

# GENESI-DR

Grant agreement no: 212073

<http://www.genesi-dr.eu>

## *GENESI-DR:* *Ground European Network for Earth Science Interoperations - Digital Repositories*

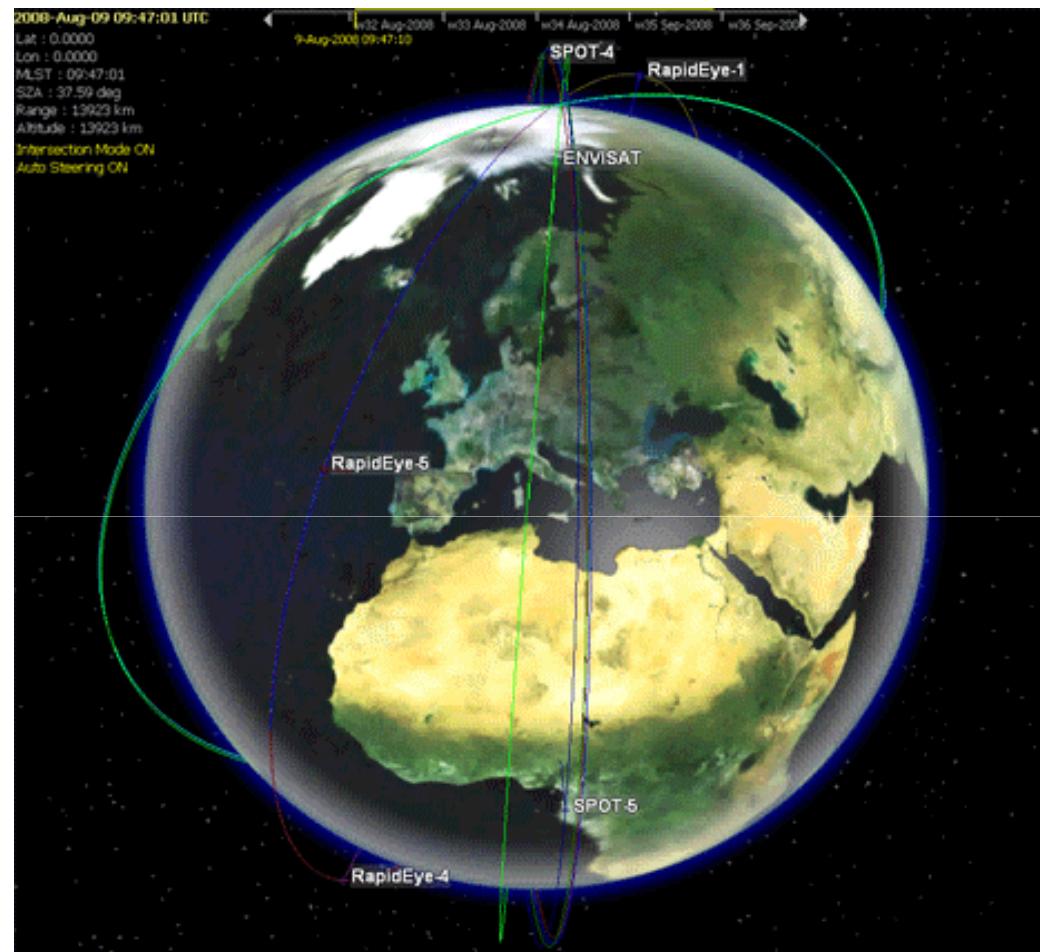
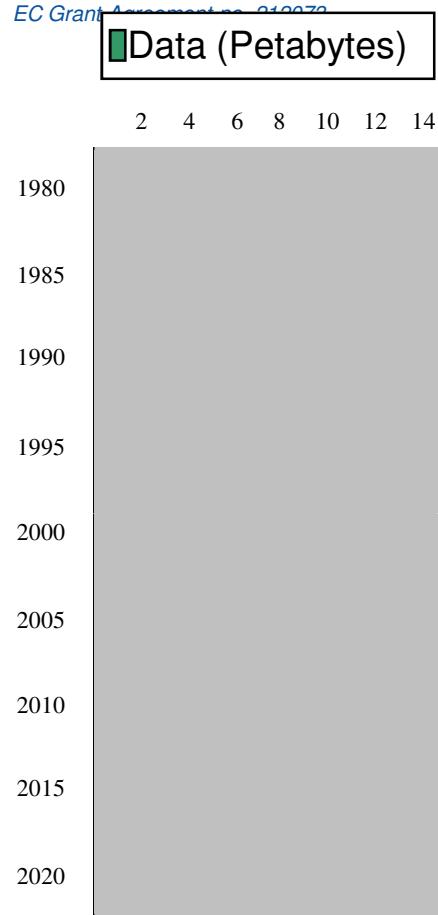
**An environmental perspective –  
GENESI-DR**  
**R Cossu - ESA**

