

## European Gravity Service for Improved Emergency Management

### Objectives

The Grant Preparation with the European Commission in the frame of the Horizon 2020 program has been successfully completed last year and EGSIM has officially started on January 1, 2015.

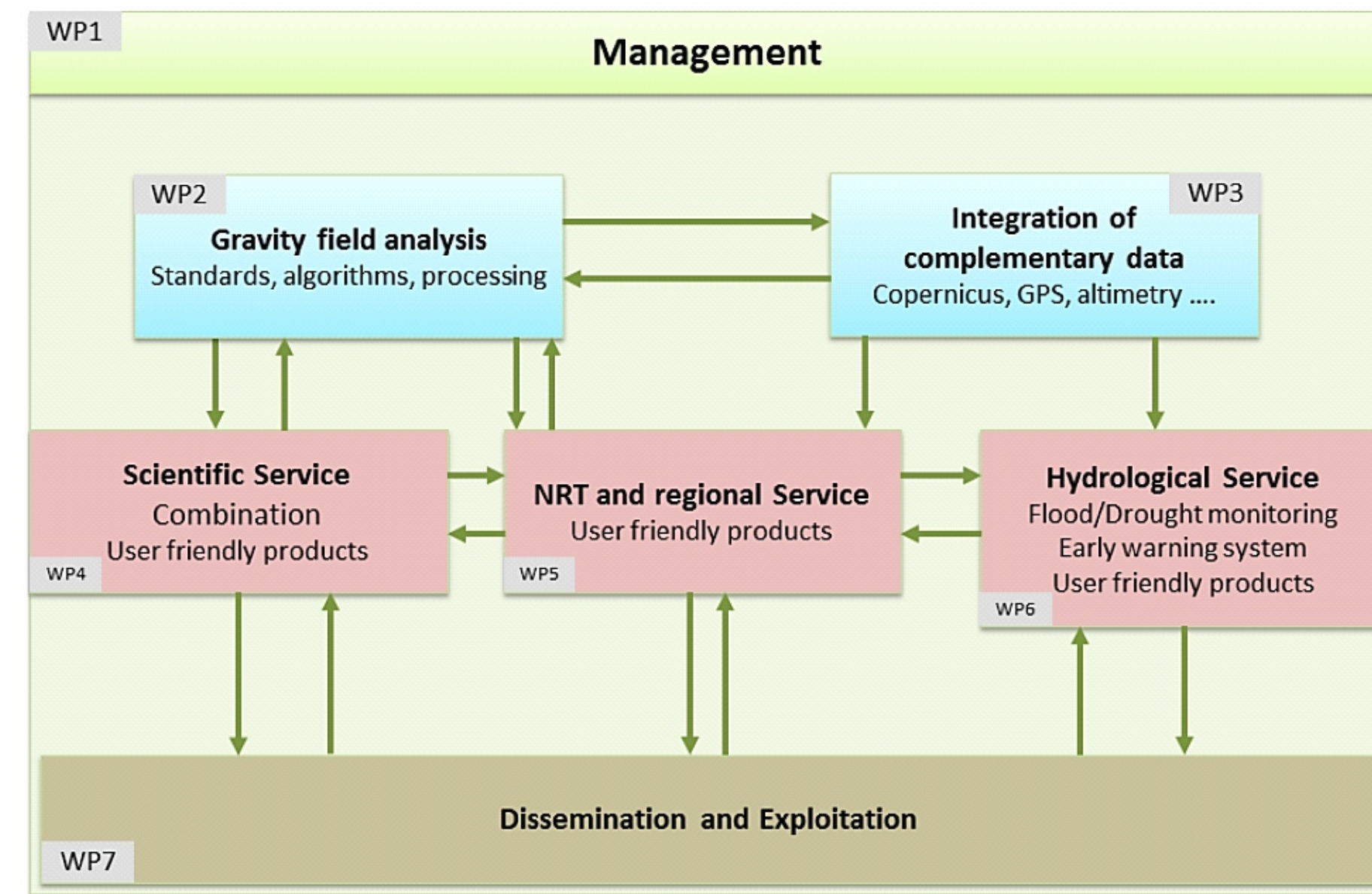
The three main objectives of EGSIM are:

- delivering the **best gravity products** for applications in Earth and environmental science research,
- reducing the latency and increasing the temporal resolution** of the gravity and therefore mass redistribution products,
- developing **gravity-based indicators for extreme hydrological events** and demonstrating their value for flood & drought forecasting and monitoring services.

