

WP7: EGSIM Summer School

Keith Cann-Guthauser

Astronomisches Institut, Universität Bern

EGSIEM Final Assembly

8. & 9. February 2018, Bern

WP7: Dissemination & Exploitation

Autumn School

- The EGSiem Summer School (Task 7.6) was scheduled to take place in the final year of the project
- Planning began earlier than expected to find a venue and additional funding – as reported in [D1.2](#)
- Our partner organisation GFZ hosted the school at their excellent facilities in Potsdam and also secured some additional funds from the German Federal Ministry of Training and Research

WP7: Dissemination & Exploitation

Autumn School

Advertising was mainly through the project website where a dedicated sub-page (egsiem.eu/autumn-school) was set up, this hosted various posters, flyers and updated logistical information.

Thanks to the Geodetic community we were also able to attract participants from around Europe with

EGSIEM
European Gravity Service for Improved Emergency Management

International Autumn School
The EGSIEM Autumn School for Satellite Gravimetry Applications
11 – 15 September 2017
GFZ Helmholtz Centre, Potsdam, Germany

This autumn school, held in the historic surroundings of the Telegrafenberg site, will educate students and young researchers in state-of-the-art Satellite Gravimetry Applications, and prepare them for the usage of those products being developed within the framework of the EGSIEM project. Presentations from key members of the EGSIEM-consortium will be augmented by high-profile guests giving presentations on selected topics.

DATE	Morning	Afternoon	Evening
Monday (10 September)	Arrival	GPS & GRACE Introduction Armin Jäggi / Ulrich Meyer	Ice Breaker Ad
Tuesday (11 September)	GRACE Analysis Torben Bauer-Gott	Hydrology I Andreas Günther	Hydrology II Annette Eicker
Wednesday (12 September)	Ice sheet signals Markus Rothrock	CSA Holger Steffen	GNSS Loading Frank van Dam
Thursday (13 September)	Remote Sensing Hendrik Zwenner/Sandro H	GRACE FIO Frank Richter	Social & Networking Event All
Friday (14 September)	Sophisticated EGSIEM Tools Séraphine Bourgeois / Marshall Wright	Departures	

Registration Deadline: 31st July 2017
Organization of the autumn school is jointly managed by the EGSIEM project and GFZ.
For more information please visit www.egsiem.eu/autumn-school

GFZ Helmholtz Centre POTSDAM
Bundesministerium für Bildung und Forschung

EGSIEM



WP7: Dissemination & Exploitation

Autumn School

The school program went through several iterations and included two social events:

DATE	Morning		Afternoon		Evening
Monday (11. September)	Arrivals		Registration & Welcome Jäggi/Flechtner 14:00-15:00	GPS & GRACE Intro Adrian Jäggi - Ulrich Meyer 15:00 - 17:30	Ice Breaker All 18:00
Tuesday (12. September)	GRACE Analysis Torsten Mayer-Gürr		Modelling the Hydrological Cycle (Hydrology I) Andreas Güntner		Assimilation of GRACE data into hydrological models (Hydrology II) Annette Eicker 19:00-20:30
	Lecture 09:30-11:00	Practical 11:30-13:30	Lecture 14:30-16:00	Practical 16:30-18:00	
Wednesday (13. September)	Ice sheet signals Martin Horwath		GIA Holger Steffen		GNSS Loading Tonie van Dam 19:00-20:30
	Lecture 09:30-11:00	Practical 11:30-13:30	Part I-Introduction 14:30-16:00	Part II-Observations 16:30-18:00	
Thursday (14. September)	Remote Sensing Hendrik Zwenzner		GRACE FO Frank Flechtner 14:00-15:00	Cruise All 16:00-19:00	
	Lecture 09:00-10:30	Practical 11:00-13:00			
Friday (15. September)	EGSIEM Tools Stéphane Bourgogne & Matthias Weigelt		Departures		
	Lecture 09:00-10:30	Practical 11:00-13:00			

WP7: Dissemination & Exploitation

Autumn School

- The Autumn School was held from 11.-15. September at the historically important (for Geodesists) Telegrafenberg site in Potsdam.
- There were over 60 people involved in the Autumn School, 46 students 12 lecturers, plus local support staff

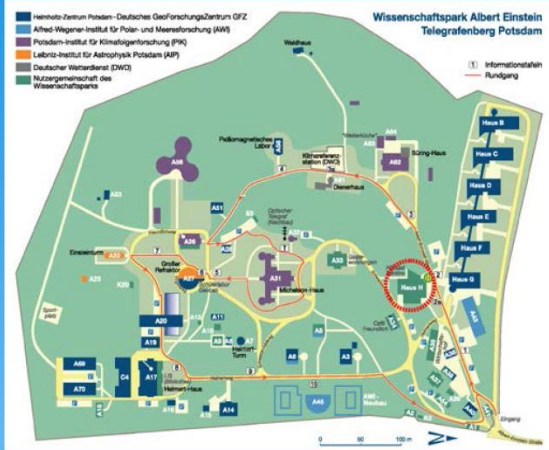


WP7: Dissemination & Exploitation

Autumn School

A flyer for the event was made available to students via the website and in hard copy at the school which included:

- Timetable
- Logistical information
- Information on the funders and EGSIEM partners
- Overview of each lecture / practical



This autumn school, held in the historic surroundings of the Telegrafenberg site, will educate students and young researchers in state of the art Satellite Gravimetry Applications, and prepare them for the usage of those products being developed within the framework of the EGSIM project. Presentations from key members of the EGSIM consortium will be augmented by guests giving presentations on selected topics.

