



# EGSIEM Minutes



## EGSIEM Kick-Off Meeting

<b>Date(s) of Meeting:</b>	11./12. June 2015	<b>Location:</b>	Raum 331, Main Building University of Bern
<b>Minute Taker:</b>	K. Cann-Guthauser	<b>Doc ID:</b>	EGSIEM_Project_Meeting_Minutes_02072015

## Participants

EGSIEM Management	EGSIEM Consortium Members
A. Jäggi / UBERN (AJ) R. Dach / UBERN (RD) M. Weigelt / UL (MW) F. Flechtner / GFZ (FF) A. Güntner / GFZ (AG) J. Flury / LUH (JF) K.Cann-Guthauser / UBERN (KCG)	Ulrich Meyer / UBERN (UM) Andreja Sušnik / UBERN (AS) Y. Jean / UBERN (YJ) A. Maier / UBERN (AM) D. Arnold / UBERN (DA) J-M. Lemoine (JML) H. Zwenzner / DLR (HZ) S. Bourgogne / G&C (SB) T. van Dam / UL (TvD) Z. Li / UL (ZL) T. Bandikova / LUH (TB) C. Gruber / GFZ (CG) B. Gouweleeuw / GFZ (BG) B. Klinger / TUG (BK) A. Kvas / TUG (AK)
Distribution	
Scientific members of EGSIM	Ms. Ines Marin-Moreno / EC

### List of Annexes: Presentations from EGSiEM Members

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<b>EGSiEM Project Meeting, 11.&amp; 12. June 2015</b>		
<b>1</b>	<b>Welcome and purpose of Meeting [UBERN]</b>	
	<p>AJ (Project Coordinator) welcomes all to the first EGSiEM Project Meeting and explains the main purpose of the meeting;</p> <ul style="list-style-type: none"> <li>– Review progress made in the first half year of the project</li> <li>– Resolve existing uncertainties</li> <li>– Assess the initiated actions (and propose corrections if necessary)</li> <li>– Get prepared for upcoming milestones and deliverables</li> </ul> <p>Fix the two year GRACE reprocessing period – <b>now fixed as 2006/2007.</b></p>	

2	<b>Administrative Overview [UBERN]</b>	
	<p><i>Annex 01: WP1_Management_Ubern_Cann-Guthauser(KCG)</i></p> <p>KCG advised the consortium of the appointment of the Management Support Team, he advised beneficiaries on the payment schedule, the importance of timely submission of deliverables and gave some details on the upcoming Periodic Review (Jan-Feb 2016).</p>	
3	<b>Action Item Status and Upcoming Deliverables [UBERN]</b>	
	<p><i>Annex 02: WP1_Action Items &amp; Upcoming Deliverables_UBERN_Jäggi (AJ)</i></p> <p>AJ presented the next deliverables due, which are;</p> <ul style="list-style-type: none"> <li>– D3.1 Reference Frame Product Report (<b>UL</b>), M10 (October 2015)</li> <li>– D7.2 EGSIEM Brochure (<b>LUH</b>), M14 (February 2016) - target end of August 2015</li> <li>– D7.3 Teaser Lecture (<b>UBERN/LUH</b>), M15 (March 2016)</li> </ul> <p>It was agreed that D7.2 would now be made available by the end of August 2015, LUH would take the lead on this.</p> <p>Following discussions over D7.3 it was decided that it would be a good idea to host a teaser lecture earlier than 2016, a discussion would take place on Friday within the section on WP7 as to the content, duration etc.</p> <p>AJ also reviewed the outstanding action items from the Kick Off Meeting, these were mostly met, but the Analysis Centres (ACs) still needed to provide SINEX format gravity field information – see WP4 (RD). WP Leaders were also reminded to provide topics/titles for possible papers to be published within the framework of EGSIEM. Ideas to be forwarded to JF.</p>	<p><b>AI#007</b></p> <p><b>AI#006</b></p>
4	<b>WP2 Gravity Field Analysis [TUG]</b>	
	<p><i>Annex 03: WP2_E2E Simulator_GFZ (FF)</i></p> <p>The aim is to operate the MWI alongside a tech demo Laser Ranging Interferometer in GRACE FO, GFZ undertook a series of simulations which show that the LRI will only <u>slightly</u> improve results and the main objective is to continue the GRACE time series using the MWI. A paper on the topic has been submitted to Survey in Geophysics.</p> <p><i>Annex 04: WP2_K Band Data Screening_Ubern (UM)</i></p> <p>The work highlights a difference in K Band screening approaches followed by UBERN and the Center for Space Research, Austin, Texas (CSR) as evidenced by the data kindly provided by Srinivas Bettadpur who agreed to his data being released (currently seen by TUG &amp; UBERN) to the whole consortium. Currently there is a difficulty in extrapolating how CSR screen their data, FF said the solutions are of limited use without knowing how they screen the K Band data. FF would like to view the solutions and have an additional month to work with them. It was noted that Day 60-159 in 2003 GPS carrier phase residuals are significantly worse than other periods of GRACE data, UM checked the sequence of events but nothing is listed for a system problem at this time. UM also highlighted the problem of modeling of dynamic orbits which become more difficult owing to increased ionosphere activity.</p>	<p><b>AI#008</b></p>