### Project Partners

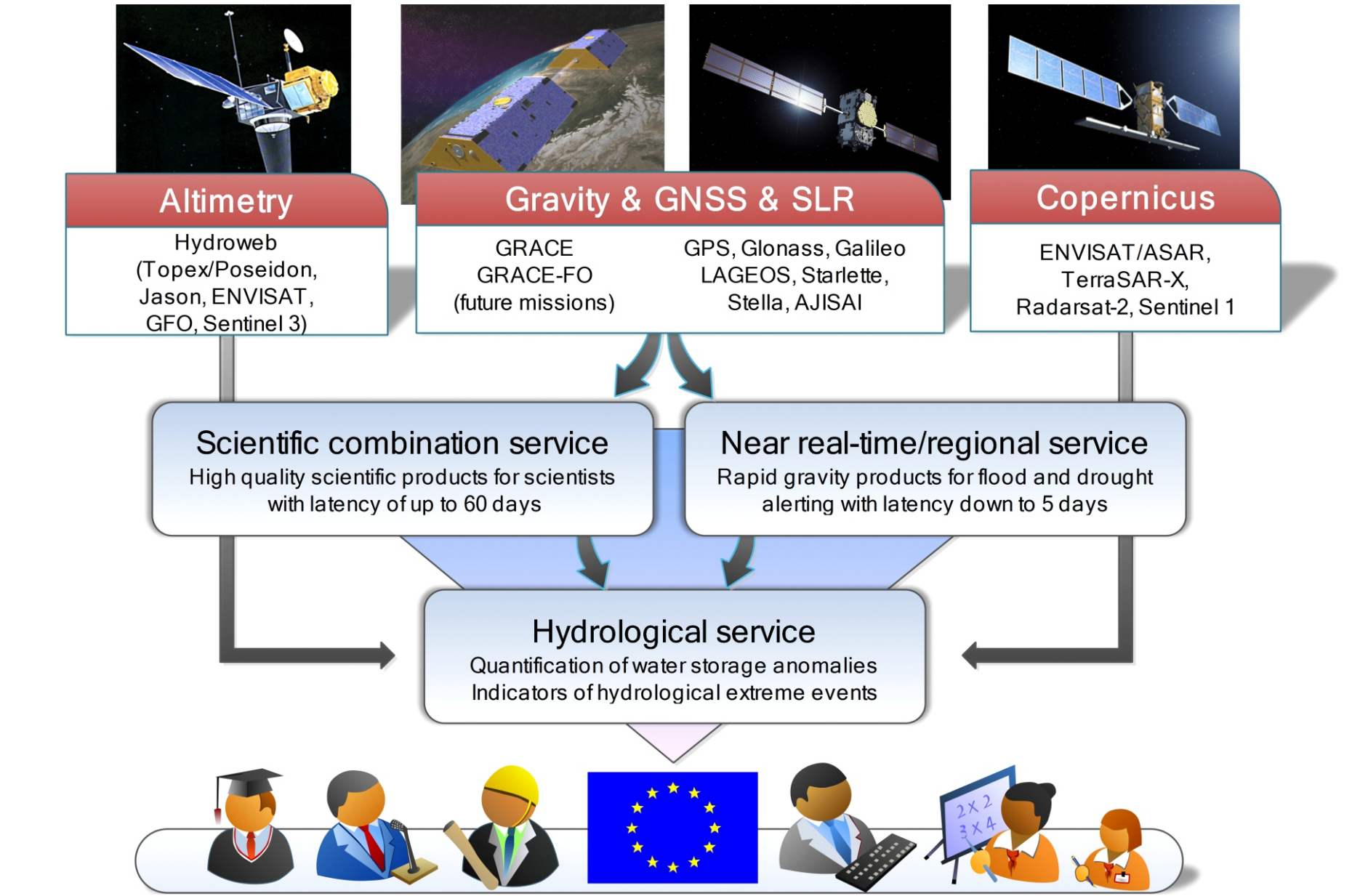


### Project Structure



The used input data sources and the anticipated services that shall be established are reflected in the EGSIM WP structure.