**Catania, 4 Mar 2009**



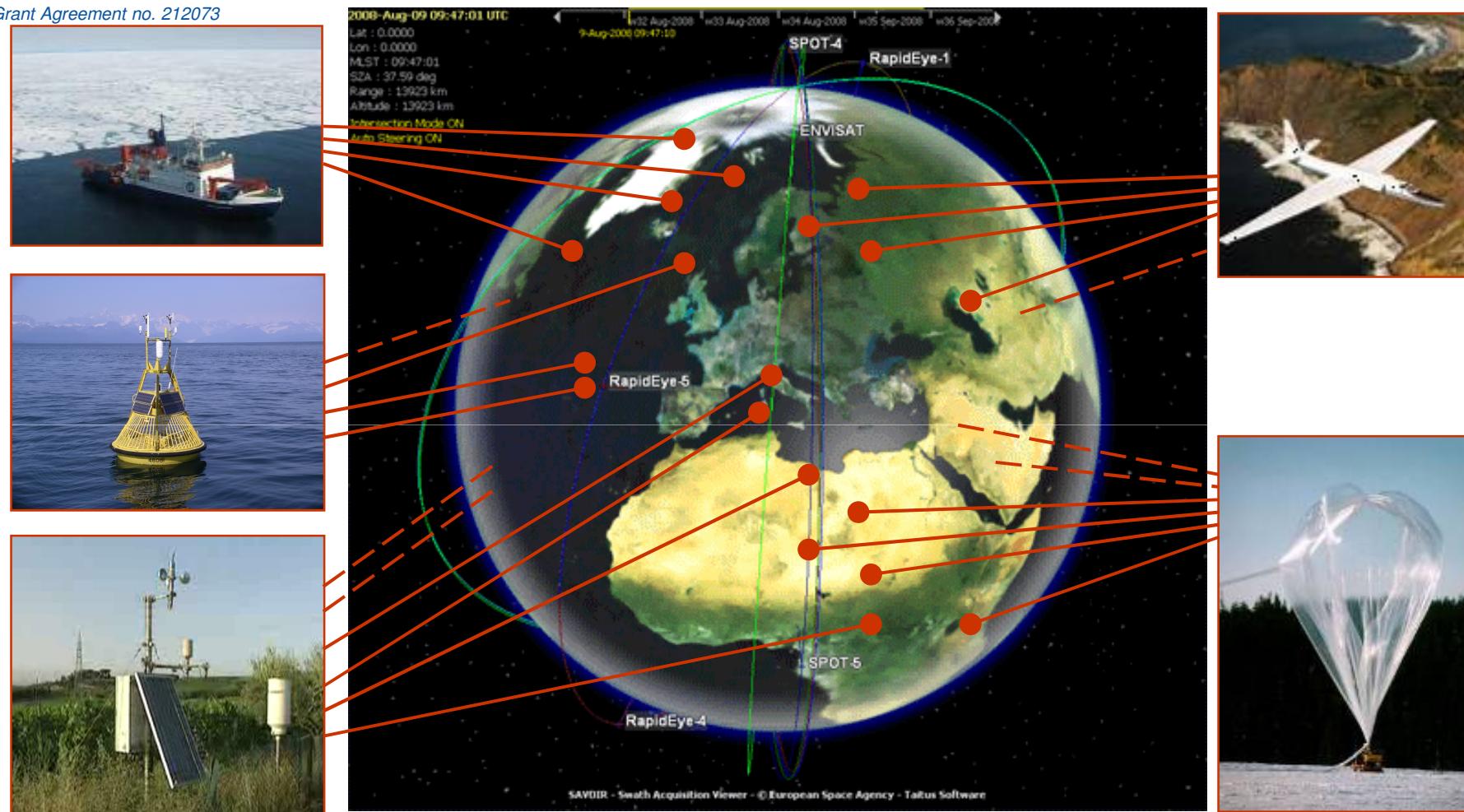
- The heritage of GENESI-DR
  - Present Earth Science “operational” capabilities
  - What is unique in ...**Earth Science Interoperations**
    - **Digital Repositories**
- How GENESI-DR works
- Objectives
- Vision
- Initial demonstrations at end of Year 1

# The EO data deluge...



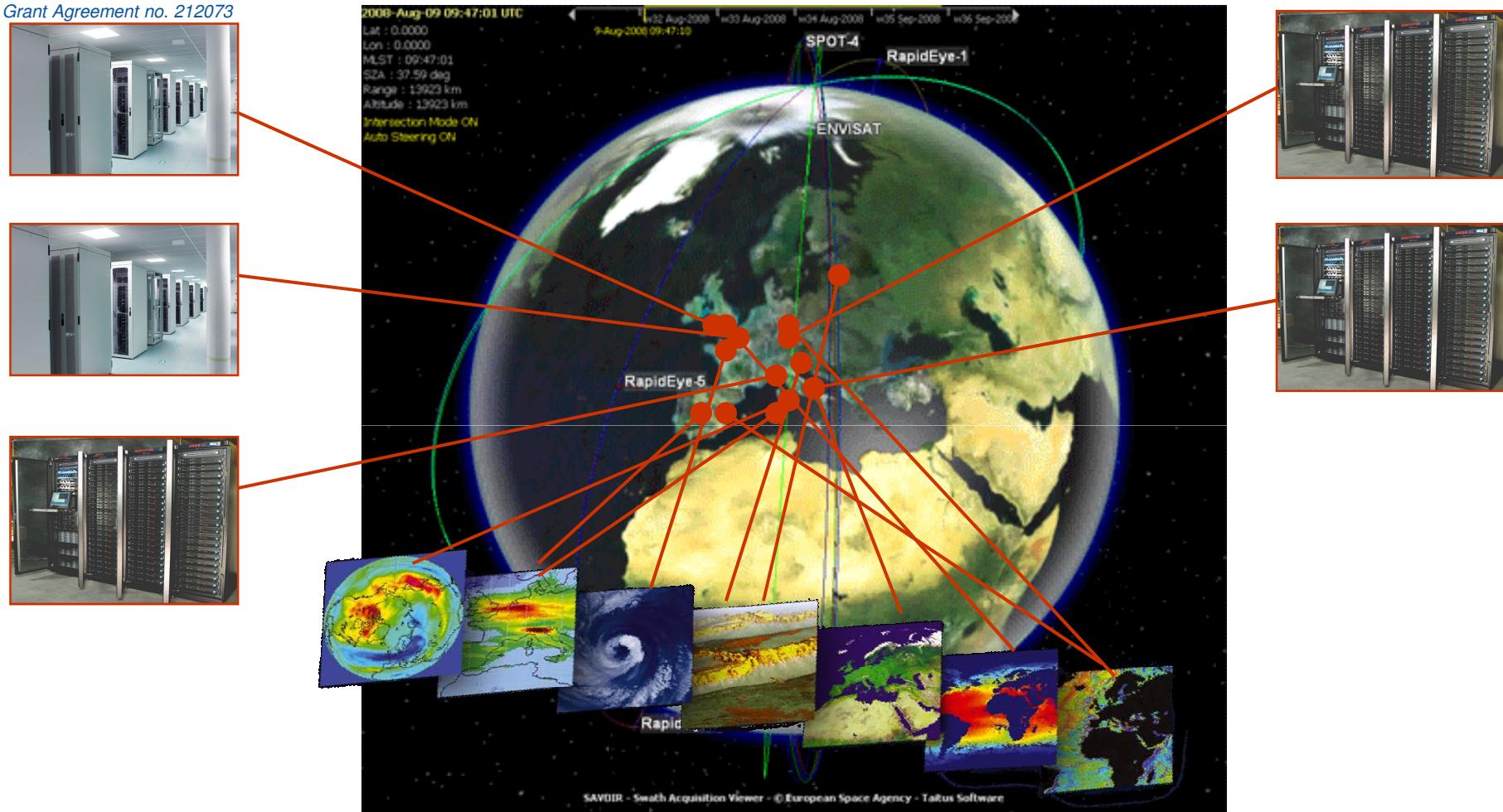
Petabytes of already acquired data are presently underexploited, because to get the results in a reasonable time not enough computing resources, tools and algorithms are available.

