



EGSIEM Minutes



EGSIEM Project Meeting

Date(s) of Meeting:	2. -3. June 2016	Location:	GFZ Helmholtz Centre, Potsdam
Minutes Taken by:	K. Cann-Guthauser	Doc ID:	EGSIEM_PM_Jun2016_Minutes

EGSIEM Management	EGSIEM Consortium Members
A. Jäggi / UBERN (AJ)	U. Meyer / UBERN (UM)
F. Flechtner / GFZ (FF)	Y. Jean / UBERN (YJ)
A. Güntner / GFZ (AG)	J.M. Lemoine / CNES (JML)
T. Mayer-Gürr / TUG (TMG)	H. Zwenzner / DLR (HZ)
J. Flury / LUH (JF)	S. Martinis / DLR (SM)
K. Cann-Guthauser / UBERN (KCG)	S. Bourgogne / G&C (SB)
	A. Shabanloui / LUH (AS)
	C. Gruber / GFZ (CG)
	B. Gouweleeuw / GFZ (BG)
	Z. Li / UL (ZL)
	Q. Chen / UL (QC)
	B. Klinger / TUG (BK)
	A. Kvas / TUG (AK)
	M. Weigelt / BKG (MW)
	<i>L. Poropat / GFZ (LP) - Guest</i>

List of Annexes: Presentations by members of EGSiEM

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Agenda Item Nr.	EGSIEM Project Meeting, June 2016	Action Item
1	<p>Welcome Introduction (FF & AJ)</p>	
	<p>Annex 01: Welcome (Flechtner)</p> <p>FF welcomed all to GFZ and Telegrafenberg, he gave an overview of GFZ and its activities and reminded those present of plans for dinner.</p> <p>Annex 02: Upcoming Deliverables (Jäggi)</p> <p>AJ talked through the upcoming Deliverables and Milestones and reminded all of the relevant dates. He also discussed the outstanding Action Items and was able to declare several as complete (see list at the end of the last EGSIM General Meeting Minutes, and updated table at the end of this document).</p>	
2	<p>Administrative Overview (KCG)</p>	
	<p>Annex 03: WP1 Management Update (Cann-Guthauser)</p> <p>KCG presented feedback on the first periodic report and review meeting that took place in Brussels on 7. March 2016. There followed a short discussion on the importance of 'licensing' data and products generated by the project (as highlighted in the review).</p> <p>KCG to feed back at the next meeting on a draft plan to handle data produced by EGSIM.</p>	AI#021
3	<p>WP2 Gravity Field Analysis (TMG)</p>	
	<p>Annex 04: WP2 Introduction (Mayer-Gürr)</p> <p>TMG introduced the work being undertaken at the ACs</p> <p>Annex 05: WP2 NEQ Level (Meyer)</p> <p>UM presented the tests he had undertaken on the EGSIM solution standards used, these were very similar to the presentation given in LUX.</p> <p>Annex 06: WP2 Level 2 Products at GFZ (Flechtner)</p> <p>FF talked through work undertaken at GFZ, including the new release AOD1B RL06</p> <p>CG gave input on the promising stochastic modelling approach, accelerometer observations show the best improvement so far. GFZ would not be happy if the combination in WP4 would only be performed once with data provided till June 30. GFZ would instead prefer to repeat the combination with more evolved 2006/07 solutions e.g. every 6 months and to present updated results at the next Meeting.</p> <p>JF advised all of possible L1B data Star Camera problems from JPL – the data has a bug which has recently been discovered. There seems to be no effect on the L2-solutions.</p> <p>Annex 07: WP2 Improved Processing Tools (Klinger)</p> <p>BK gave a presentation on Accelerometer Calibration – advised on existing problems (such as sensitivity to temperature) however, using Scale factor matrix approach the C20 results are improved (compared to CSR) with regards to SLR data.</p>	