### Upcoming Services



Services will be tailored to the needs of governments, scientists, decision makers, stakeholders and engineers. Special visualisation tools will be used to inform, update, and attract also the large public.

### Scientific Service

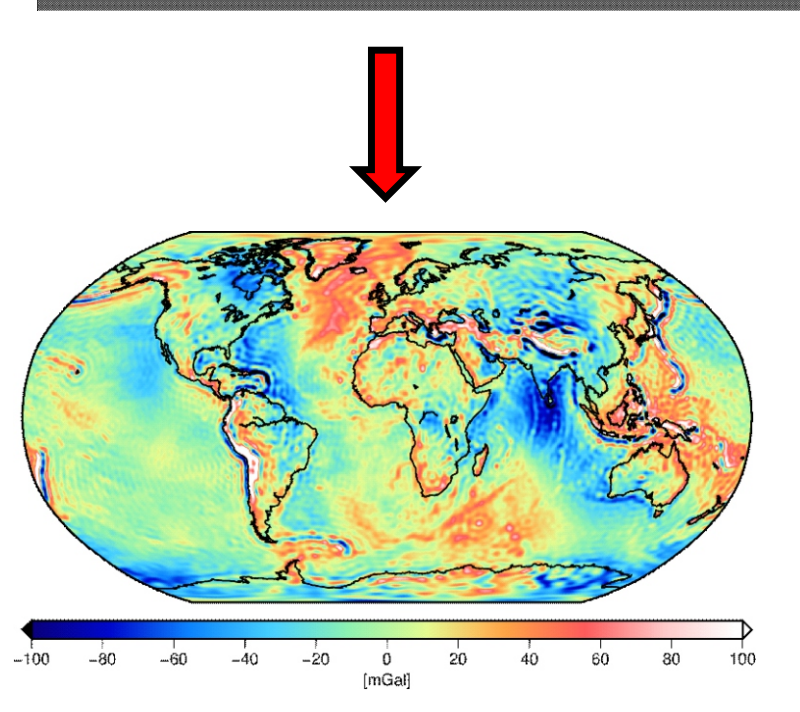
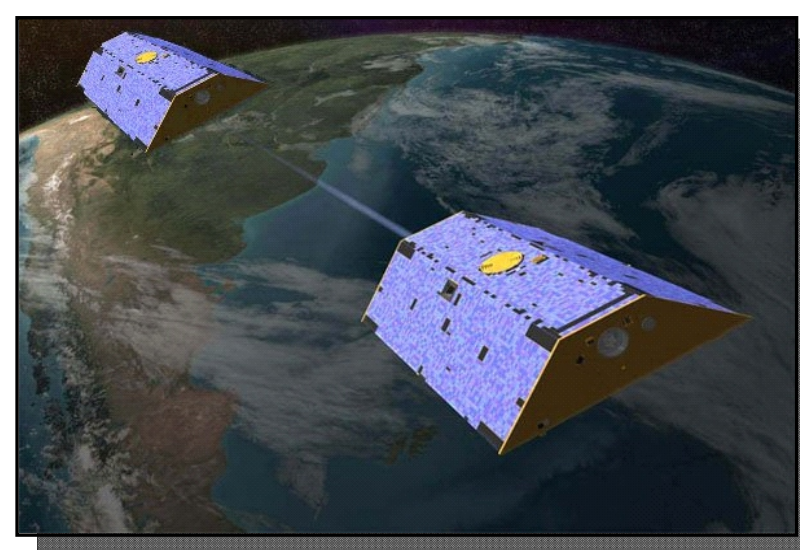
In the frame of the project different groups will generate gravity field solutions based on independent processing strategies:

- GFZ**: direct approach
- CNES**: direct approach
- AIUB**: celestial mechanics approach
- ITSG**: short-arc approach
- University of Luxembourg**: acceleration approach (may be more in future)
- ...

Adopting rigorous and independent processing approaches, each analysis center will deliver consistent gravity field solutions. For the first time, a meaningful combination of gravity field solutions will be possible.

