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European Gravity Service for Improved Emergency Management

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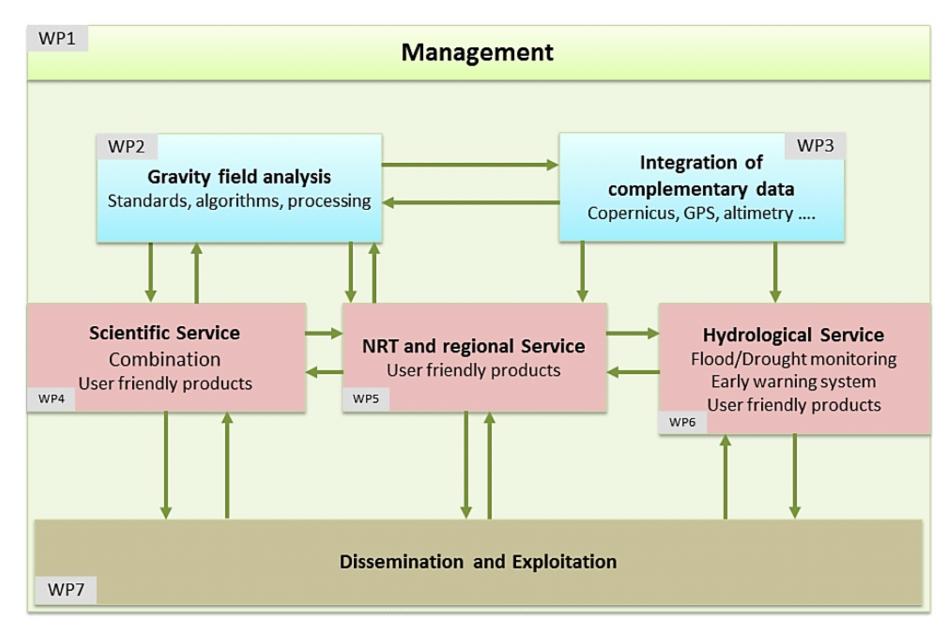
Objectives

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

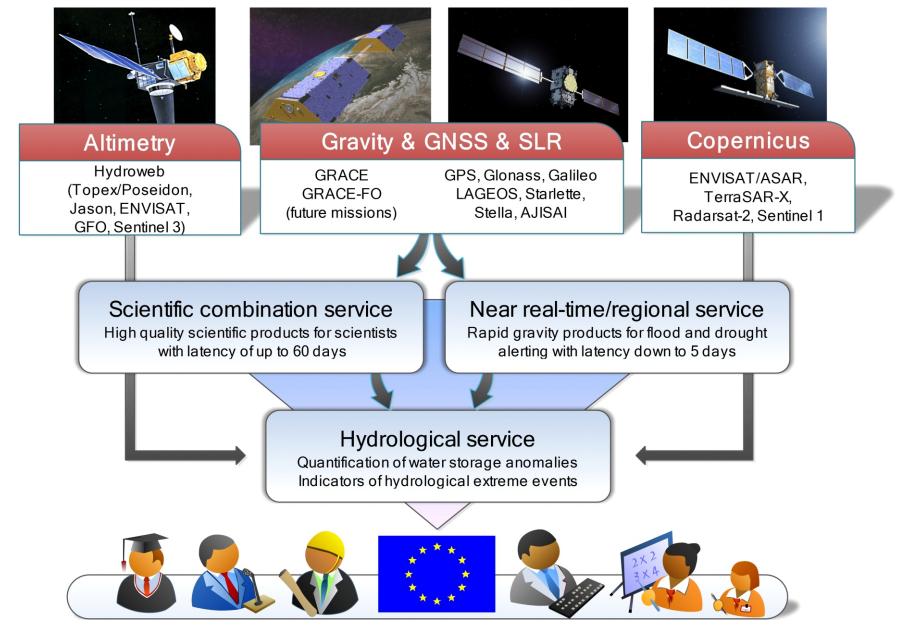
The three main objectives of EGSIEM are:

- 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 &





Upcoming Services



drought forecasting and monitoring services.