	<p><u>Annex 08: WP2 GRACE Processing at CNES (Lemoine)</u></p> <p>JML presented work undertaken at CNES, they have computed time series from 4 SLR satellites from 2002-16 which will be supplied to the consortium, their latest release (CNES RL03 v2) shows improved performance at the poles. Discussion ensued over the use of filters in solutions – JML said that he would like to include constrained solutions somehow – though this would be almost impossible to include in the combined solution.</p> <p><u>Annex 09: WP2 Rigorous Acceleration Approach (Li)</u></p> <p>ZL has been attempting to follow the rigorous solution approach, based on Jäggi et al 2007, ZL also asked for some input in solving difficulties – MW asked the consortium for integrated orbit data with which to compare the rigorous approach. AJ suggested some useful orbits to compare against products and UM said that he would prepare data to be sent to ZL for comparison purposes.</p> <p><u>Annex 10: WP2 TUG AOD1B Release 5.9 (Mayer-Gürr)</u></p> <p>TMG proposed all ACs compute and provide the monthly mean of all background models adopted. TG queried the use of tide data, TMG answered that tides are also mass transport signals which can be investigated by GRACE gravity field solutions.</p> <p>Before opening the discussion on reprocessing data TMG made the case for working on Level 2 data. TMG argued that there is no compelling reason why EGSiEM uses some models (Total mass change) and by the proposal there is a clear separation between observations and models, solutions from ACs are comparable & combinable.</p> <p>UM & AJ supported provision of monthly tidal mean models. FF supported the approach, but would advise implementation on a ‘step by step’ basis, starting at a GRACE science team meeting. AJ suggested providing presentations at the next project meeting. MW proposed writing a statement of intent. PD & JF raised concerns over the new L2 product on the Hydrological community – TMG responded that it would be possible to ‘leave out’ the new products. AG expressed his view that the higher processing (the ‘cook book’ approach) necessary with L2 products may put Hydrologists off this source.</p>	
4	<p>WP3 Integration of complementary data (QC)</p>	
	<p><u>Annex 11: WP3 Progress Report at UL (Chen)</u></p> <p>QC gave an update on progress in WP3, then talked about GNSS validation, following a comparison between 949 GNSS stations and the GRACE-derived displacements, where the EGSiEM solution shows the best agreement with the ITRF2014 solution. With respect to 394 common GNSS stations from JPL, SOPAC and ITRF2014, EGSiEM performed as well as CSR RL05 and better than GFZ and JPL GRACE solutions.</p> <p>FF questioned the access to hydrological solutions for NRT validation</p> <p><u>Annex 12: WP3 GNSS reprocessing campaign at AIUB (Jäggi/Sušnik)</u></p> <p>The GNSS reprocessing campaign at AIUB has been expanded to include all years, in case any members want to undertake gravity field determinations outside 2006/7 (requires coordinates and ERPs).</p> <p>Years 2006/7 are available at:</p> <p><u>http://dl.aiub.unibe.ch/data/egsiem/private/Repro-15/YYYY/CLK</u></p> <p>GNSS Satellite clocks (RFPHYydd.CLK - 30 second, high-rate products and</p>	

	<p>RFPYydd.CLK -5 second, ultra-high-rate products): http://dl.aiub.unibe.ch/data/egsiem/private/Repro15/YYYY/ORB</p> <p>GNSS Orbits (RFPydd.PRE) and Earth rotation parameters (RFPydd.ERP): Annex 13: WP3 SLR processing at AIUB (Jäggi/Meier)</p> <p>SLR processing C20 series from SLR seem to be biased when compared to other series, currently being investigated, this maybe related to the combination of normal equations of several artefacts as LAGEOS only satellite solutions are closer to other SLR solutions.</p> <p>JML also reported a problem in degree 4. Annex 14: WP3 CNES SLR processing (Lemoine)</p> <p>CNES have also been looking at SLR data (5 day arcs), the main difference has been in Degree 4. CNES weighted their SLR by a factor of 3.</p> <p>Annex 15: WP3 CNES Altimetry Study (Lemoine)</p> <p>Altimetry as a different validation solution gives an exact method of calculating water height, JML took two methods to calculate altimetry (Caspian Sea/Zapiola Gyre point wise and Octagon) The best results stemmed from the Zapiola Gyre, which showed an 80% correlation coefficient.</p> <p>CNES will make these two areas open to all.</p>	
5	<p>WP4: Scientific Service (UM)</p>	
	<p>Annex 16: WP4 AIUB Combination Progress (Jean)</p> <p>YJ described the work undertaken in WP4 at AIUB. TMG highlighted the processes which need to be added/subtracted from each solution (Hydrology/Cryology/GIA...) to provide the combined solution. UM invited comments on the combined solution:</p> <p>Regarding error level TMG said it would be better to plot the square root</p> <p>Annex 17: WP4 GFZ Level 3 Products (Flechtner)</p> <p>FF introduced a preliminary approach to generate lan, ocean, ice and solid Earth Level 3 products under development in the GRACE-FO SDS at GFZ - Ingo Sasgen at Alfred Wegener Institute (as new co-funders of GRACE-FO) will be responsible for L3/4 ice products.</p> <p>TMG: Degree 1 coefficient differs over land and water</p> <p>General discussion about the importance of involving decision-makers</p> <p>AJ proposed another meeting of the Level 3 product working group regarding future use of L2/3 products.</p> <p>Action Item: FF to inform EGSIM about the future generation of L3 products at the next GRACE user meeting.</p> <p>Annex 19: WP4 NEQ combination at AIUB (Meyer)</p> <p>UM reported on the normal equation level combination activities being undertaken at AIUB. Providing the monthly mean of all background models in the SOLUTION/APRIORI block of the SINEX files would make the solution independent of the models used by the individual ACs and give the user the choice of which models to use.</p>	AI#022

Degree 1 terms: SB – Fix Degree 1 to 0 or invert them and pre-eliminate from the solution.