This task will be coordinated by AIUB, it includes

- comparison of the analysis center solutions, identification of gross errors
- pair-wise comparison of gravity solutions to approximate empirical weights for the individual analysis centers
- combination of all analysis centers solutions to generate combined solutions using the following two schemes:
  - calculate weighted averages based on the empirical weights
  - determine the combined solution based on a combination of normal equations (NEQ) generated by the individual analysis centers
- provide suitable products for hydrological and geophysical applications from the combined and individual analyse center products



### Near Real Time and Regional Service

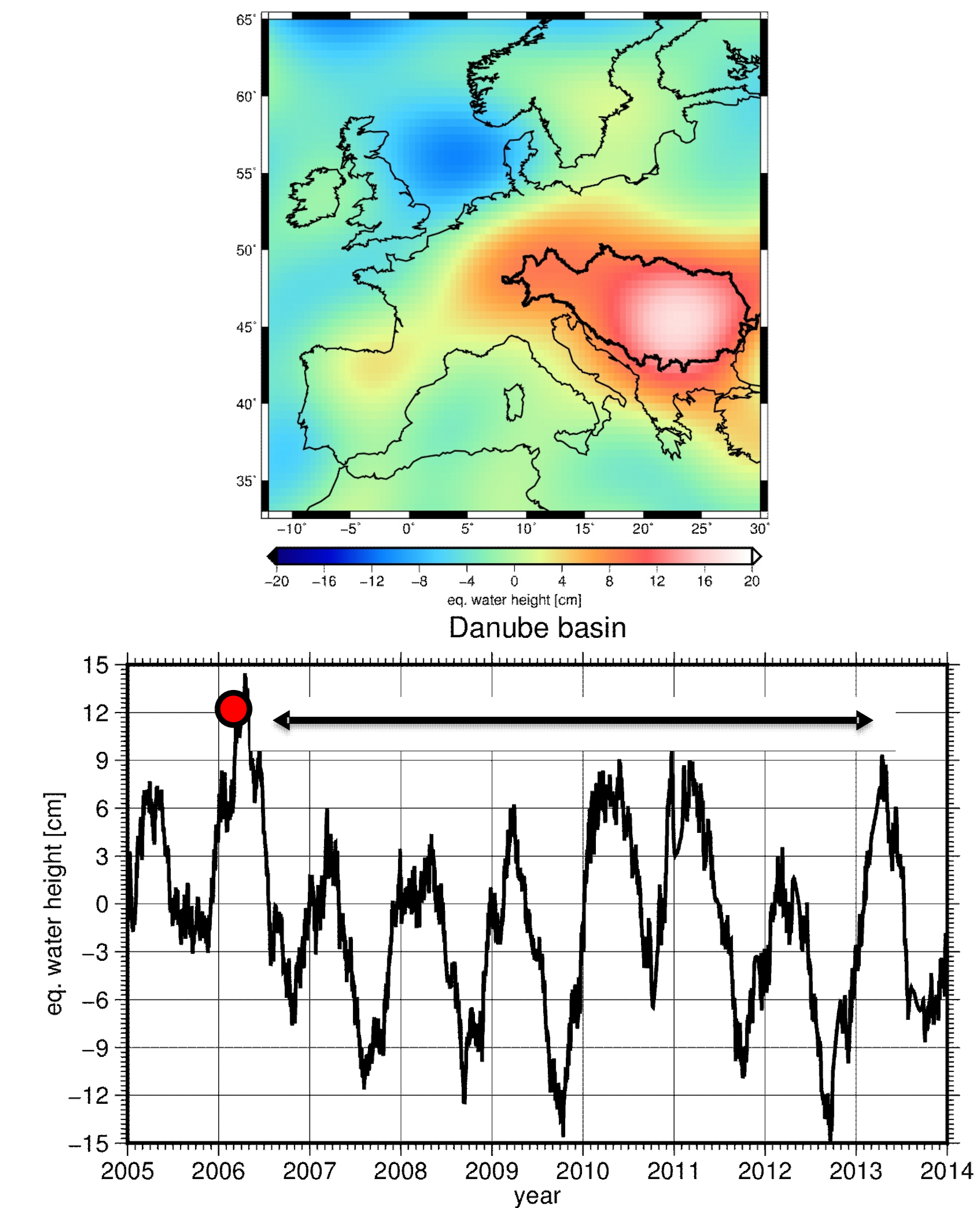
Daily updated solution (Near real-time with max. 5 days delay)

