

GeoGravGOCE

***Geoid and Gravity Field Modelling by
GOCE Satellite Gradients
and Terrestrial Data***

WP 1: Project management
TSK1100: Financial and administrative management

DELIVERABLE
DL1110.1: Minutes of the kick-off meeting

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Abstract

This report refers to management activities of the GeoGravGOCE project and more precisely to the minutes of the kick-off meeting. During the kick-off meeting, the entire research team has been updated on the project status and the obligations in terms of the work that needs to be carried out and the time of the various Deliverables. Moreover, stress was put on the actions that are foreseen during the first six months of the project.

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Acronyms

DL	Deliverable
EFRF	Earth Fixed Reference Frame
ES	Earth Surface
FIR	Finite Impulse Response
GGMs	Global Geopotential Models
GRF	Gradiometer Reference Frame
GSRT	General Secretariat for Research and Technology
HFRI	Hellenic Foundation for Research and Innovation
IIR	Infinite Impulse Response
IRF	Inertial Reference Frame
LNOF	Local North Oriented Frame
LS	Least Squares
LSC	Least Squares Collocation
MC	Monte Carlo
MIMOST	Multiple Input Multiple Output System Theory
MO	Mean Orbit
MRA	Multi-Resolution Approximation
PSD	Power Spectral Density
RTM	Residual Terrain Model
SA	Simulated Annealing
SGG	Satellite Gravity Gradiometry
SISOS	Single Input Single Output System
TSK	Task
WL	Wavelet
WP	Work Package
WPS	Work Package Structure
w.r.t.	with respect to

1.

GeoGravGOCE project kick-off meeting

1.1 Outline of the deliverable

This report refers to management activities of the GeoGravGOCE project and more precisely to the minutes of the kick-off meeting. During the kick-off meeting, the entire research team has been updated on the project status and the obligations in terms of the work that needs to be carried out and the time of the various Deliverables. Moreover, stress was put on the actions that are foreseen during the first six months of the project.


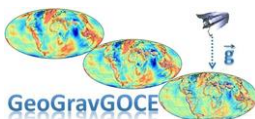
1.2 Kick-off meeting agenda and participants

During the first month of the GeoGravGOCE project, mainly contractual activities with respect to signing the contract (HFRI project #3488) with GSRT have been carried out. Given that, the project kick-off meeting has been scheduled and held on January 8, 2020. The agenda included a briefing on the current status of the project and the immediate work that needs to be done. All project team members participated in the kick-off meeting, with the attendees being: a) Prof. Ilias N. Tziavos, Principal Investigator of the Project, b) Dr. George S. Vergos, Co-Investigator and c) Dr. Vasilios N. Grigoriadis.

The discussion was opened by Prof. Tziavos, who first congratulated everybody on the successful project proposal and stressed the tight schedule of the foreseen activities. He mentioned that the proposed work is at the front line of geodetic research and that the foreseen results, upon completion of the DLs, should compose novel research. He then passed the floor to Dr. Vergos in order to present the details of the foreseen actions, the responsible for each action and the DLs that should be prepared.

Dr. Vergos, repeated in detail the WPs, TSKs and DLs of the project, as shown in the signed contract with GSRT, reporting in each one the person in charge as well as the team members that will be involved. Below is a summary of the TSK and DLs presented with details on the project team members; responsibilities.

Table 1: Activities and DLs of GeoGravGOCE TSK1100.

PROJECT: GeoGravGOCE		WP: 1	TSK1100
 HFRI. Hellenic Foundation for Research & Innovation		Ref: Con. Nr. 3488 Version: 1.0 Date: 1.21.2020 Page: 15/22	

Task Title: Financial and Administrative Management		Personnel: Tziavos, RA1,RA2
Responsible: GeoGrav	Person in charge: GS Vergos	
Beginning: 0 th month	End: 24 th month	
Summary of activities: TSK1000 covers all management activities to be undertaken during the entire duration of the GeoGravGOCE project. Prof. I.N. Tziavos, acting as the Project Leader will be responsible for the daily financial monitoring of the project and its administrative management. This Task includes also the organization of the kick-off, semi-annual, final meetings of the project and the preparation of meeting minutes.		
Actions:		
1110	Financial management of the project	
1120	Administrative management of the project	
1130	Kick-off, semi-annual and final meeting organization	
1140	Preparation of the meeting minutes	
Output (deliverables):		
DL1110.1	Minutes of the kick-off meeting	
DL1110.2	Minutes of the final meeting	
DL1120.1	Financial reporting of the project	

Table 2: Activities and DLs of GeoGravGOCE TSK1200.