# The ES data deluge...



Similar situation with other ES sensors airborne,  
 on ground and in the sea – e.g. **sensor webs**

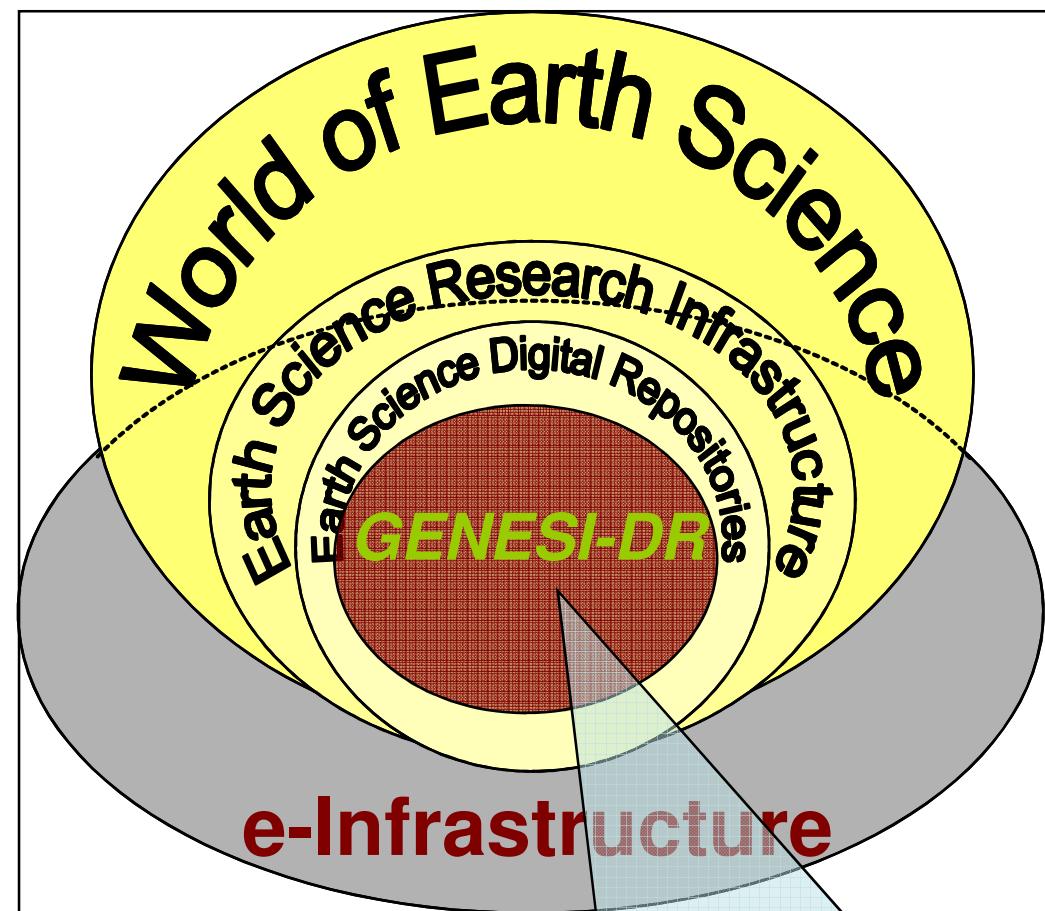
# Several Digital Repositories



Difficulties in **discovering** and **accessing** data and products  
 Differences in **data policies, formats** and **quality**...

# The *GENESI-DR* goals

- GENESI-DR will:
  - Demonstrate a single way to access space (from various mission operators) and “non space” Earth Science data products
  - Experiment new technologies (e.g. fast data access by users via P2P)
  - Provide data products (already planned to be accessible online) in GRID based Storage Elements for further user processing under user responsibility
  - ...