**ITSG:**

Kalman filtered solutions

**GFZ:**

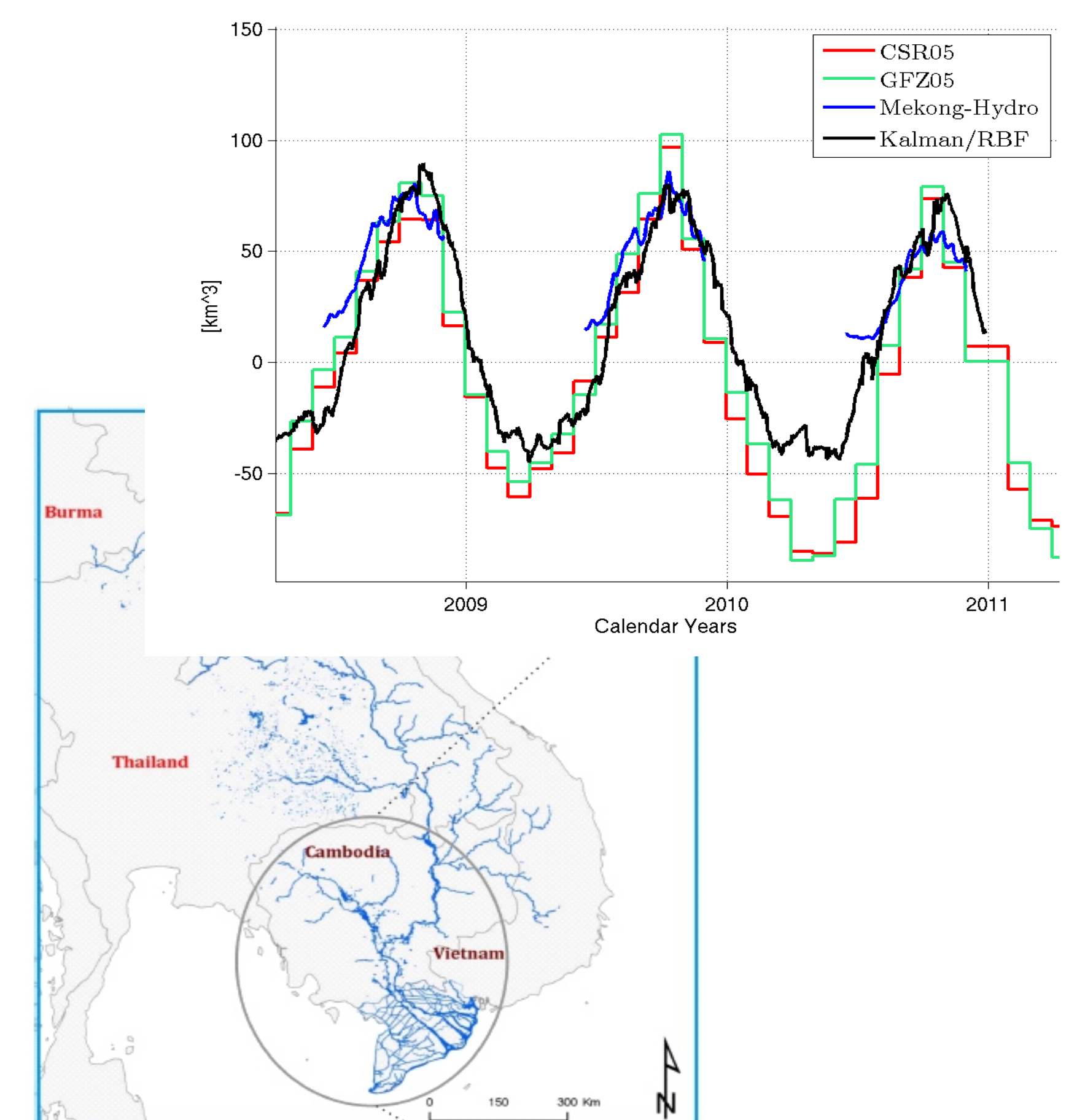
Alternative representations (e.g., radial basis functions)



### Hydrological Service

Gravity-based flood and drought indicators as descriptors of the integral wetness status of river basins → early warning for hydrological extreme events.

Integration into automatic flood emergency management services. An operational test run of half a year is foreseen in the frame of DLR's Center for Satellite Based Crisis Information.