TMG: In this approach of combination the degree wise scaling calibration of formal errors is not included, UM considered this but was not sure how to best scale the degree wise signal. Applying calibration of formal errors to all solutions would be fairer. FF said that weighting of GFZ solution seemed a little unfair given the similar formal errors in both the GFZ & AIUB NEQ solutions, UM pointed out that not only the formal errors but also the number of observations is reflected in the weights (GFZ is using the original GPS phases leading to almost three times more observations compared to kinematic orbits; this fact has also to be balanced by the empirical weights).

[Annex 18: WP4 Improving Level 2 Products \(Mayer-Gürr\)](#)

TMG proposed additional data to be included within EGSIM L2 products and that the Geocenter information should be provided, hydrological models should also be included (no need to handle different degree 1 terms, but different grids).

<i>UM described the proposed product as:</i>		
Coefficients	Level 2	Level 3
Total (including degrees 1+2)		
AOD-(A/O)		
A-Tides		
O-Tides		
H		
GIA		

Temporal average: current Monthly mean (GAA + GAB) is averaged over months (Day 1-31) for which GRACE has data. TMG proposed that the ‘simpler’ version of calculating a monthly mean should be used by all members.

Proposal of a new definition
 Average over the complete month

$$\bar{c}_{nm} = \int_{t_0}^{t_1} c_{nm}(t) dt$$

MW/AJ advised that figures should be produced to see if there is an acceptable error rate when using the simpler method of calculating days of GRACE data

Action Item: TUG to compare between the two methods to see if there is an ‘acceptable’ level of missing data when using the new definition (see above).

AI#023

End of Day One

6	WP7: Dissemination and Exploitation (AJ)	
	<p>Annex 20: WP7 Student Competition (Shabanloui)</p> <p>AS announced that the EGSiEM challenge will start on 1st October (and should last for 3 months), he presented a proposed section of 20 questions to the consortium ('pass' rate is c.75%) and asked for feedback on these round one questions by 15. June, otherwise they would go forward as is. AS asked for assistance from AIUB in best incorporating the competition within egsiem.eu and in hosting an additional url for the competition. A number of methods were discussed on how best to advertise the competition including social media and a Europe-wise geodesy database developed at LUH.</p> <p>Action Item – UBERN to secure url egsiem.challenge.eu</p> <p>MW queried the amount of time necessary for students to complete the questions. AJ requested large format posters to be produced for display on notice boards</p> <p>Annex 21: WP7 Copernicus visibility (Jäggi)</p> <p>EGSiEM has recently been involved in events for the EO work program 2018-20, Copernicus user survey should be completed by all institutions (Link). AJ asked the general question of how to target Copernicus events to promote gravity as an area for future funding and mission targeting. Could we develop a gravity teaser talk? The public talk given by AJ in Bern is available for use by all at http://egsiem.eu/images/static/BlogEntries/PhysikamFreitag/PhysikamFreitag_Jaeggi_w eb.pdf</p> <p>MW had also previously disseminated a link to the same questionnaire, please complete it and include here whatever you feel is necessary for future funding. His second point (endorsed by AJ) was to promote EO with the local EU 'Space' National Contact Point.</p> <p>The consortium then briefly discussed the list of possible EGSiEM themed-sessions at conferences (see Agenda) and it was felt that a GRACE science team meeting dedicated session could be possible, otherwise an EGU session could easily be absorbed into a session on Gravimetry.</p> <p>Annex 33: WP7 EGSiEM Plotter (Bourgoqne)</p> <p>SB gave a demonstration of 2 new modules of the EGSiEM Plotter for better presentation, all filtered by DDK5. The results can be tailored later for EGSiEM. Statistics module can be amended to plot other data, current plots available are altitude/distance between satellites etc. JML asked about the possibility to export images - these can be simply cut and pasted. Picture generation is not dynamic.</p> <p>Next steps: saving configuration for next visit (via link generation).</p> <p>Annex 22: WP7 Mass Change - EGSiEM (Weigelt)</p> <p>MW – gave feedback on some recent meetings he attended, the main message was that our language needs to be less inclusive, and to show how (in clear language) EGSiEM can help. Global Earth Observation (GEO) is an umbrella organisation which is preparing a response to the EUs question about how to fund future research at which MW presented EGSiEM.</p> <p>Annex 23: WP7 GRACE Videos (Chen)</p> <p>QC presented a list of videos available based on GRACE in response to Action Item 015.</p>	AI#024

