

2020-2022 GEO Work Programme

In-Situ Observations and Practices for the Water Cycle (IN-SITU WATER)

1. Executive Summary

IN-SITU WATER aims to provide general and specific, as well as selected tailor-made services to GEOGLOWS program framework activities through the provision of data provided in standard formats to users, including dissemination in accordance to agreed data policies, upkeep of data archives, and the further development of standards in cooperation with the Open Geospatial Consortium (OGC) and WMO.

2. Purpose

Using mainly in-situ earth observations in the water domain, IN-SITU WATER provides improved services in terms of standardized and openly accessible data and products to the international community to improve assessments and trends in water resources and extremes at regional and global scales.

3. Background and Previous Achievements

Overall assessment:

Significant progress has been achieved in most planned activities in the working period as summarized below with limited personal and financial resources made available through GEO Members to the federated data centers of GTN-H and GTN-H itself. The POC for the CA has however no resources to perform coordination tasks and liaison with other groups and entities of relevance for the CA. There is the need for closer coordination and consultations specifically between the POC of the CA, GTN-H and the Secretariat of GEOGLOWS.

Resource Summary

At present there are no extra budgetary funds available to develop and operationalize the CA. CA partners provide all resources on the basis of in-kind contributions and derivatives from activities already under planning and/or implementation. The new sub-activity on surface water storage needs to be further developed on voluntary inputs from leads and contributors still to be identified. Some additional financial and in-kind resources need to be made available to enable improved coordination of the WP activities and including the development of integrated data products in cooperation with existing global data centers of relevance to the CA.

4. Key Activities

Soil Moisture

The activities were carried out through the International Soil Moisture Network (ISMN). ISMN has expanded significantly in the period 2015-2017 including 8 new networks. Currently data are available from 56 networks, 2250 stations, 8800 soil moisture datasets and historical data sets since 1952. Almost half of all stations provide real-time updates.

There has also been a strong increase in subscribed users of the ISMN to over 2.100 users. Upcoming plans include: Expansion by integrating new networks (focus on data sparse regions) and extending existing datasets; transferring processing chain from programming language IDL to Python; continue investigating and improving quality control procedures.

Future opportunities could include citizen science support as thousands of citizens maintain soil moisture stations in Europe using low cost soil moisture sensors

River Discharge

The activities have been carried out by the Global Runoff Data Centre (GRDC).

Complementary to GRDC's own data services, GRDC data are made available through the GEOSS Common Infrastructure as GRDC registers data set with GEO.

Links with GTN-H, WMO, GCOS have been fully established and extensive use of data is facilitated through IGWCO and WMO programs, directly interacting with National Hydrological Services world-wide.

A long pending issue, the generation of integrated data products has received a boost as financial means and personnel has been made available through national German resources to develop product prototypes extending to discharge, precipitation, water quality and groundwater.

Promotion of sharing data and an open data policy in close cooperation with WMO are ongoing.

Migration to a new data management system has been the main focus to build a platform for a series of web-based services to be developed further. Conforming to WMO as well as OGC standards the migration was completed in June 2017.

GRDC has been instrumental in the development of metadata standards and the Hydrologic Feature Model in close cooperation with OGC. OGC membership has unfortunately expired in 2017. It is hoped that OGC membership can be renewed as soon as possible.

The number of users is also continuously rising with now over 700 data requests in the past two years and over 300.000 time series of data being delivered in 2016 alone.

Groundwater

The activities have been carried out by the International Groundwater Resources Assessment Centre (IGRAC).

The Global Groundwater Information System (GGIS) has been significantly improved as an interactive, web-based portal to groundwater-related information and knowledge regionally and world-wide and is one of IGRAC's flagship products. The Managed Aquifer Recharge (MAR) Portal is the first structured database on Managed Aquifer Recharge sites globally. It is a climate change adaptation tool making use of underground water storage information. So far, more than 1200 case studies from over 50 countries from around the world were collected, analyzed and compiled in the global inventory of MAR schemes. Progress has been made in the estimation of GRACE derived groundwater depletion that will be carried on in the GRACE follow-up mission.