Testing the added value of gravity-based indicators at different lead times (several months to near real time)

- via assimilation into flood forecasting models
- in statistical forecasting approaches

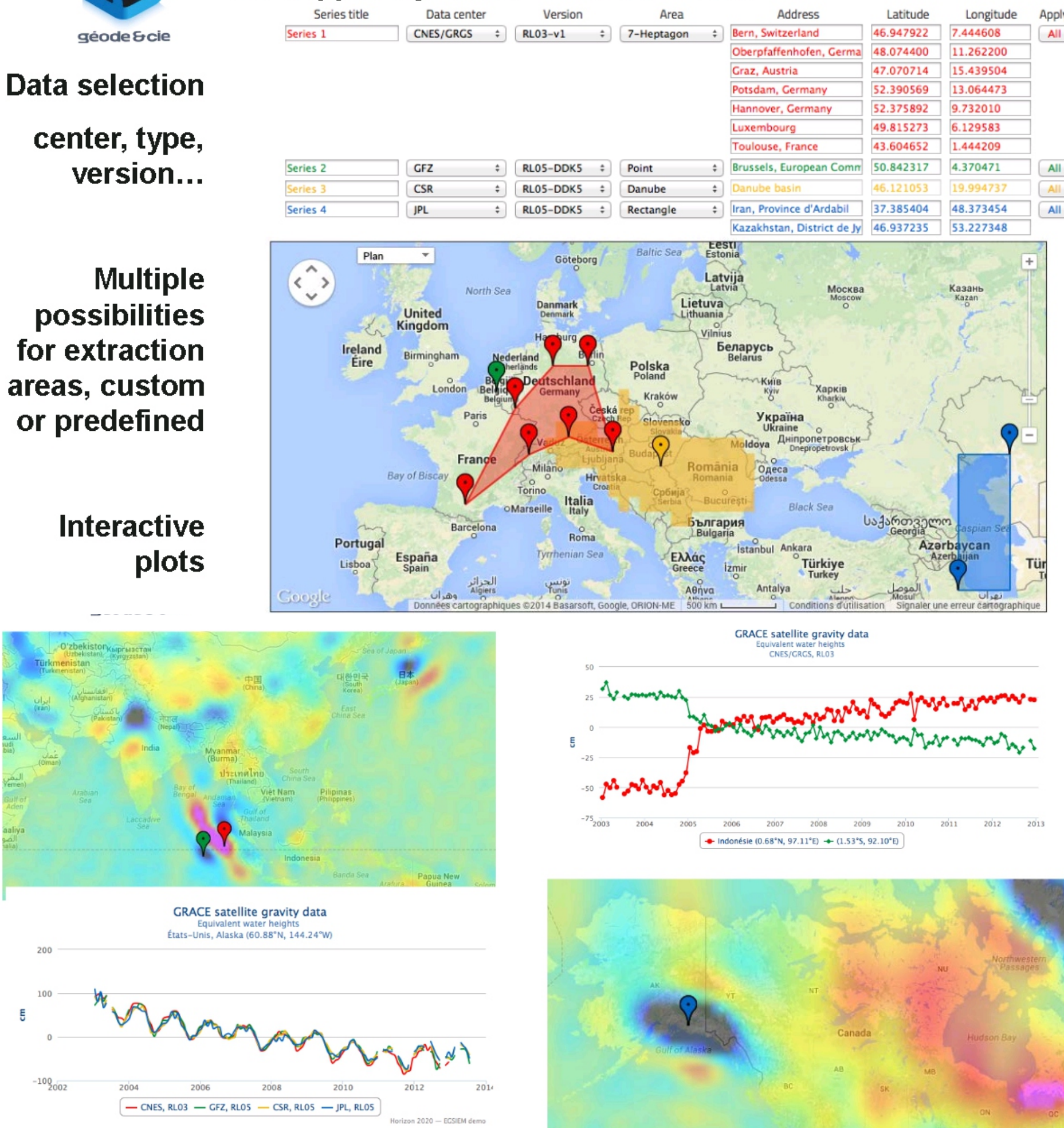
### Dissemination and Exploitation

A central component of the EGSIM dissemination activities will be the EGSIM plotter, which allows easy data access and visualization (examples on the right hand side).