PROJECT: GeoGravGOCE		WP: 1	TSK1200
Task Title: Reporting and action list update		Personnel: Tziavos, RA1,RA2	
Responsible: GeoGrav	Person in charge: G.S. Vergos		
Beginning: 0 th month	End: 24 th month		
Summary of activities: This task refers to all reporting activities to be undertaken by the project, i.e., the preparation, production and dissemination of semi-annual progress reports to GSRT as well as the update of the Action List and the bar-chart maintenance with all work carried out by the project. Finally, this Task includes all necessary interaction with the GSRT officers for the GeoGravGOCE project planning and on-going progress.			
Actions:			
1210	Progress reporting		
1220	Action list and bar-chart maintenance and updating		
Output (deliverables):			
DL1210.1-DL1210.3	Semi-annual progress reports		
DL1220	Final project report		
DL1230	Project action list		
DL1240	Project bar-chart		

Table 3: Activities and DLs of GeoGravGOCE TSK2100.

PROJECT: GeoGravGOCE		WP: 2	TSK2100
Task Title: Data collection, archiving, and homogenization		Personnel: Tziavos, Vergos, RA1, RA2	
Responsible: GeoGrav	Person in charge: I.N. Tziavos		
Beginning: 0 th month	End: 3 rd month		
Summary of activities: The objective of this task focuses on the collection, archiving and homogenization of all available satellite and terrestrial data needed for the Greece-wide geoid evaluation. These data refer to: a) free-air gravity anomalies over Greece; b) GOCE and GOCE/GRACE derived GGMs; c) DTM and DBM models for the evaluation of topographic effects; d) GNSS/Leveling data and e) GOCE SGG observations. Moreover, within this WP measurement campaigns will be conducted to collect GNSS data at selected trigonometric BMs.			
Actions:			
2110	Local gravity data		
2120	Local GNSS/Leveling data		
2130	Global Geopotential Models		
2140	Topography/Bathymetry Models		
2150	GOCE raw SGG data		

Output (deliverables): DL2110	Report on the data collected for GeoGravGOCE realization
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Table 4: Activities and DLs of GeoGravGOCE TSK2200.

PROJECT: GeoGravGOCE		WP: 2	TSK2200
Task Title: Measurement campaigns		Personnel: Tziavos, Vergos, RA1, RA2	
Responsible: Geograv	Person in charge: I.N. Tziavos		
Beginning: 6 th month	End: 12 th month		
Summary of activities: The main objective of this task is to determine the measurement campaigns. This task will be conducted to collect GNSS data at selected trigonometric BMs.			
Actions:			
2210	Measurement campaigns		
Output (deliverables):			
DL2210	Report on the performed GNSS campaigns and data processing.		

Table 5: Activities and DLs of GeoGravGOCE TSK3100.

PROJECT: GeoGravGOCE		WP: 3	TSK3100
Task Title: GOCE SGG frame transformation and GGM evaluation		Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis	
Responsible: Geograv	Person in charge: I.N. Tziavos		
Beginning: 4 th month	End: 14 th month		
Summary of activities: The objective of this task is to determine the transformation of the GOCE gradients from the GRF to the IRF, then to the EFRF and finally to the LNOF. Within this WP we will also investigate with of the latest GOCE GGMs, namely DIR/TIM/SPW/GOCO R5 provides the overall best spectral performance and residuals relative to the GNSS/Leveling data, so as to use it as reference for the SGG filtering.			
Actions:			
3110	GOCE SGG transformation from GRF to LNOF		
3120	GOCE GGM evaluation in spectral domain and with GNSS/Leveling		
Output (deliverables):			
DL3110	Report on the GOCE SGG data to the LNOF		

Table 6: Activities and DLs of GeoGravGOCE TSK3200.