	<p>Annex 24: WP7 Summer School (Jäggi)</p> <p>AJ gave the group feedback on the recent unsuccessful application to the WE Heraeus Stiftung, it may be possible to submit once more to the Stiftung but AJ asked those present for any possible alternatives. It was also mentioned that EGU offer half day training sessions (short courses), perhaps this could be a session on EGSiem products student for student training?) the <u>possible</u> deadline for proposals was announced as 31. July</p>	
7	<p>WP5: NRT and Regional Service (FF)</p> <p>Annex 27: WP5 Status Report TUG (Kvas)</p> <p>Different GNSS products do not have a large impact on the NRT products. Current Gridded total water storage products have a latency of 4 months. In seasonal data small deviations currently exist, which may impact on the hydrological service. Area Mean Value AG: Basin average. As automated as possible interfaces are still to be defined for the validation process and hydrological service notification, Software packages for NRT operations are implemented for MS3-</p> <p>Annex 28: WP5 Status and Milestones (Gruber)</p> <p>CG – AOD1B data available in 3 days currently. Radial Basis Function (RBF) has been successfully implemented, still awaiting a ‘handshake’ program. FF - L1B data source needs to be confirmed, CG to email JPL (Gerhard Kruizinga) to make data available to TUG. Daily solutions will shortly be available at ftp://egsiem@gfzop.gfz-potsdam.de</p> <p>FF Grid comparison between CG/AK – to be taken up online.</p> <p>Annex 29: WP5 Some questions (Flechtner)</p> <p>FF initiated a discussion based around some questions he had:</p> <p>AMVs – MW asked where to document this standard, Concept of NRT Service seemed to be the best fit (submitted already) but it should be possible to update this document.</p> <p>Historical Flood Events – is it possible to update the amount of flood event examples used?</p>	
8	<p>WP6: Hydrological Service – (AG)</p> <p>Annex 30: WP6 Seasonal forecasting (Güntner)</p> <p>AG updated the stream flow forecasting in central Asia by including GRACE water storage anomalies, for 2003-14 GRACE solutions combined with precipitation models produce the best results – the combined EGSiem solution and ‘natural’ model was the 7th best predictor (based against observation data). A combination of 3 predictors improves forecasting to around 90%.</p> <p>Annex 31: WP6 Basin comparison (Gouweleeuw)</p> <p>BG Daily GRACE gravity solutions track major flood events in the GB delta, a paper is currently under review, Gouweleeuw et al 2016. Reviewers wanted more quantitative analysis (which was not included in the paper) Brahmaputra observation shows closer relationship between the Water Gap model and GRACE data</p>	

	<p><u>Annex 32: WP6 DLR Flood volume (Zwenzner)</u></p> <p>HZ Water level data integration is causing problems, probably due to inconsistencies between the flood mask and Digital Elevation Model (DEM). Grid cell size of 50km (with 15% cell 'loss') was found to give the best coverage – this was used in the Meghna basin investigated also by GFZ. ENVISAT coverage is too narrow when compared to GRACE.</p> <p>CG asked whether the volume estimation could be automated, HZ replied that there were still a lot of manual steps involved.</p> <p>BG resumption, Flood and Drought Indicator showing good results in Ganges-Brahmaputra (however it also shows significant noise over the Sahara).</p> <p>AG Possible approach may be to develop a basin-based calculation, rather than the pixel-based approach. CG asked whether GIA was removed, it is not hence why there is a large signal near ice sheets in the TWSA model. MW – it may be worth de-trending the time series.</p>	
9	Closing comments (AJ)	
	<p>Next (General) meeting to be held in Bern on the days of 19. & 20. January 2017.</p> <p>AJ thanked GFZ for hosting the meeting and everyone else for their input.</p>	

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Action Item Status List (open and new AI's)				
A.I.	Originator	Actionee	Action Description	Due Date
006	EGSIEM	WP Managers	Collect ideas for paper topics to set up a publication plan	Continuous
017	EGSIEM	TUG	TMG to provide a plan for the removal or restoration of background models	02.06.2016
018	EGSIEM	UBERN	SLR processing standard text will be added to Deliverable 2.1	02.06.2016
019	EGSIEM	UBERN	UBERN to draft a plan on how to incorporate SLR data and how to welcome new contributors.	02.06.2016
020	EGSIEM	UL	Submission plan to be created for dedicated sessions at conferences (see Task 7.5)	31.3.2016
021	EU REA /EGSIEM	UBERN	Present work undertaken on DOI numbers (at UBERN & GFZ) and draft Data Plan.	20.01.2017
022	EGSIEM	GFZ/FF	Consortium to be informed about the future generation of L3 products at the next GRACE user meeting.	31.10.2016
023	EGSIEM	TUG	Data collection exercise using simplified monthly GRACE day calculation (Monthly Mean comparison)	30.06.2016
024	EGSIEM	UBERN	Secure EGSIM Competition URL	30.06.2016