Diagram

Legend

Map scale

Interpretation

The Eyjafjöll volcano located in southern Iceland began erupting on Saturday night the 20th of March 2010. The ash plume has reached an altitude of 10 km. Ash has been spotted in the proximity towards Europe, causing significant air traffic interruptions.

This view, created with SPOT 6, also captures the side of April 2010, shows the location of the Eyjafjöll volcano and glacier with blowing due to volcanic activity.

Cartographic Information

Local coordinates: UTM Zone 32N, Datum: Datum: WGS 84, Geographic projection: Lambert Conformal Conic, WGS 84, Scale: 1:50 000 for A1 print

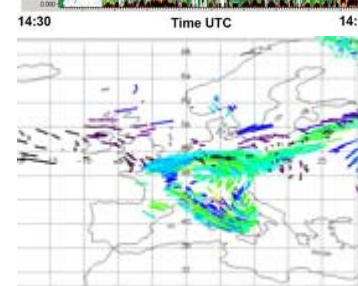
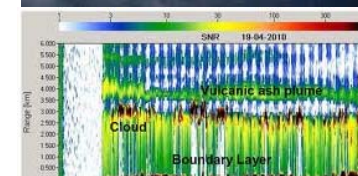
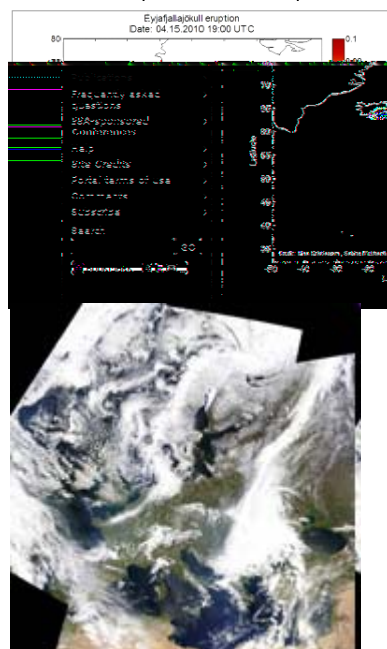
Background from: National Centre for Space Exploration (CNES) acquired on 20th of April 2010, © CNES, International SPOT Image S.A., The French Space Agency, SPOT 6 Image S.A., CNES, ESA, SAFER 2010

References

The product available for the SAFER project is available for the use of all users, with the only restriction being the prohibition of its use for commercial purposes. All geographic information has been provided as it is available. The user is responsible for the accuracy of the information and for the protection of the product.

Map produced on 20th of April 2010 by SAFER/ENES

#### Animation of the ash plume from Icelandic eruption



A single access point to Earth Science data

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Digital Earth Communities

# Digital Earth community's needs



INTERNATIONAL CHARTER SPACE AND MAJOR DISASTERS

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Volcanic eruption in Iceland

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Type of Event: Volcano  
 Location of Event: Iceland  
 Date of Charter Activation: 28/04/2010

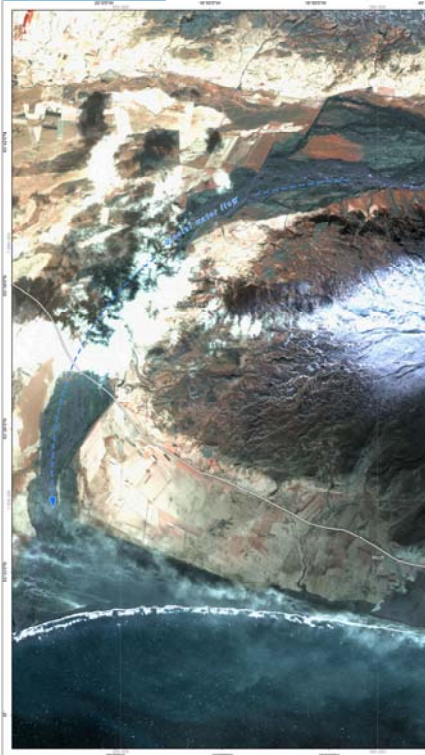
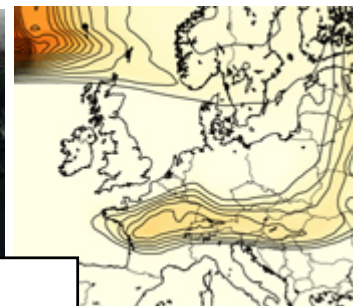
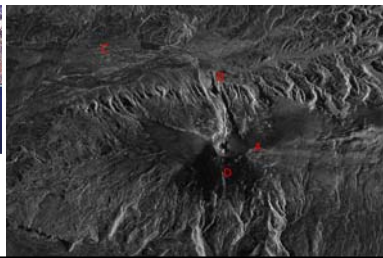
Charter

Project

Descrip

A volcanic air and p... consequ... progress...

- **Comments**
  - What we have seen are access to "images" not "data"
- **Questions and needs**
  - How to "discover" such complex, distributed and very specific data holdings?
  - How to access available "data and results" for "user defined processing"?
  - How to provide a multi-disciplinary environment for "discovery and access to data"



on Saturday night the 20th of March 2010. The ash plume has reached an altitude of 10 km. Ash has been reported to be falling in some areas in Europe, causing significant air traffic disruption.