The improved Global Groundwater Monitoring Network (GGMN) portal gives insights on the availability of groundwater monitoring data through space and time on an increasing number of in-situ observation sites.

Connecting the GGMN with countries worldwide continues to be one of IGRAC's main targets. With new GGMN application there is also the potential to attract new participants and users of services.

Activities for the sub-activity "Surface Water Storage":

The sub-activity includes mainly surface water storage of lakes and reservoirs and storage in river channels. Cryospheric water storage is not yet included. Progress has been achieved through the activities of the Global Database on Lakes and Reservoirs (HYDROLARE, Russia), Legos/CNES, France (altimetric lake level observations and volume change computations). Consultations are under way to compute water storage in river channels with other partners. Details need to be further discussed and a more formal structure of the sub-activity agreed upon with partners.

Major other activities

The 8th Meeting of the GTN-H Panel was conducted in June 2017 including discussion of services from CA partners and including specific sessions on GEO and IGWCO/GEOGLOWS including anticipated services of IN-SITU WATER to GEOGLOWS (Report available).

The 13th Meeting of the GRDC Steering Committee was conducted in June 2017 including specific sessions on standards in hydrological data and meta-data as well as standards in the exchange of hydrological and related data, and data policy issues (Report under development).

5. Relationship to GEO Engagement Priorities and to other Work Programme Activities

All achievements of the CA are freely available to users, and therefore supporting the United Nations Sustainable Development Goals (SDGs), and is an important tool for the implementation of the Sendai Framework. *In-situ observations and practices* is also contributing to the GEO Global Water Sustainability (GEOGLOWS) through interaction and collaboration with other GEO centers.

In the GEO Work Programme, a Foundational Task on "In situ observations" had been established.

IN-SITU Water is closely related to the Global Terrestrial Network – Hydrology (GTN-H under the governance of GCOS and WMO. Likewise, GTN-H has been for a long time the observational arm of water-related GEO activities. The CA is a principal contribution to GEOGLOWS

IN-SITU WATER is a direct contribution to GEOGLOWS under the stewardship of IGWCO. In this way, the following direct benefits are provided to GEOGLOWS and its Working Groups (WGs):

WG 2: Integrated data products, library for data and analysis products, provision of in-situ observation data and gridded data products;

WG 3: Development of a GTN-H community portal: using the GEOSS portal functionalities, discussion/adapting requirements for EWV requirements, OGC standards for EWVs, facilitating a harmonized approach to deal with requirements and review of both ECVs and EWVs;

Partly as a result of the Frascati meeting in March 2017, GEO is looking at GTN-H to become the GEO coordination body for in-situ hydrological observations. This could be achieved by assuming a coordination role for the Subtask "Integrated Water-cycle Products and Services". Appropriate linkages with relevant Initiatives such as GEOGLOWS need to be ensured. The GEO Secretariat in 2017 had proposed that GTN-H and GEOGLOWS coordinate their interactions with user groups.

6. Governance

Governance of In-situ observations and practices is under the Integrated Global Water Cycle Observations – Community of Practice (IGWCO-CoP). It collaborates with GEOGLOWS, and other GEO entities. There are especially

close relations to the Global Terrestrial Network – Hydrology (GTN-H) that operates under WMO and is closely linked to IGWCO as its observational arm.

7. Data Policy

In-situ observations and practices follows the GEO data principles as well as the WMO data principles. It is based on the data policies of the contributing data centers that in general conform to WMO and GEO data sharing principles

8. Annexes:

Supporting Documents

The report of the 8th session of the GTN-H Panel has been published as GCOS Report 216, World Meteorological Organization, 2018. The links for download are:

To the document

directly: https://library.wmo.int/opac/doc_num.php?explnum_id=4524

To the WMO

Library: https://library.wmo.int/opac/index.php?lvl=notice_display&id=20249

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