GENESI-DR is a good example of  
**DATA INFRASTRUCTURE**

# *What is unique in GENESI-DR (1)*

A centralized discovery service

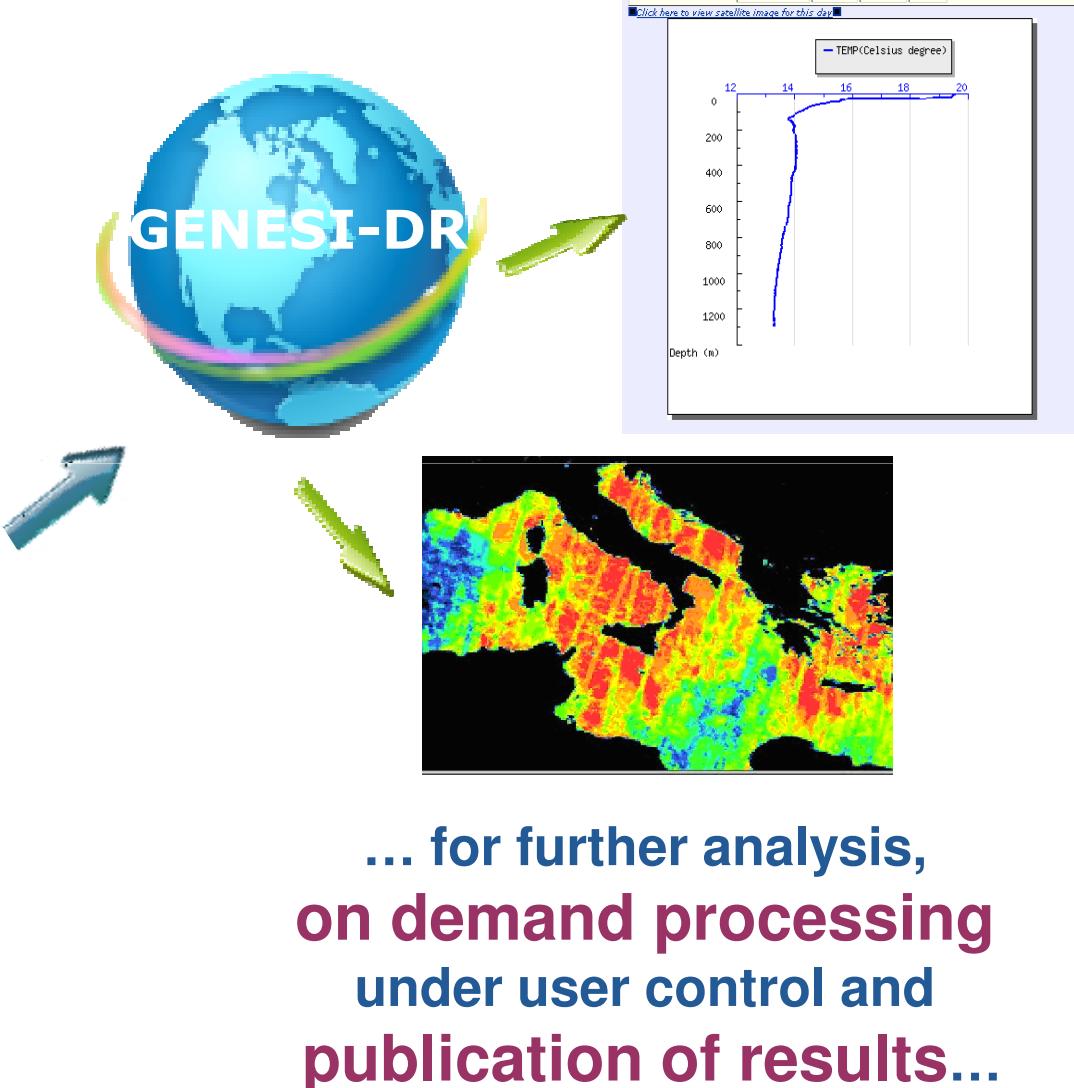
to seamlessly access heterogeneous sources of data...



...in situ, satellite,  
airborne...

# *What is unique in GENESI-DR (2)*

**Direct online access  
with no ordering stage  
to authorized users  
(following data providers'  
policies) ...**



# *What is unique in GENESI-DR (3)*

Attention to **standardisation**,  
**flexibility** and **scalability** of the architecture allow...

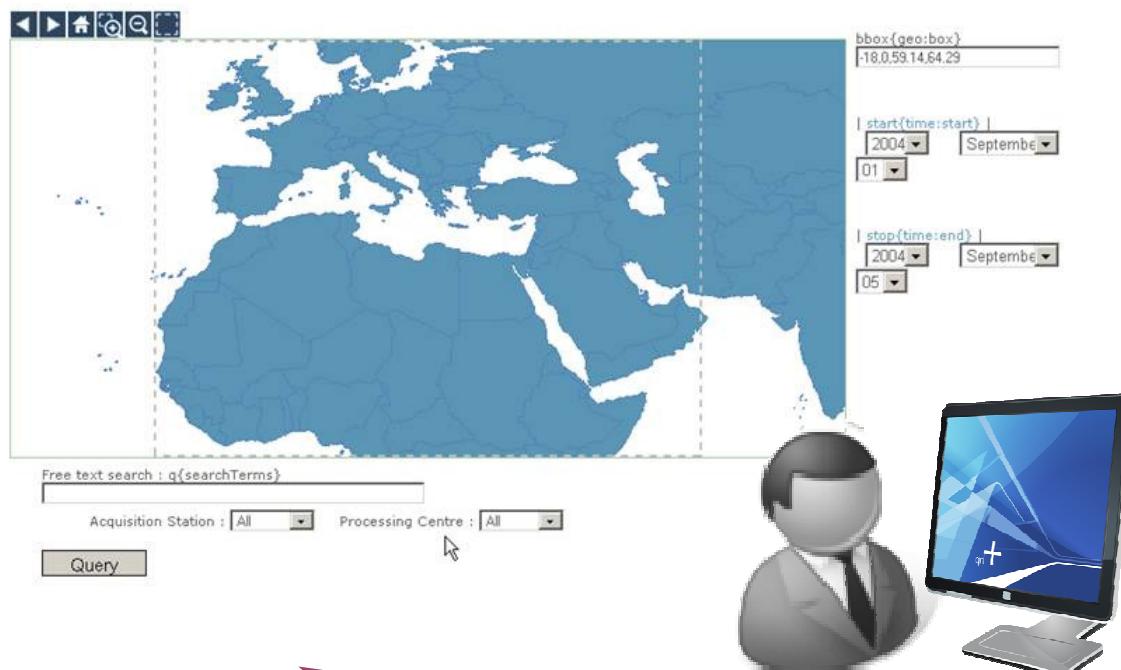
...accessibility through  
**user applications**  
via the exposed  
**programming**  
**interface**