EGSIM will have an open data policy with respect to all data generated within the project. Accessibility to all levels will be guaranteed via the project website: <http://www.egsim.eu>



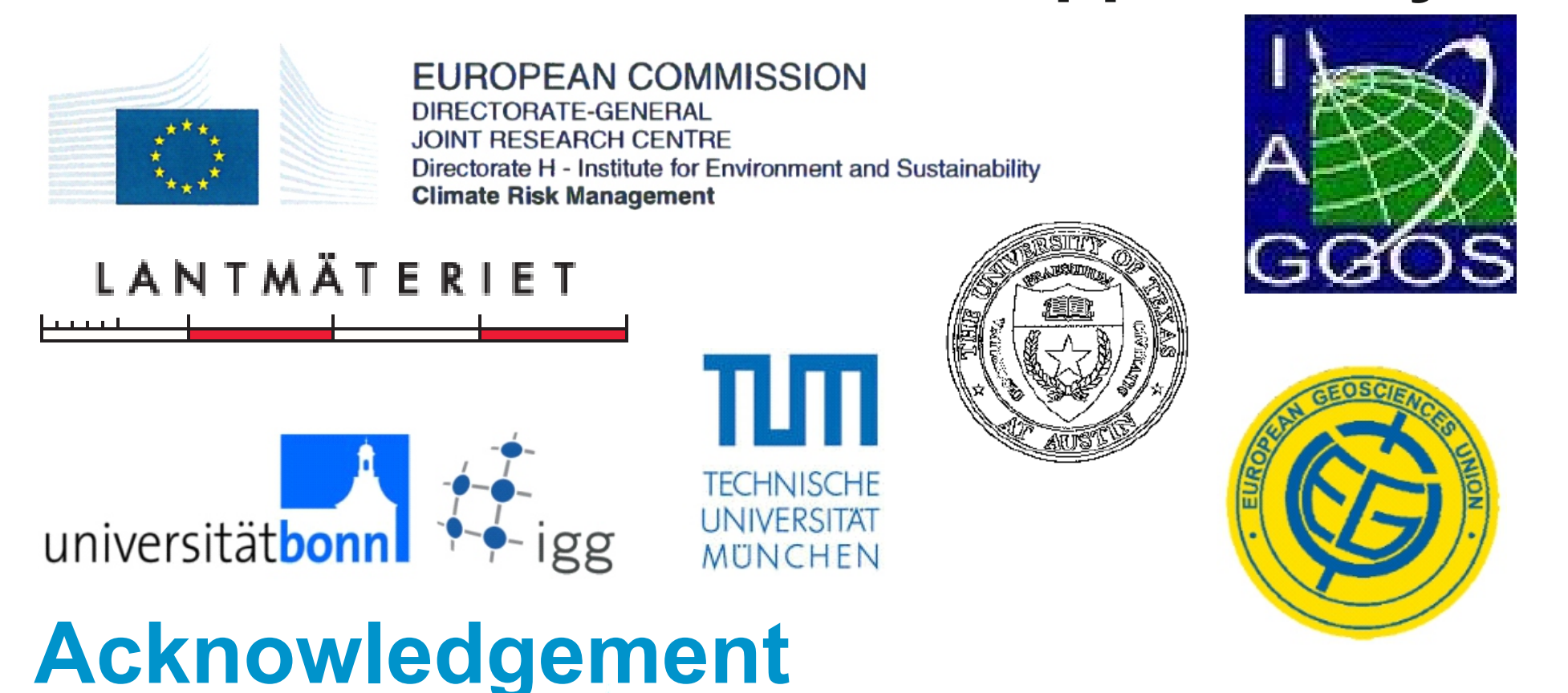
### EGSIM Visualization Tool: Extension of The GRACE Plotter, developed by Géode & Cie for CNES.



### Status of the Project

- The EGSIM project started on January 1<sup>st</sup>, 2015.
- EGSIM will run for three years (2015-2017).
- Future integration into the services of the International Association of Geodesy (IAG), e.g., under the umbrella of the International Gravity Field Service (IGFS), and into the Copernicus emergency service is envisaged.
- EGSIM will have an open data policy and is open for collaborations with further partners.
- Collaborations/associating projects with other partners are very welcome. Service Level Agreements can be signed anytime during project duration.

### In collaboration with and supported by



### Acknowledgement

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