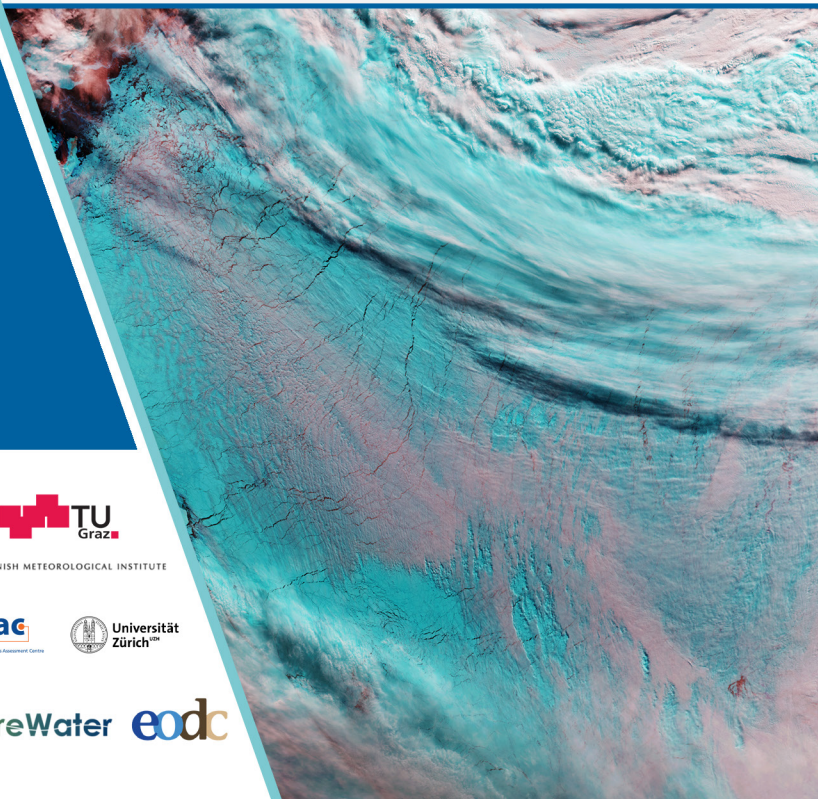




GLOBAL GRAVITY-BASED GROUNDWATER PRODUCT



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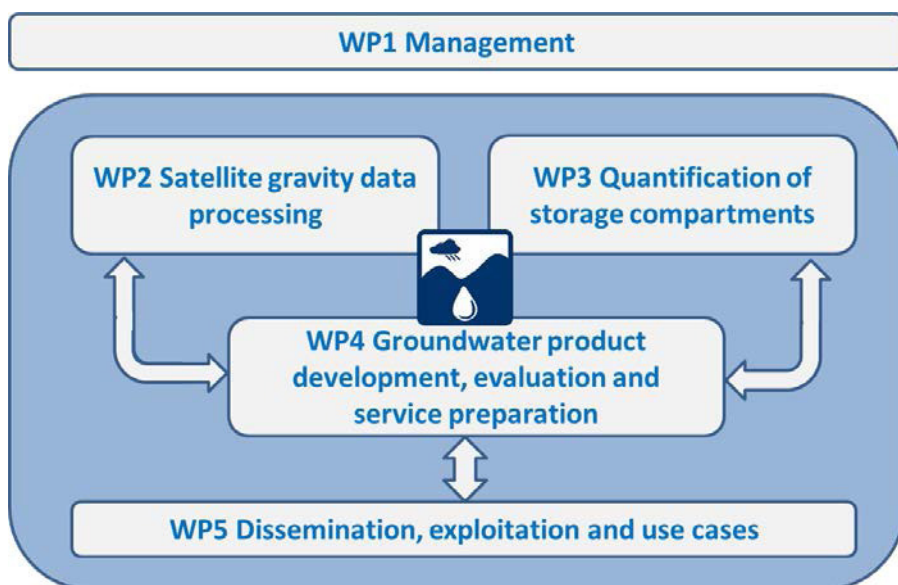
THE GLOBAL GRAVITY-BASED GROUNDWATER PRODUCT

Groundwater is one of the most important freshwater resources for mankind and for ecosystems. Due to its fundamental role in the Earth's water and energy cycles, groundwater has been declared as an Essential Climate Variable (ECV) by GCOS, the Global Climate Observing System.

The Copernicus Services, however, do not yet deliver data on this fundamental resource, nor is there any other data source worldwide that operationally provides information on changing groundwater resources in a consistent way, observation-based, and with global coverage.