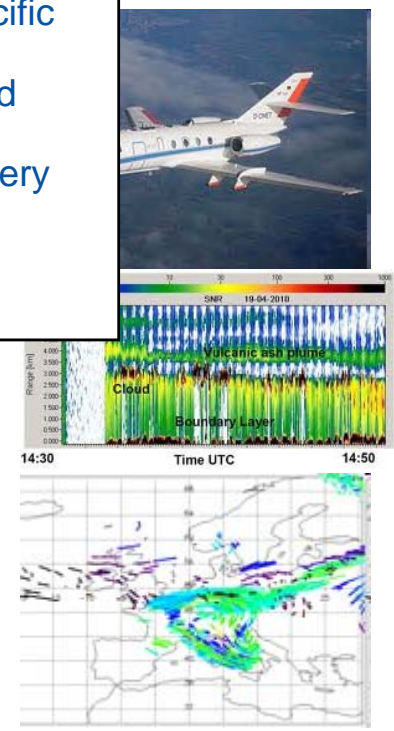
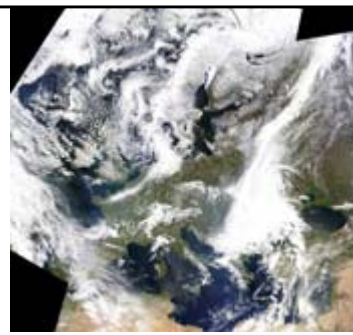
This view, created with SPOT 6 data, shows the side of April 2010, showing the location of the Eyjafjallajökull volcano and glacier with the plume due to volcanic activity.

**Cartographic Information**

Local coordinates: UTM Zone 32N, Datum: WGS 84, Geographic projection: Lambert Conformal Conic, UTM 32N, Scale: 1:50 000 for A1 print

**Background from:** National Centre for Space Exploration (NASA) acquired on 20th of April 2010. © 2010 NASA. All geographic information for this image is the result of the National Centre for Space Exploration (NASA) and is not intended for use in any other context without the explicit consent of the National Centre for Space Exploration (NASA).

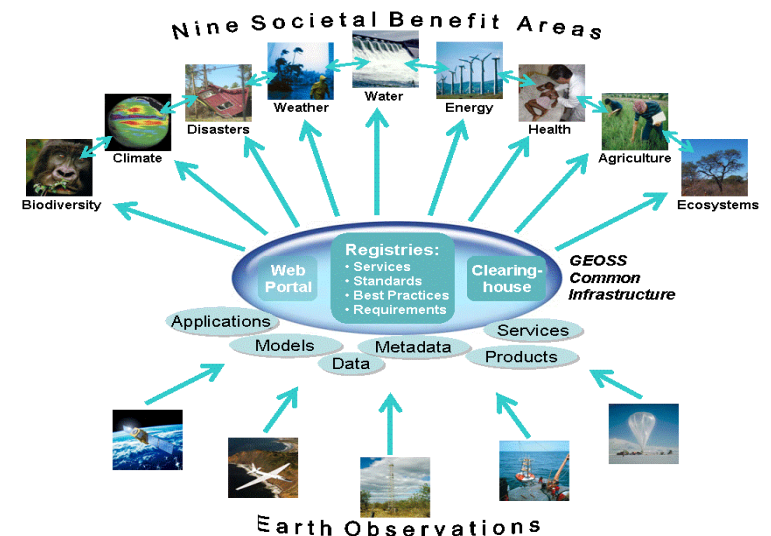
Map produced on 20th of April 2010 by GENESI-DEC



- **Liaising** with the wide **Digital Earth Community** and e-infrastructures projects
- **Analysing and documenting the needs** and functionalities required by the Digital Earth Communities
- Defining high level **use cases**
- Identifying and developing specific **applications**
- **Validating** GENESI-DEC to verify compliance with the community needs

- GEO is a **voluntary partnership** coordinating efforts to build GEOSS: A “**system of systems**” composed of contributed EO systems
- Nine “**Societal Benefit Areas**”:
  - disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity.
- GEOSS has a **10-year implementation plan** (2005-2015).
- Partners as of June 2010: **81 Governments** and EC, plus **58 intergovernmental**, international and regional organisations.
- GENESI-DEC will be used for demonstrating data access at the next GEO Plenary meeting (Istanbul, November 2011).
- GEOSS Common Infrastructure will be enhanced using GENESI-DEC technology (in the GEOWOW EC project, Kick-off 12-13 November 2011)

## THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



A single access point to Earth Science data

➔ GENESI-DEC

Digital Earth Communities

Environmental ESFRI

ESFRI

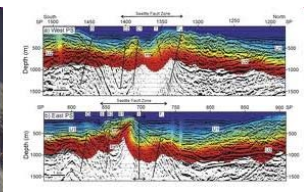
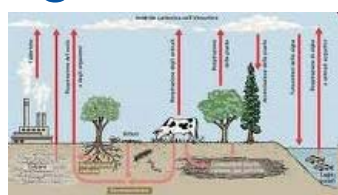
European Strategy Forum  
on Research Infrastructures

Several ESFRI projects are contributing to

GEO-GEOSS:



- Involving several heterogeneous communities:



- These communities have common needs in terms of data discovery and access
- Several ESFRI projects will use the GENESI-DEC approach for discovering, accessing, and sharing cross-community data (ENVRI initiative)

## Specific objectives of GENESI-DEC

- **Supporting the Observation Community** using Aircraft in:
  - data standardization
  - the management of data from different platforms (ground-stations, aircraft, satellites) and infrastructures
  - the development of advanced visualization tools
  - the establishment of co-operations with data user communities (e.g. GEMS centers).
- **Developing applications combining heterogeneous data** (aircraft, satellite) for atmospheric studies
- **Combining data and models** for specific atmosphere/climate research questions
- **Enhancing capabilities of model and satellite data validation by** providing access to in-situ data measured by aircrafts

## Applications developed

- Discovering aircraft data (in geographical area, time period, etc.)
- Discovering co-located satellite data (e.g. in defined geophysical range and time span from aircraft data)
- Tool for visualizing and retrieving aircraft and satellite data
- Accessing GENESI-DEC satellite data in the DLR Mission Support System (e.g. the output of the previous tool)