Organisation of the autumn school is jointly managed by the EGSIM project and GFZ. This event has received partial support from the European Union's Horizon 2020 research & innovation programme under grant agreement No. 637010, and generous funding from the German Federal Ministry of Education and Research.

The European Gravity Service for Improved Emergency Management (EGSIEM) Project consists of the following partners:

International Autumn School

The EGSIEM School for Satellite Gravimetry Applications

11 – 15 September 2017

GFZ Helmholtz Centre, Potsdam, Germany



DATE	Morning	Afternoon	Evening
Monday (1 st September)	Arrivals		Ice Breaker 18:00
Tuesday (2 nd September)	GRACE Analysis Tizian Mayer-Gürr Lecture 09:30-11:00 Practical 11:30-13:30	Hydrology I Andreas Götterer Lecture 14:30-16:00 Practical 16:30-18:00	Hydrology II Alexander Essler 19:00-20:30
	Wednesday (3 rd September)	Ice sheet signals Martin Horwich Lecture 09:30-11:00 Practical 11:30-13:30	GIA Rüdiger Stoffens Part I Introduction 14:30-16:00 Part II Observations 16:30-18:00
Thursday (4 th September)		Remote Sensing Reinhold Zwiers Lecture 09:00-10:30 Practical 11:00-13:00	GRACE FO Frank Heitbrock 14:00-15:30
	Friday (5 th September)	EGSIEM Tools Stéphane Bourgeois & Matthias Weigelt Lecture 09:00-10:30 Practical 11:00-13:00	Departures

The EGSIEM Autumn School will be held at:

Haus H, Helmholtz Centre Potsdam
GFZ German Research Centre for Geosciences
Telegrafenberg
14473 Potsdam, Germany
Tel.: +49 (0)331 288-0



Universität Bern



Université du Luxembourg



Helmholtz-Zentrum Potsdam
GeoForschungsZentrum



Technische Universität Graz



Leibniz Universität Hannover



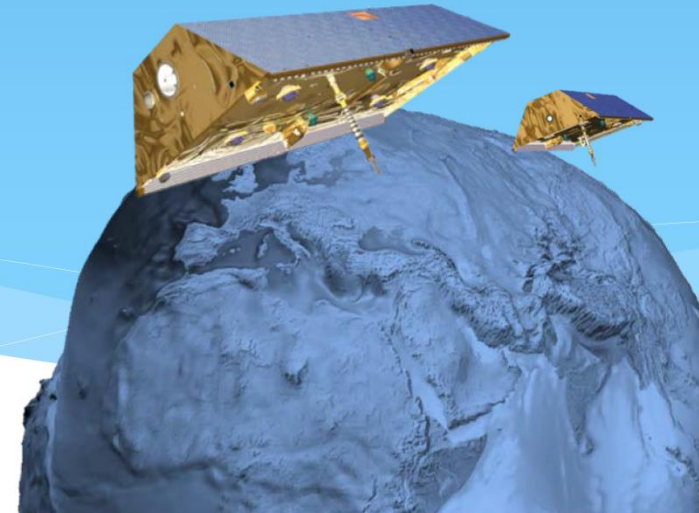
Deutsches Zentrum für Luft-und
Raumfahrt



Centre national d'études Spatiales



géode & cie





Adrian Jäggi
Universität Bern
Global Positioning
Systems

Precise Orbit Determination (POD) with GPS has for 20 years been used as one of the standard techniques to derive satellite trajectories in low Earth orbit (LEO). Since the launch of dedicated gravity missions, GPS is not only used as key tracking system for LEO POD and as a necessary prerequisite to analyze dedicated measurements such as GRACE inter-satellite K-Band data, but also for extracting the long wavelength part of the Earth's gravity field. The lecture gives an introduction into the analysis of GPS data for LEO POD and presents different orbit determination strategies.



Ulrich Meyer
Universität Bern
Introduction to GRACE

One of the main goals of the GRACE mission over the past 15 years has been to observe the medium to short wavelength part of the Earth's gravity field and its temporal variations, and additionally to measure the twin satellites' orbits (the inter-satellite range is measured with micrometer accuracy). This lecture gives an overview of the GRACE mission and data processing, and offers a first glimpse of the main products available, and their application.