...easy **integration**  
of new  
**Digital**  
**Repositories**

# How it works...

User can discover via the **GENESI-DR Web portal** data and services on the base of free text string and metadata...



such as  
**geographical area,**  
**temporal range..**

...and other **specific parameters** as applicable

**GENESI-DR central site *owns* a description of the series of data archived at the federated DRs**



24/02/2009

OGF Data Repo

# How it works...

The image shows a screenshot of a web-based data management interface. At the top, there's a navigation bar with links for 'Home', 'Public Web Site', 'Partners', 'Blog', and 'Digital Repository'. A user profile for 'Roberto Cossu' is visible. Below the navigation, a message says 'We're querying one access point : Series search (central-site.terradue.it) Info taken from http://central-site.terradue.it'. A large globe graphic is centered on the page. To the right of the globe, there's a detailed description of a dataset:

```

about=rdf:about="http://earth.esa.int/object/index.cfm?objectid=1454"
title=MERIS Full Resolution Geophysical Product (MER_FR_2P)
abstract=MERIS Full Resolution Geophysical Product (MER_FR_2P) MERIS MER_FR_2P is a Full-Resolution Geophysical Product for Ocean, Land and Atmosphere. The product is also specific to Water Leaving Radiance (Reflectance). Each MERIS Level 2 geophysical product is derived from a MERIS Level 1b product and auxiliary parameter files specific to the MERIS Level 2 processing and distributed following the floating scene concept. NRT version is available 1 day after acquisition, OFL (fully consolidated version) 2 weeks after acquisition. The file size is 187 Mbytes per scene and auxiliary data include: Surface identification flags included in the level 1b product, Orbit state line correlation parameters, Latitude, , altitude and topographic corrections, Sun elevation, view azimuth, view , Mean Sea Level pressure, Total column total column water vapour, Wind speed.
=MER_FR_2P
process=Level=Level 2
satellite=ENVISAT
sensor=MERIS
subject1=Atmosphere (Clouds)
subject2=Ocean and Coast (Sea Surface Temperature, Ocean Colour/Biology)
subject3=Atmosphere (Air Quality (Ozone), Atmospheric Winds, Clouds, Precipitation)
subject4=Land (Soil)
rights=Free Usage with Rights
projection=pseudo-satellite projection along track
resolution=265
spatial=POLYGON((-180.0 -90.0, -180 90, 180 90, 180 -90, -180 -90))
fileFormat=Ni (ENVISAT)
contact=rdf:resource="http://eohelp.esa.int/"
  
```

# How it works...

**DRs reply with all data and services matching the query**



Free text search : q{searchTerms}

Acquisition Station : All Processing Centre : ACRI

Query

ID	Dataset	Series	Start and End Time	Additional Metadata
<input type="checkbox"/>	MER_RR_1PQACR20040901_075603_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T07:56:03.000000 2004-09-01T08:39:52.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040901_093640_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:39:40.000000 2004-09-01T08:29.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040902_072433_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:24:33.000000 2004-09-01T08:22.000000	show
<input checked="" type="checkbox"/>	MER_RR_1PQACR20040902_090510_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:05:10.000000 2004-09-01T08:59.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040902_104546_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:54:46.000000 2004-09-01T09:35.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040903_084011_000022392030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:40:11.000000 2004-09-01T08:29.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040903_101417_000026292030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:14:17.000000 2004-09-01T08:17:29.000000	show
<input type="checkbox"/>	MER_RR_1PQACR20040904_080633_000023662030 <a href="https://">https://</a>	MER_RR_IP	2004-09-01T08:06:33.000000 2004-09-01T08:29.000000	show



# How it works...



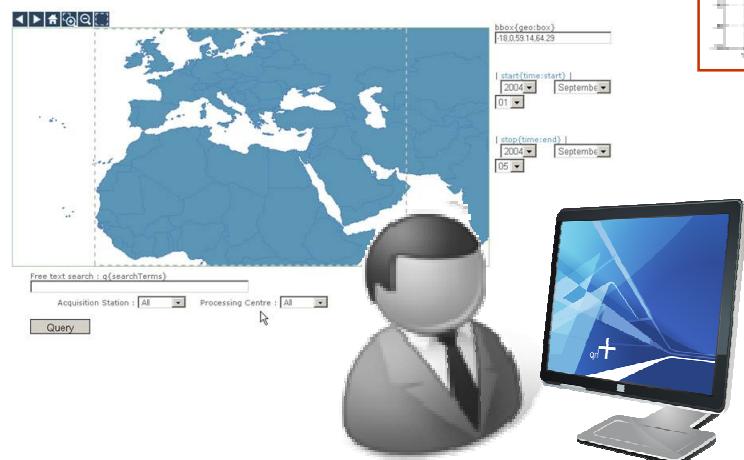
User is provided with  
the direct  
access to the DR  
catalogue, data  
and services.  
(Data are not copied  
to the central site).