<p><i>Annex 05: WP2_Preparation of NEQ and Product Proposal_TUG (BK)</i></p> <p>Hydrological users need to know what models they are using, TUG presented a proposal to provide GRACE solutions that contain the full signal, i.e. all background models should be restored consistently and that should be given in the CM frame. They also proposed the implementation of a new user interface/platform providing the gravity field solutions and arbitrary background models. The consortium was concerned that by providing data which still requires background modeling work is not providing a useful service for the hydrological user. FF proposed an average, weighted combination model (as per the proposal) with already subtracted background model. Also, he advised the consortium that many monthly solutions contain missing data, 15-18 days rather than 31. Therefore, removal/restoration of full monthly (30/31 days) background models may not be adequate for all months. Concerning the derivation of proper accuracy information, e.g. de-aliasing products do not come with accuracy information, which makes error propagation difficult. Could TUG implement solutions with everything included – AJ proposed that TUG had an opportunity to present their approach to be given at the next EGSiem meeting. TvD queried the approach of center of earth, saying that it should be center of figure, TUG replied that it was the user who would make the transition (centre of earth&gt;figure). TvD said this would not be thought of by hydrological users.</p>	<p><b>AI#009</b></p>
<p><i>Annex 06: WP2_FES2014-a new Global Tidal Model_CNES (JML)</i></p> <p>At the moment the new model is at the validation stage, it features twice as many nodes as FES2012. FES2014 model shows very good performances on the global ocean, in deep &amp; shallow waters and in the Arctic region. FES2014 is only available for the moment on request from the validation team (see presentation in annex). The official release is foreseen late 2015. The final validation results are due to be presented at the next OSTST (Oct. 2015), otherwise the release will be available at:  <a href="http://www.avis.altimetry.fr/en/data/products/auxiliary-products/global-tide-fes.html">http://www.avis.altimetry.fr/en/data/products/auxiliary-products/global-tide-fes.html</a></p>	<p><b>AI#010</b></p>
<p><i>Annex 07: WP2_Simulated recovery of various hydrological signals using real GRACE data at CNES (JML)</i></p> <p>JML introduced a new technique currently being developed at CNES (initial results are only two thirds ready), the technique relies upon re-computing a monthly GRACE solution using a perturbed version of previous results and real GRACE data, then comparing them solving using the same algorithm as for the original solutions and the re-computed perturbed solution. When simulations are completed, CNES needs to interpret the results in terms of: Shape, size and orientation of the test basins, amplitude of the perturbations, the Latitude and choice of the processing strategy.</p>	
<p><i>Annex 08: WP2_Acceleration Approach_Ulux (ZL)</i></p> <p>First results of the GRACE monthly solutions computed by the acceleration approach where presented. They show a similar quality as other solutions. Small degradations at low frequencies occur when compared to other solutions as shown in the presentation, which are currently under investigation.</p> <p>AJ asked whether pre-CHAMP fields could be used as a priori information to perform the data analysis.</p>	
<p><i>Annex 09: WP2_Status &amp; Plans RL05a-06_GFZ (FF)</i></p> <p>RL06 shall be published in 2017 (before launch of GRACE-FO) and will incorporate the following changes from RL05a: use of the latest background models &amp; standards e.g. a new AOD1B RL06, ..., improved data screening, changes in parametrization, and estimation of ACC scales throughout the entire time series. Other new versions of</p>	