PROJECT: GeoGravGOCE		WP: 3	TSK3200
Task Title: GOCE SGG filtering		Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis	
Responsible: Geograv	Person in charge: I.N. Tziavos		
Beginning: 4 th month	End: 14 th month		
Summary of activities: The objective of this task refers to the testing of various spatial and digital filters to the SGG data and the application of WL MRA for the gradients decomposition.			
Actions:			
3210	Spatial filtering		
3220	Digital filtering		
Output (deliverables):			
DL3210	Report on the filtering methods		

Table 7: Activities and DLs of GeoGravGOCE TSK3300.

PROJECT: GeoGravGOCE		WP: 3	TSK3300
Task Title: Software and GUI development Responsible: Geograv Beginning: 4 th month		Person in charge: I.N. Tziavos End: 14 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This work package refers to the activities that will be carried out in the frame of the proposed GEOGRAVGOCE project for the development of open access software for the GOCE frame.			
Actions: 3310 Code development 3320 GUI build-up			
Output (deliverables): DL3310 Report on the GOCE SGG transformation software			

Table 8: Activities and DLs of GeoGravGOCE TSK4100.

PROJECT: GeoGravGOCE		WP: 4	TSK4100
Task Title: MIMOST methodology development Responsible: Geograv Beginning: 3 th month		Person in charge: I.N. Tziavos End: 18 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This task focuses on the reduction of the filtered GOCE SGG data from the orbit level to a MO and then to the ES. MC annihilation together with MIMOST will be used for the downward/upward continuation. MC is used in combination with MIMOST to iteratively downward continue and convert all six GOCE SGGs to gravity anomalies on the global geoid and further to refine the local/regional geoid. The goal is the resulting SGG-derived gravity anomalies to provide overall minima w.r.t. a reference GGM, which will be XGM2017.			
Actions: 4110 MIMOST theoretical development for gradients 4120 Software development for MIMOST application			
Output (deliverables): DL4110 Methodology for GOCE SGG upward/downward continuation			

Table 9: Activities and DLs of GeoGravGOCE TSK4200.

PROJECT: GeoGravGOCE		WP: 4	TSK4200
Task Title: Upward/Downward continuation to MO and ES Responsible: Geograv Beginning: 3 th month		Person in charge: I.N. Tziavos End: 18 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This task focuses on the reduction of the filtered GOCE SGG data from the orbit level to a MO and then to the ES. MC annihilation together with MIMOST will be used for the downward/upward continuation. MC is used in combination with MIMOST to iteratively downward continue and convert all six GOCE SGGs to gravity anomalies on the global geoid and further to refine the local/regional geoid. The goal is the resulting SGG-derived gravity anomalies to provide overall minima w.r.t. a reference GGM, which will be XGM2017.			
Actions: 4210 Downward continuation to MO 4220 Downward continuation to ES			
Output (deliverables): DL4210 Report on the GOCE SGG data on the Earth Sphere			

Table 10: Activities and DLs of GeoGravGOCE TSK5100.

PROJECT: GeoGravGOCE		WP: 5	TSK5100
Task Title: Topographic effects on SGG and gravity data Responsible: Geograv Beginning: 3 th month		Person in charge: I.N. Tziavos End: 18 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This Task being the last implementation Task of the project amalgamates the results and DLs from all previous WPs in order to estimate high-resolution and accuracy geoid models for the wider Hellenic region. The prediction methodology will be based on LSC employing local gravity data and the downward continued GOCE SGG to the ES.			
Actions: 5110 Topographic effects with classic RTM approach 5120 Topographic effects based on spherical harmonic synthesis of the topographic potential			
Output (deliverables): DL5110 Report on the evaluation of topographic effects for GOCE gradients			

Table 11: Activities and DLs of GeoGravGOCE TSK5200.

PROJECT: GeoGravGOCE		WP: 5	TSK5200
Task Title: LSC-based geoid modeling and validation Responsible: Geograv Beginning: 3 th month		Person in charge: I.N. Tziavos End: 18 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This Task focuses on the estimation of local empirical and analytical covariance function models will be developed, while various solutions based on single- and multi-gradient solutions will be developed. Furthermore, we will investigate the influence of the full topographic and RTM effects on the GOCE gradients based on DTM and DBM models. The evaluation will be performed against the available GNSS/Levelling data over Greece			
Actions: 5210 LSC-based geoid estimation 5220 Geoid validation			
Output (deliverables): DL5210 Report on the developed geoid models and their validation.			