Torsten Mayer-Gürr
TU Graz
GRACE Data

One of the main products of the GRACE mission are the monthly gravity field solutions in terms of spherical harmonics. These products are not easy to handle and to interpret. This lecture explains some properties of the solutions. It will also give an overview on how to process the data for mass transport interpretation. This includes filtering and gridding and the transformation in terms of total water storage or equivalent water heights. In the practical MATLAB software will be developed to compute such results.



Andreas Güntner
GFZ
Modelling the
hydrological cycle

This lecture will give an overview of the components of the global water cycle and an introduction into the concepts of hydrological modelling. Focus is given to illustrating different water storage compartments and the value of time-variable gravity data to quantify their dynamics. During practicals students will use a hydrological model to experience the inter-play of water fluxes and water storage dynamics as influenced by model parameterization. The basic principles of model calibration as a strategy of tuning the model structure and model parameters in a way that simulation results correspond to observations will be conveyed within a calibration exercise.



Annette Eicker
HCU Hamburg
Assimilating GRACE
data into hydrological
models

Data assimilation (DA) is a tool for integrating observations into numerical models in order to provide more realistic model results. We will introduce the concept of data assimilation for integrating GRACE observations into hydrological models. The approach allows us to improve the model results, but also delineate GRACE observations into individual hydrological storage compartments and increase the spatial and temporal resolution of water storage estimates. The methodological concept of the ensemble Kalman filter method of DA will be introduced and the associated challenges discussed.



Martin Horwath
TU Dresden
Ice Sheet Signals

The lecture introduces processes related to ice sheet changes, ranging from local glaciological phenomena to global sea level fingerprints. These processes add up as prominent signals in GRACE satellite gravimetry. They also affect a wealth of complementary geodetic observations. The lecture illustrates how a combination of geodetic techniques, together with glaciological and geophysical modeling, leads to an improved understanding of ice sheet processes. Exercises will give participants access to current results and challenges.



Holger Steffen
Lantmäteriet
GIA

Glacial isostatic adjustment (GIA) describes the response of the Earth in terms of deformation as well as stress, rotation and geopotential changes due to changing ice-ocean load distributions on the Earth's surface. The lecture will give an overview of the determination, observation and modelling of GIA from the initiation of the first measurements about 300 years ago in Fennoscandia to the most recent advances thanks to satellite-geodetic techniques.



Tonie van Dam
Uni du Luxembourg
GNSS Loading

The Earth responds elastically to surface mass loading. Many publications have demonstrated that GNSS is capable of observing these displacements. GNSS combined with GRACE observations allows us to refine the mass load at a finer scale in regions where GNSS is sufficiently spatially dense, and by analysing the horizontal motions, we can determine where the load is located. In this session, we will review elastic loading theory. We will demonstrate the theory that allows us to compare GRACE and GNSS observations. We will also review the literature that compares GNSS and GRACE to outline the limitations and the benefits of these comparisons.



Hendrik Zwenzner
DLR-ZKI
Remote Sensing

This lecture and practical will present an overview of different space-based earth observation techniques and mechanisms currently in use. Special focus will be placed on the application of SAR satellite data for flood mapping. Examples from the rapid mapping service of DLR's Center for satellite-based Crisis Information (ZKI) will be presented and discussed during this session.



Frank Flechtner
GFZ
GRACE FO Mission

The GRACE Follow On (FO) mission, due for launch early 2018, will continue providing time-variable estimates of the Earth's gravity field for a period of up to five years at a precision and temporal sampling equivalent to that achieved with GRACE. The FO will provide quick look (<24h) products for enhanced operational use for water resource management and will demonstrate inter-satellite interferometry in LEO for future gravity missions. The talk will focus on the mission status and will also give an outlook on potential Next Generation Gravity Missions.



Matthias Weigelt
LU Hannover
EGSIEM Tools

Dissemination is an essential part of the EGSiEM project: therefore we developed the EGSiEM plotter which allows easy but powerful access to GRACE data. Users can be overwhelmed by the number of available solutions and preprocessing possibilities on offer. The EGSiEM plotter simplifies these variables considerably. Individual & combined solutions are available for various applications which automatically consider various preprocessing steps.



Stéphane Bourgonne
géode & Cie
The EGSiEM Plotter

The GRACE mission allows us to monitor mass transfers and water variations all over the globe. We have designed and built a tool to instantly visualize the results by simple clicks on a web page: The EGSiEM Plotter. We will explore the full possibilities of the tool together with the students, and discover how mass distribution is changing rapidly over the Earth, either in a periodic fashion (monsoons, seasonal effects over equatorial areas...), or in a secular fashion (ice melt at the poles).

- We would like to thank once again all the students, lecturers and support staff for their time and flexibility in attending the School!
- All presentations given can be found at egsiem.eu/autumn-school