	background models will also include e.g. ocean models as this is one of the problems in all RL05 time series (shown by center solutions inter-comparisons at GSTM2014).	
<b>5</b>	<b>WP3: Integration of Complementary Data [Li/van Dam]</b>	
	<p><i>Annex 10: WP3_3<sup>rd</sup> reprocessing campaign_Ubern (AS)</i></p> <p>The time span of the current reprocessing campaign is between January 1994 and December 2013, it incorporates GPS-only from January 1994 to December 2001 and GPS/GLONASS combined from January 2002 to December 2013. The number of stations reprocessed per day is between approx. 40 in 1994 and 270 in 2013 (based on 2<sup>nd</sup> reprocessing campaign). The first step was to complete necessary input data (RINEX observation files and a priori orbits from previous reprocessing campaigns, CODE operational processing and other AC's, the second step was to cross-check and complete station equipment changes for all stations between the period 1994-2013. SLR validation for three years, new SLR residuals from the replaced satellite (around day 200) show a mean shift in the results (around 3 cms) no definite reason was given for this shift.</p> <p><i>Annex 11: WP3_Establishment of a consistent reference frame_Ubern (AM)</i></p> <p>GNSS satellites have difficulties in mapping geocenter coordinates, therefore AIUB uses SLR observations to spherical satellites to generate weekly solutions which will be combined with the SLR data to GNSS satellites to generate solutions using space ties which are fully consistent to both measurement types. Because of the difficulties of estimating range biases from weekly solutions, UBERN produces multi-year solutions from 7 day NEQs/Microwave/LAGEOS (SLR) observations. This is ongoing work, and is purely an early innovative approach, not a defined product to be released to the community as yet.</p> <p><i>Annex 12: WP3_GNSS loading Validation_Ulux (ZL)</i></p> <p>Ubern to provide UL with gravity field solutions with uncertainties for at least a year. For normal usage, daily solutions provide sufficient data.</p> <p>UL would like to instigate a dedicated website for their service, interfaces for future systems will need to be incorporated somehow. Possible action point for next year as this is currently at an early developmental stage.</p> <p><i>Annex 13: WP3_Compilation of representative historical flood situations_DLR (HZ)</i></p> <p>To compare with GRACE Data, ZKI have obtained significant data from various German flooding events (2013, 2006, 2011), the question remains; how big does a flood have to be to register on GRACE? DLR to provide data and AG will formulate an action item over the required interfaces.</p> <p><i>Annex 14: WP3_Validation by OBP_GFZ (FF)</i></p> <p>FF gave a presentation similar to that at the KO Meeting in January 2015, validation will be automatized by the end of 2016 (project Month 24). Results will also be included in the G<sup>3</sup> (GFZ GRACE Gravity) Browser at ICGEM (another time series to various non-EGSIEM and EGSIEM GSMs and WGHM).</p>	<b>AI#011</b>