Project Partners uni.lu GFZ Helmholtz Centre UNIVERSITÉ DU LUXEMBOURG 102 Universität 1004 Hannover Cnes

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

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

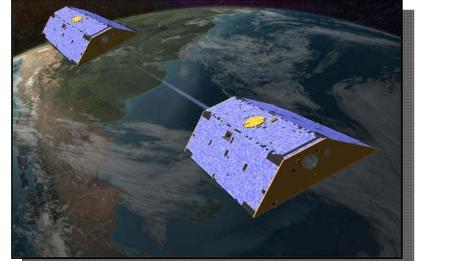
In the frame of the project different groups will generate gravity field solutions based on independent processing strategies: GFZ

direct approach CNES direct approach

AIUB

celestial machanics approach ITSG

short-arc approach **University of Luxembourg** acceleration approach (may be more in future)

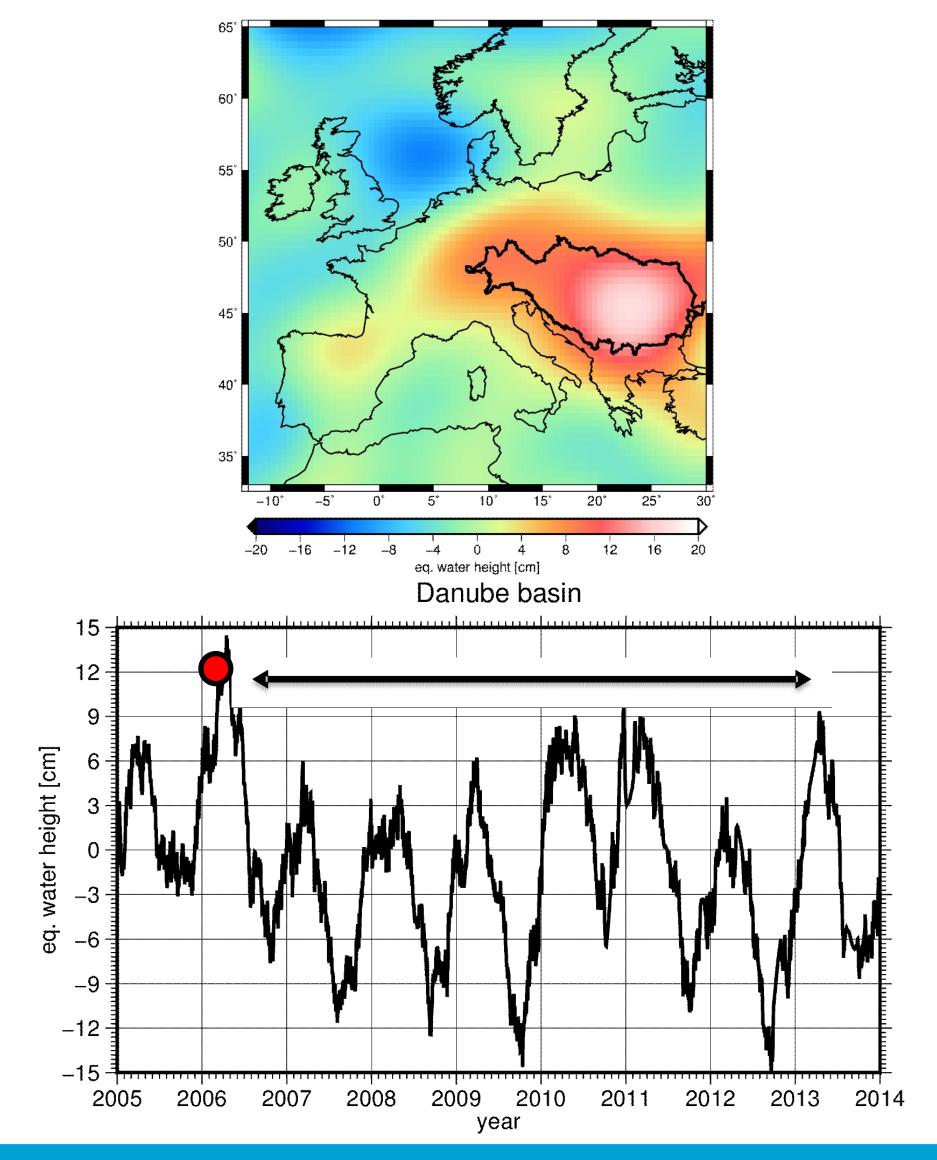


Near Real Time and Regional Service

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

Kalman filtered solutions **GFZ**:

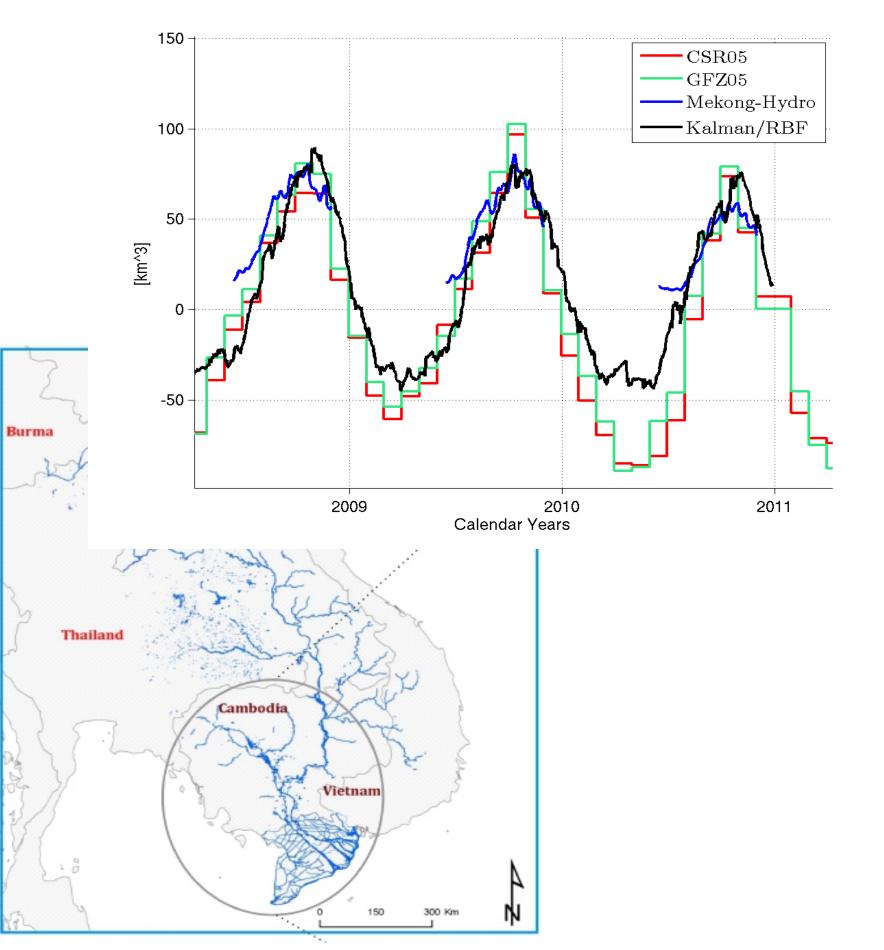
Alternative representations (e.g., radial basis functions)

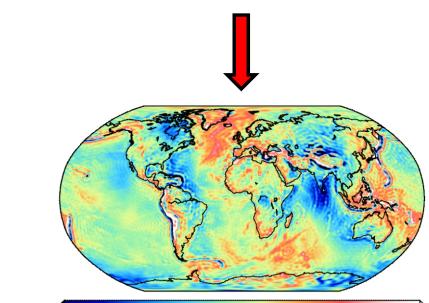


Hydrological Service

Gravity-based flood and drought indicators as descriptors of the integral wetness status of river basins \rightarrow 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.





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

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

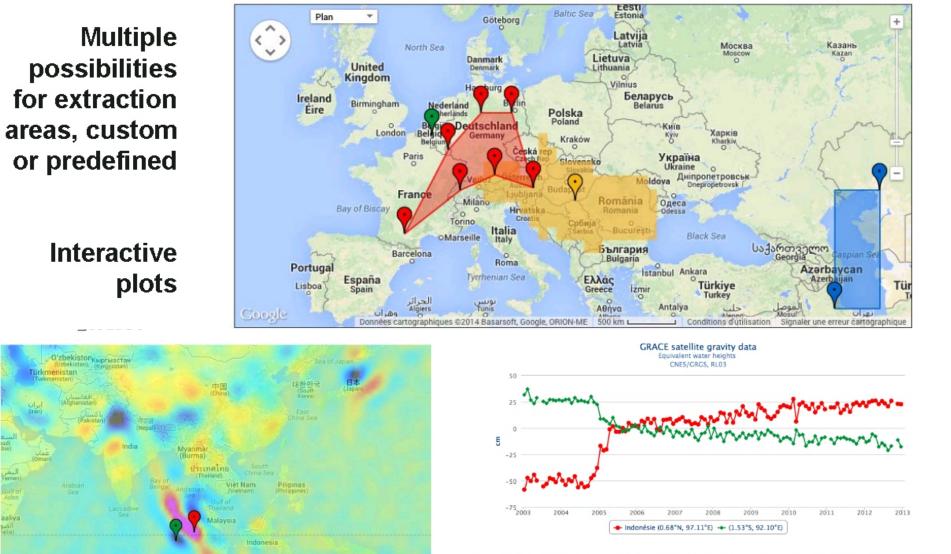
A central component of the EGSIEM dissemination activities will be the EGSIEM plotter, which allows easy data access and visualization (examples on the right hand side).