ID	Dataset	Series	Start and End Time	Additional Metadata
<input type="checkbox"/>	MER_RR__1PQACR20040901_075603_000026292030 <a href="https://">https://</a>	MER_RR__1P	2004-09-01T07:56:03.000000 2004-09-01T08:39:52.000000	show
<input type="checkbox"/>	MER_RR__1PQACR20040901_093640_000026292030 <a href="https://">https://</a>	MER_RR__1P	2004-09-01T09:36:40.000000 2004-09-01T10:20:29.000000	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_072433_000026292030 <a href="https://">https://</a>	MER_RR__1P	2004-09-02T07:24:33.000000 2004-09-02T08:08:22.000000	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_090510_000026292030 <a href="https://">https://</a>	MER_RR__1P	2004-09-02T09:05:10.000000 2004-09-02T09:48:59.000000	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_104546_000026292030 <a href="https://">https://</a>	MER_RR__1P	2004-09-02T10:45:46.000000 2004-09-02T11:29:35.000000	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_104546_000026292030 <a href="http://">http://</a>	R__1P	Apri in nuova finestra Apri in nuova scheda	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_104546_000026292030 <a href="http://">http://</a>		Aggiungi link nei segnalibri... Salva destinazione con nome... Invia link... Copia indirizzo	show
<input type="checkbox"/>	MER_RR__1PQACR20040902_104546_000026292030 <a href="http://">http://</a>		Proprietà	show

Configuration

# How it works...

User can access and manipulate data ...  
...buoys archived at ENEA  
...SST maps previously archived at CNR  
...SST generated on the fly from satellite data at ESA  
using Grid resources



...to perform new science (and collaborate)  
...to generate new products  
... to populate new repositories

# *The deployed operational infrastructure*

- Currently:
  - 8 DRs have been GENESI-fied
  - 42 different dataset series
- Data discovery, data access, processing
- “GENESI-DR Operations Manual” and “GENESI-DR User Manual”





GENESI-DR

EC Grant Agreement no. 212073

# The deployed operational infrastructure



# Demonstrations

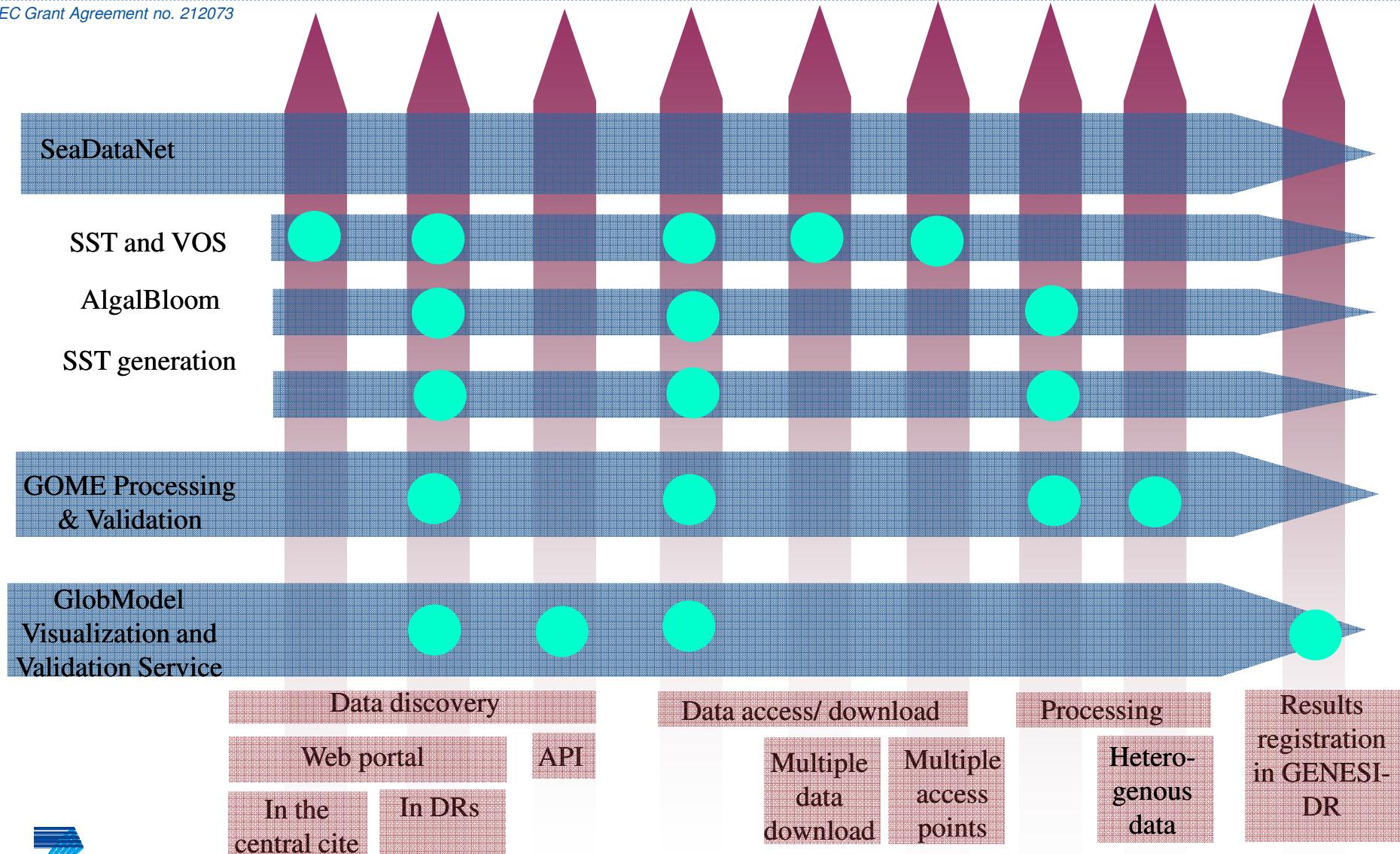
- Three demonstrators representative of services/feature currently available in GENESI-DR infrastructure
  - 1. GOME data processing and validation
  - 2. Ocean data/products discovery, access, processing and visualization
  - 3. GlobModel results discovery and comparison with satellite observations