9	<b>WP5: NRT and Regional Service – [Flechtner]</b>	
	<p><i>Annex 18: Status and plans_GFZ (CG)</i></p> <p>CG presented the current plan for development of the Near Real Time service including indicative timeframes, as presented in Deliverable 5.1. The current iteration of the NRT Concept gives little time for evaluation of the NRT results, Hydrological evaluation data would be difficult to acquire in such a timeframe (+4.5 days). CG proposed constructing anisotropic covariance functions, he also proposed subtraction of the reference model (monthly updated) and asked whether we need the introduction of reference stochastics for a better process noise estimation? One of the next steps will be a further convergence of the regularized solutions with the monthly (SDS) fields (without regularization), and beginning work on purely regional solutions.</p> <p><i>Annex 19: WP5_NRT @ TUG (AK)</i></p> <p>NRT is implemented according to D5.1 using L1B data and final GPS products, the GRACE time series starting from 2006 is currently being processed at TUG. The primary focus is on the impact on solutions of NRT strategy compared to post processing, and finding software bugs and generally improving the system robustness. There is also work being undertaken on the adaption of kinematic orbit processing to rapid products. AK uses different process noise models for 6h time series, then passes them through a Kalman filter. TUG plans to reprocess their time series using rapid GPS data, and working towards (provisional) service operations resulting in D5.2.</p>	
10	<b>WP6: Hydrological Service – [Güntner]</b>	
	<p><i>Annex 20: WP6_Hydrological Service_GFZ (BG)</i></p> <p>The university of Colorado’s Dartmouth Flood Observatory database will be expanded to include hydrological data by GFZ. BG will spend time in Bonn in 2016 to work with J. Kusche’s group on assimilation of GRACE daily data into WGHM. Such a move will require a cooperation agreement/SLA. The JRC European Drought Observatory is a good candidate for including a GRACE based drought indicator. JML to include Altimetry data to be added within WP3 as an extra evaluation element at the next meeting.</p> <p>Can GRACE daily water basin products (for selected areas) be used as flood indicators? From looking at the historical data from the Ganges basin, the solutions mirror water levels, but in the Elbe example the GRACE data misses the (peak) floods in 2006/11. For floods in 2006/2007 in the Lower Mekong the GRACE signal experiences a delay, compared to observed river flow at the basin inlet, but not compared to flood volumes from a hydrodynamic model more downstream. There was a proposal that TUG investigates the effect of different constraints on their daily GRACE solutions. The longer term memory of GRACE TWS gives scope for added value to multivariate indices and there have been encouraging preliminary results for daily GRACE product in terms of sensitivity to individual flood peaks</p> <p><i>Annex 21: WP6_Flood Mapping-from semi-automatic tools to fully automatic services_DLR (HZ)</i></p> <p>HZ gave a presentation on the difficulties faced when using various satellite data (SAR and optical) to record flooding, SAR based flood detection has many challenges, items such as roads, clouds, sand dunes etc can all be confused with flooding ( represented as dark areas). HZ described the MODIS Flood Service and TerraSAR-X flood service. He also discussed planned improvements which will come when the Sentinel1b is launched in 2016. It is planned that every point on earth will be radar mapped every 6 days, data processing capabilities will therefore have to be increased and automated owing to the</p>	

	large amounts of data coming from Sentinel(s). Automation still needs to take place to produce flood masks. Automatic flood mapping via Sentinel1 (a,b) will be incorporated within EGSiEM. A question was raised by JML to give SAR data in 3D models, HZ replied that this was because of difficulties experienced with vegetation and flooding.	
<b>11</b>	<b>WP7: Dissemination and Exploitation [Jäggi]</b>	
	<p><i>Annex 22: WP7_Dissemination and Exploitation_UBERN (AJ)</i></p> <p>KCG briefly showed some Google Analytic usage statistics for egciem.eu to the consortium, it was agreed that these would be summarized and distributed to all within the next weeks. TvD requested that KO meeting presentations should be hosted on our website. A general discussion took place over upcoming items for the EGSiEM newsletter, TB will circulate a revised draft asking for specific contributions for the next deadline in July. A subscription button for the Newsletter was to be incorporated on the front page of the project website (UBERN).</p> <p><i>Annex 23: WP7_EGSiEM Plotter_G&amp;C (SB)</i></p> <p>SB displayed the updates which have been incorporated into the EGSiEM Plotter since the demo version (proposal and Kick Off Meeting) which include:</p> <ul style="list-style-type: none"> <li>- Integration into the EGSiEM website, and addition of GRACE data from every group: UBERN, CNES, CSR, GFZ, JPL, TUG.</li> <li>- Gravity functionals now also include geoid heights and spherical harmonic coefficients, in addition to equivalent water heights. All data can be plotted on the same graph, with a possible application of bias and scale on the series.</li> <li>- It is now possible to calculate regressions on time-series, from standard linear to parabolic to periodic to the more sophisticated "Advanced" which includes polynomial and modulated annual and semiannual components. It is also possible to display the components of the regression, which is very useful to see the subtle variations of the annual amplitude and phase over the years.</li> <li>- Numerical data is provided in full details and downloadable in one click.</li> <li>- Predefined hydrological basins will be completed to a number of over 200.</li> </ul> <p>A section providing information as well as help bubbles will be added in the next few weeks. The website was to show the impact of the filters on the Sumatran earthquake. Other improvements to the Plotter are planned later in the life of the project.</p> <p><i>Annex 24: Dissemination_LUH_Flury (JF)</i></p> <p>JF provided various suggestions for teaser lectures; a video or cartoon to start off teaser lectures, pose the audience some straightforward questions, it should be around 55 mins duration, have many pictures and be aimed at high school students. JF will circulate his Saturday morning lecture as means of collecting ideas, all groups to contribute similar event presentations, to act as a resource pool. LUH currently host a summer school at the Physikzentrum Bad Honeff in Germany:</p> <p><a href="https://www.dpg-physik.de/dpg/pbh/anfahrt/anfahrt.html?lang=en">https://www.dpg-physik.de/dpg/pbh/anfahrt/anfahrt.html?lang=en</a></p> <p>Local accommodation costs could be covered by the attached Foundation, however planning needs to start two years in advance – deadline in fall 2015 for 2017. In terms of widening interest it was felt that there were little audio visual aids available to the Geodesist at the moment, TvD agreed to investigate costs and timeframes of updating videos for GRACE/EGSiEM – any ideas or information to be sent to TvD.</p>	<b>AI#015</b>