EGSIEM 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.egsiem.eu



EGSIEM Vis	ualizatior	n Tool: E	Extension	of The	GRAC	E Plotter,				
developped by Géode & Cie for CNES.										

	Denes due	Data center	VCI SION	Alcu	Address	Lacitade	Longrade	- Abbi
géode & cie	Series 1	CNES/GRGS \$	RL03-v1 ‡	7-Heptagon ‡	Bern, Switzerland	46.947922	7.444608	All
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Data selection					Potsdam, Germany	52.390569	13.064473	
					Hannover, Germany	52.375892	9.732010	
contor tuno					Luxembourg	49.815273	6.129583	
center, type,				Toulouse, France	43.604652	1.444209		
version	Series 2	GFZ ‡	RL05-DDK5 \$	Point \$	Brussels, European Comm	50.842317	4.370471	All
Versionni	Series 3	CSR \$	RL05-DDK5 \$	Danube \$	Danube basin	46.121053	19.994737	All
	Series 4	JPL \$	RL05-DDK5 \$	Rectangle \$	Iran, Province d'Ardabil	37.385404	48.373454	All
					Kazakhstan, District de Jy	46.937235	53.227348	



Status of the Project

- The EGSIEM project started on January 1st, 2015.
- EGSIEM 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.
- EGSIEM 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

🛋 Andreas Kvas 🛛

Each year, the geodesy institutes at TU Graz host the geoday, an outreach event targeted at students about to graduate high school. This year over 200 students from schools all over Styria took the opportunity to get to know the courses of study, the geodesy institutes at TUG, and their current research topics. Besides regional and lunar gravity field recovery, GRACE and the monitoring of the time variable gravity field were hot topics at our booth. We engaged the students with interactive displays of satellite models and gravity products which sparked many interesting discussions.

Blog Entry: How EGSIEM will support flood monitoring and mapping

📥 Hendrik Zwenzner 🛗 15 May 2015 -

Severe and very large flood events, such as the floods in central Europe in 2002 and 2013 or the flood in Pakistan in 2010 for example, are amongst the most devastating catastrophes for the Earth's population, economy and environment. According to the number of activations of the International Charter Space and Major Disasters, almost 50 percent of all major disasters during the last 15 years have been flood events.

Due to their capability to present a synoptic view of the spatial extent of floods, satellite remote sensing technology has been successfully applied for flood mapping and monitoring applications. Because of their specific illumination, their day/night as well as all-weather capabilities, synthetic aperture radar (SAR) sensors (e.g. TerraSAR-X, Radarsat-2, ALOS-2 which all operate in different wavelengths, i.e. X,C and L-band) are optimally suited for providing reliable information on floods,

You are kindly invited to subscribe to the quarterly EGSIEM Newsletter.

Blog Entry: EGSIEM @ EGU (Part II) Blog Entry: EGSIEM Gravity and Time Blog Entry: The water and the javascript 🔒 Username A Password 🗆 Remember Me

Blog Entry: EGSIEM at

Blog Entry: How EGSIEM

monitoring and mapping

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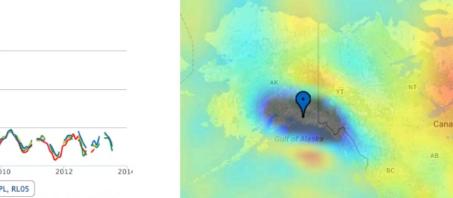
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will support flood



GRACE satellite gravity data





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