Table 12: Activities and DLs of GeoGravGOCE TSK6100.

PROJECT: GeoGravGOCE		WP: 6	TSK6100
Task Title: Project Dissemination Responsible: Geograv Beginning: 0 th month		Person in charge: I.N. Tziavos End: 24 th month	Personnel: Tziavos, Vergos, RA1, RA2,PD, Sideris, Grigoriadis
Summary of activities: This Task refers to the dissemination activities that will be carried out in the frame of the proposed GeoGravGO-CE project. The results will be disseminated through presentations in conferences and the publication of original articles in high-prestige journals.			
Actions: 6110 Project brochures 6120 Participation and promotion at conferences 6130 Project journal papers			
Output (deliverables): DL6110 Project newsletters and brochure DL6120.1-6120.4 Project semi-annual newsletters			

DL6130	Participation and promotion to conferences and workshops
DL6140	Three journal papers regarding the IHRsg

Table 13: Activities and DLs of GeoGravGOCE TSK6200.

PROJECT: GeoGravGOCE		WP: 6	TSK6200
Task Title: Project website			Personnel: Tziavos, Vergos, RA1, RA2, PD, Sideris, Grigoriadis
Responsible: Geograv		Person in charge: I.N. Tziavos	
Beginning: 0 th month		End: 24 th month	
Summary of activities: This Task refers to the Project website			
Actions:			
6210	Project website		
Output (deliverables):			
DL6210	Project newsletters and brochure		

Then Prof. Tziavos indicated the actions that have already started and those that their DLs are fast approaching and need to be worked upon. This list includes the following TSKs

- TSK 1100
- TSK 1200
- TSK 2100
- TSK 2200
- TSK 6100
- TSK 6200

1.3 Planned activities until the first semi-annual meeting (June 2020)

Given the TSK and activity structure, Prof. Tziavos provided detailed list of the work to be carried out and the DLs to be produced, within the next six months.

1.3.1 TSK1100

For this task the financial and administrative management of the project (Actions 1110 and 1120, respectively) need to be undertaken. The necessary financial and administrative monitoring documents have been filled and the project has been registered in the web-based project management system of RC-AUTH.

1.3.2 TSK1200

For this task, action 1210 refers to the semi-annual progress reports and action 1220 to the updating of the project action list and bar chart.

1.3.3 TSK2100

For this task, action 2110, 2120, 2130, 2140, 2150 refer to the data collection, archiving, and homogenization. These data sets refer to local gravity data, local GNSS/Leveling data, Global Geopotential Models, Topography/Bathymetry Models and GOCE raw SGG data (**DL2110**).

1.3.4 TSK2200

For this task, measurement campaigns will be conducted to collect GNSS data at selected trigonometric BMs.

1.3.5 TSK 6100

This task refers to the GEOGRAVGOCE semi-annual newsletter (**DL6120.1**) to be delivered in January 31, 2020 and the project brochures (**DL6110**).

1.3.6 TSK 6200

This task refers to the GEOGRAVGOCE project website and dedicated server. The web-site is already setup <http://olimpia.topo.auth.gr/GeoGravGOCE/> and the respective deliverable **DL6210.v1** is already at the protected GEOGRAVGOCE partner's corner. The dedicated web-page <http://olimpia.topo.auth.gr/GeoGravGOCE/partners/partners.php> is where all DLs will be uploaded and access is granted only to the project team and to the administrators from HFRI and GSRT. The set password used is **GeoGravGOCE2020** (see also **DL6210.v1**)

The project server, where all data will be stored will be located at Prof. Tziavos' office, with the following details:

ftp host : olimpia.topo.auth.gr
Port : 21
Password: GeoGravGOCEserver!

A back-up of the GEOGRAVGOCE data server will be maintained at Dr. Vergos' local host for redundancy, with the following details:

ftp host: lscol.topo.auth.gr
Port: 21
Password: GeoGravGOCEserver!2@

1.4 Concluding remarks

Prof. Tziavos concluded the kick-off meeting by wishing everyone a good project start, fruitful cooperation and timely delivery of the DLs. The next project meeting (1st semi-annual meeting) will take place during the first week of June 2020.