	<p><i>Annex 25: WP7_Student Competitions_LUH_Bandikova (TB)</i></p> <p>University undergrads would be the better audience owing to age restrictions, something needs to be offered to students as a prize to attract interest. Egsiem.eu will need updating to include a registration portal and questionnaire hosting, to be instigated by the end of this year.</p>	
<b>13</b>	<b>Meeting Review [Jäggi]</b>	
	<p>AJ asks for input from the WP managers to set up a publication plan. He reminds everyone that papers on EGSiEM topics should be announced to all consortium members, wherever possible, within 45 days of publication and announced the three paper ideas from UBERN.</p> <p><i>Next meeting:</i></p> <p>Location to be confirmed (probably Luxembourg), but the next meeting of the EGSiEM General Assembly will take place on 18. &amp; 19. January.</p>	<b>AI#006</b>

<b>Action Item Status List (open and new AI's)</b>				
<b>A.I.</b>	<b>Originator</b>	<b>Actionee</b>	<b>Action Description</b>	<b>Due Date</b>
006	EGSIEM	WP Managers	Collect ideas for paper topics to set up a publication plan	31.05.2015
007	EGSIEM	LUH	EGSIEM Brochure	31.8.2015
008	EGSIEM	UBERN, TUG	Send slides of UBERN and TUG investigations about the analysis of the CSR data screening to Srinivas. Ask for more details about the screening procedure and for an additional, more problematic month of data.	30.06.2015
009	EGSIEM	TUG	Further elaborate on the proposal to add back the monthly mean of all gravitational accelerations reduced during the processing before combination by numerical examples. Explain why background models should be added with a mean over the entire month, even if there are data gaps.	31.12.2015
010	EGSIEM	CNES	Clarify the availability of FES2014 for the EGSIEM ACs	30.06.2015
011	EGSIEM	GFZ (AG), DLR, CNES	Establish the interfaces between ZKI, Hydrology, and CNES to clarify the possibility to derive flood volumes and the potential role of altimetry (Hydroweb).	30.09.2015
012	EGSIEM	EGSIEM ACs	Each AC to provide a test SINEX file of a monthly GRACE solution (NEQ information).	31.07.2015
013	EGSIEM	GFZ (FF), UL, GFZ (AG)	Compile a list of EGSIEM L3 products Compile a list of sources for degree 1 terms and C20	30.09.2015
014	EGSIEM	CNES	Validation of GRACE solutions over oceans using altimetry and ocean surface topography	31.12.2015
015	EGSIEM	UL	Check availabilities of GRACE movies and possibilities (persons) to update them	31.12.2015