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# Which services/features we demonstrate



24/02/2009

GF D

Repositories Workshop – Catania, M

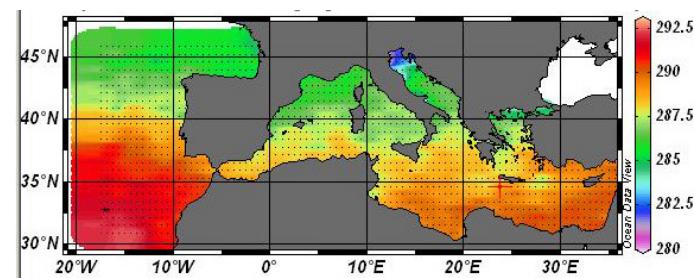
4<sup>th</sup>,

1

18

# *Ocean data/products discovery, access, and processing*

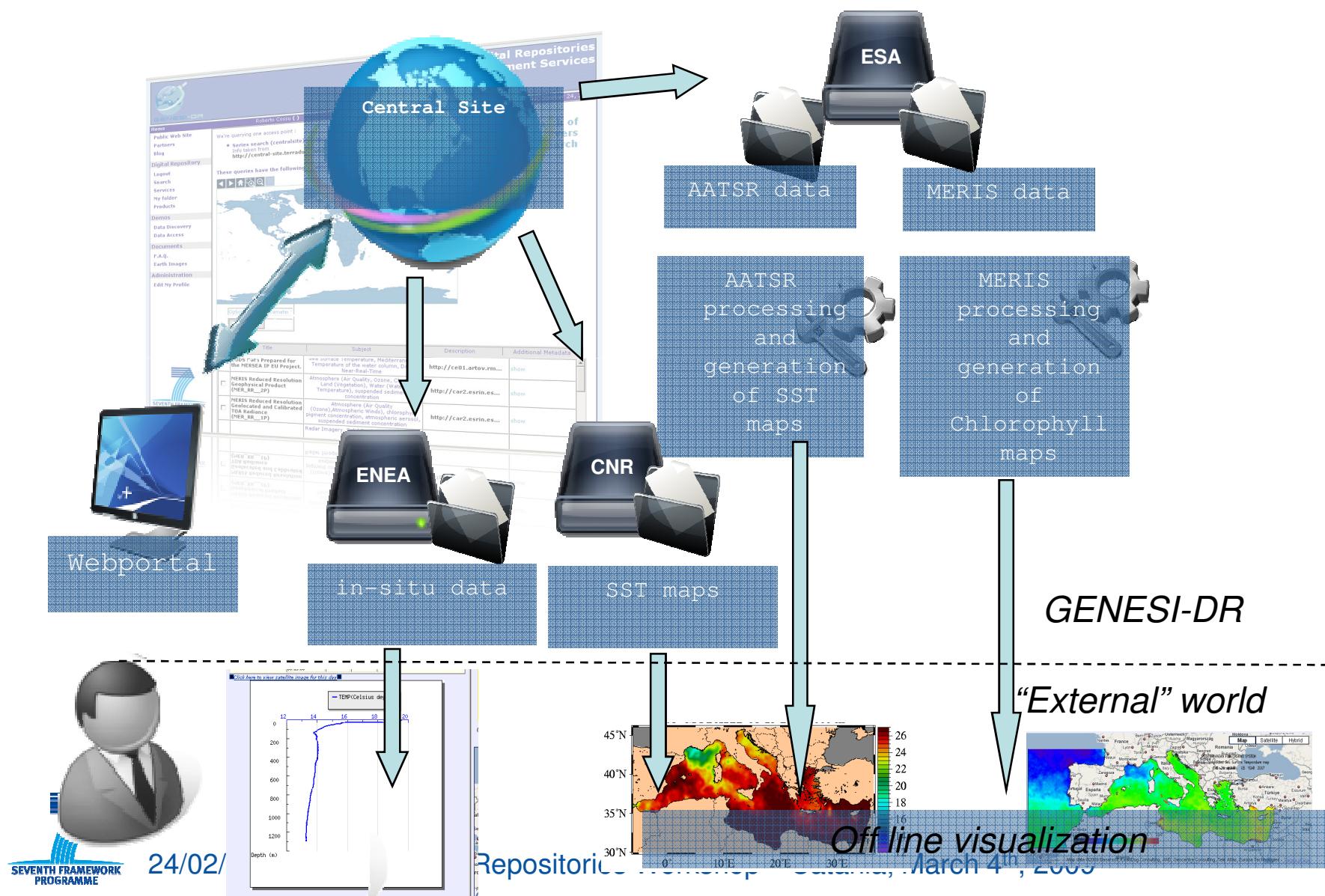
- **Aim:** to discover, access, process and visualize (off-line) different typologies of Ocean related datadata and products
- **Data and services:**
  - Sea Surface Temperature maps generated and archived at CNR
  - Voluntary Observing Ship (VOS) data archived at ENEA
  - L3 products (algal bloom, SST) generated on-the-fly from Envisat data (MERIS and AATSR) archived at ESA-ESRIN
- The scenario includes in-situ and satellite data, already generated products, and products generated on the fly from satellite data



