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European Gravity Service for Improved Emergency Management

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Objectives

EGSIEM is a project of the Earth Observation Space Calls of the Horizon 2020 Framework Programme for Research and Innovation of the European Commission.

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 thereof derived mass redistribution products,
- developing gravity-based indicators for extreme hydrological events and demonstrating their value for flood

Project Structure



Upcoming Services



and drought forecasting and monitoring services.



The used input data sources and the anticipated services that are currently being established (see right hand side) are reflected in the EGSIEM work package (WP) structure.

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

Scientific Combination Service

In the frame of EGSIEM different groups 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)





Adopting rigorous and independent processing approaches, each analysis center (AC) delivers consistent gravity field solutions. For the first time, a meaningful combination of gravity field solutions is

Near Real-Time / Regional Service

Daily updated solutions (near real-time with max. 5 days delay) **ITSG:** Kalman filtered solutions

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



10 12 14 16 18 20

Hydrological Service

Gravity-based flood and drought indicators as descriptors of the integral wetness status of river basins will be developed for early warning of hydrological extreme events at different lead times (several months to near real-time):

- via assimilation into flood forecasting models

- in statistical forecasting approaches







Daily Kalman filtered solutions (green) agree well with river discharge data (blue) provided by the Global Runoff Data Center (example for Bazias, Danube basin).

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



Dissemination and Exploitation

A central component of the EGSIEM dissemination activities is the EGSIEM plotter, which allows easy data access and visualization (examples on the right hand side). EGSIEM has an open data policy with respect to all data generated within the project. Accessibility to all levels is given via the EGSIEM website: http://www.egsiem.eu



géode & cie

EGSIEM Visualization Tool: Extension of The GRACE Plotter, developped by Géode & Cie for CNES.

	Series title	Data center	Version	Area	Address	Latitude	Longitude	Appl
géode & cie	Series 1	CNES/GRGS \$	RL03-v1 ‡	7-Heptagon ‡	Bern, Switzerland	46.947922	7.444608	All
					Oberpfaffenhofen, Germa	48.074400	11.262200	
Data selection					Graz, Austria	47.070714	15.439504	
					Potsdam, Germany	52.390569	13.064473	
					Hannover, Germany	52.375892	9.732010	
					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
	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	1



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Summary

- The EGSIEM project started on 1 January 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 has 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.

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Blog Entry: Utilising the EGSIEM Plotter

& Keith Cann-Guthauser 22 April 2016

Add new comment

The Astronomical Institute of the University of Bern has been hosting a student from a local school (Gymnasium Kirchenfeld) who has been using the EGSIEM Plotter to extract time-varying signals from all over the globe.





You are kindly invited to subscribe to the quarterly EGSIEM Newsletter on our website.

AIUB

Poster compiled by Adrian Jäggi, May 2016 Astronomical Institute, University of Bern, Bern adrian.jaeggi@aiub.unibe.ch



GFZ

UNIVERSITÉ DL

UXEMBOUR

Helmholtz Centre







l l Leibniz l o 2 Universität l o 4 Hannover



CNES/GRGS, RL03

← Indonésie (0.68°N, 97.11°E) → (1.53°S, 92.10°E)





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