This gap will be closed by G3P, the Global Gravity-based Groundwater Product. The project activities are carried out by twelve G3P partner organisations as part of five work packages:

1. Management
2. Satellite gravity data processing
3. Quantification of storage compartments
4. Groundwater product development, evaluation and service preparation
5. Dissemination, exploitation and use cases



WP1 - Management

The bulk of project management is shared between the Coordinator and the Operations Manager, both GFZ. A clear definition of roles and tasks as well as frequent contacts will ensure seamless interaction between them.

The coordinator will oversee the overall legal, contractual, ethical, financial and administrative management. The Operations Manager has the largest share in terms of workforce of WP1, being in charge of the execution of most tasks and advising of the Coordinator.

Objectives

- Productive collaboration and integration of all partners
- Dealing with overall administrative and financial issues
- Meeting EC requirements
- Scientific coordination
- Organisation of consortium meetings
- Risk management
- Reporting

Deliverables

- Management guidelines

WP1

WP2 - Satellite gravity data processing

WP2 is dedicated to the analysis of satellite gravity data, from raw Level 1b to user-adapted Level 3 data of total water storage (TWS) variations.

Three GRACE/GRACE-FO analysis centres (Universität Bern, Technische Universität Graz, GFZ) are involved in this WP in order to perform the different processing steps at each data level, but also to capitalize from different processing strategies for GRACE/GRACE-FO data into an optimally combined TWS product where differences among the individual products will serve for assessing the errors in TWS estimates.

Deliverables

- GRACE/GRACE-FO Level-1B Report
- GRACE/GRACE-FO Level-2 Report
- GRACE/GRACE-FO Level-2 Combination Report
- GRACE/GRACE-FO Level 3 Report

2^{WP}

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WP3 - Quantification of storage compartments

The development of data sets of water storage variations in individual compartments of the continental water cycle (glaciers, snow, soil, surface water bodies) is subject of WP3. WP3 unifies consortium partners (Universität Zürich, TU Wien, Finnish Meteorological Institute, Collecte Localisation Satellites SA, Université Paul Sabatier Toulouse III, Magellium SAS) that run operational Copernicus service products for these storages that need to be further developed and adapted to the needs of G3P for the subtraction process from TWS. This refers in particular to the full spatio-temporal coverage of all data sets and to error estimates.

Deliverables

- Improved global snow water equivalent product and quality assessment report
- Global glacier mass-change product Report
- Surface soil moisture product and summary document
- Unsaturated zone soil moisture product & summary document
- Surface Water Storage Variations – Lakes Product & Quality Assessment Report
- Surface Water Storage Variations - Rivers Product & Quality Assessment Report

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WP4 - Groundwater product development, evaluation & service preparation

WP4 is the central work package of G3P as it is here where the final global groundwater product is generated by merging TWS from WP2 with all storage compartments of WP3 in the subtraction process.

Product evaluation against independent in-situ groundwater data is an important component of WP4. WP4 is closely interlinked with WP2 and WP3 to optimally design each input data set and to work jointly on adequate data merging and joint error estimation approaches.

Furthermore, product development including error assessment in WP4 is largely driven by end-user and dissemination needs with respect to spatial units or user-oriented metrics, for instance. Thus, WP4 is also closely linked to WP5 in defining and responding to these requirements.

The main work load of WP4 is at GFZ and IGRAC. Besides the scientific development of the new groundwater product, WP4 works in parallel on its development towards an operational Copernicus service, for which the major responsibility is with EODC. A demonstration G3P will be prepared and implemented, concluding with an assessment of the service and recommendations on how to evolve to an operational G3P service.

4^{WP}_P

Deliverables

- G3P product report
- G3P evaluation report
- Service Specification Document
- Prototype Service Design Document
- Road Map Document for G3P Operational Service



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WP5 - Dissemination, exploitation & use cases

WP5 is devoted to G3P product dissemination, exploitation and use cases. On the one hand this is done by preparing the technical framework for web-based user interfaces and, on the other hand by actively delivering G3P results to the general public and the user communities via different communication and publication channels.

One important part of WP5 is the application of G3P groundwater data to a European use case for drought monitoring on the Iberian peninsula, as an example of demonstrating applications and the potential value of the new product.

WP5 will develop web interfaces for visualization and access to G3P products by expanding two respective portals that are already well-known to the user communities in the field of gravity data processing and application (GravIS), and in the field of groundwater science and management (GGMN), respectively.

In this way, independently of the possible future G3P integration into an operational Copernicus services, it is assured already during the G3P project runtime that the project results are widely disseminated and made accessible.

Deliverables

- G3P project website
- Web-based information system: G3P results integrated in GGMN
- Web-based information system: G3P results integrated in GravIS
- Global groundwater resources assessment report
- G3P teaser lecture
- G3P-GDI InfoSequia integration and evaluation report Operational Service

WP5



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