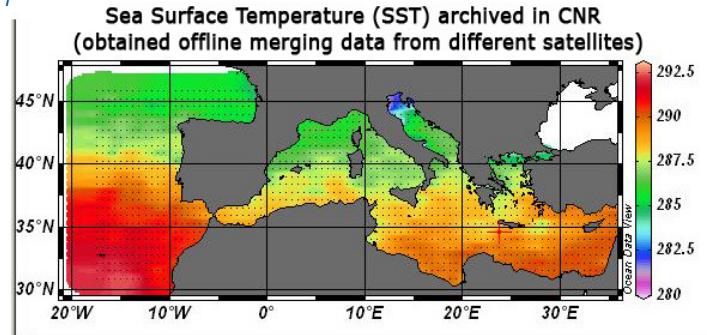


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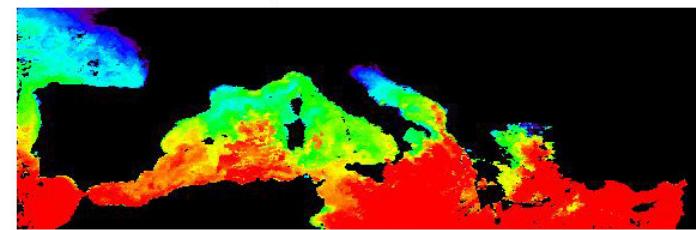
# Ocean data/products discovery, access, and processing



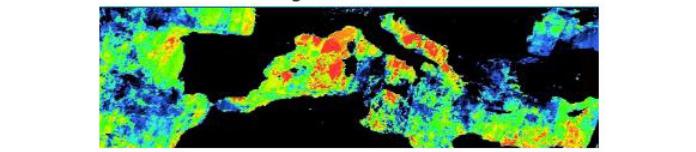
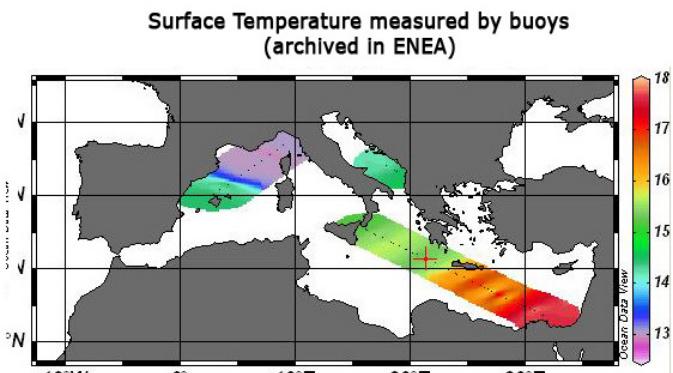
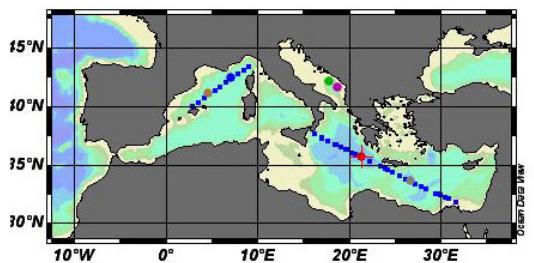
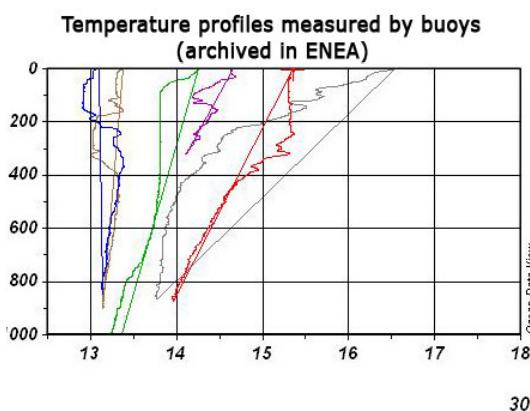
# Ocean data/products discovery, access, and processing



SST generated on-the-fly by GENESI-DR processing service  
using Envisat AATSR data

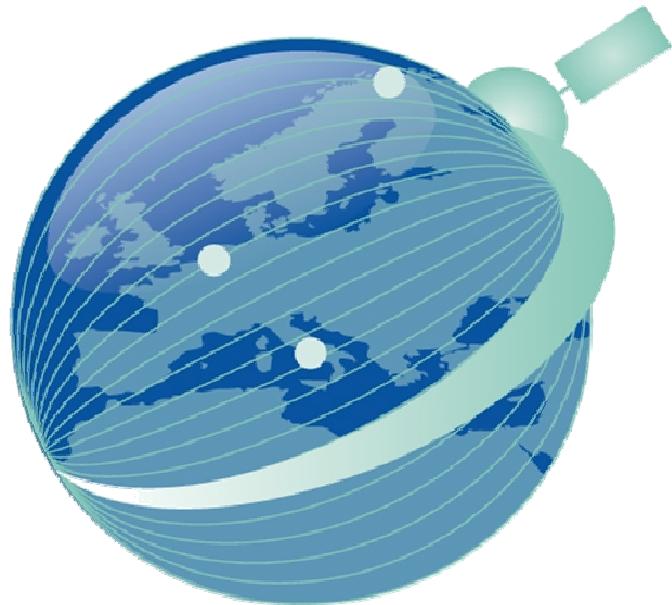


Chlorophyll map generated on-the-fly by GENESI-DR processing service  
using Envisat MERIS data

# Conclusions

- GENESI-DR is an ambitious project with large implications on present operations in ES data providers
- Getting the right set of demonstration and validation scenarios are of fundamental importance to convince both Data Providers and Data Users to join the GENESI-DR federation of Earth Science Digital Repositories



**GENESI-DR**

**Thank You!**

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*Catania, 4 Mar 2009*

