GGOS Contribution to Promote Geodesy and Increase its Visibility in Science and Society

Der Beitrag von GGOS zur Erhöhung der Bedeutung der Geodäsie in Wissenschaft und Gesellschaft




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Abstract

The Global Geodetic Observing System (GGOS) of the International Association of Geodesy (IAG) is a collaborative contribution of the global geodesy community to the observation and monitoring of the Earth System. Geodetic observation techniques and analysis infrastructures, as well as high-quality geodetic products, provide the basis for advances in Earth and planetary system sciences and for various applications. One main objective of GGOS is to support activities and initiatives to communicate the value of Geodesy to science and society, as well as contribute to understand and solve complex issues facing the global geodetic community. This article describes the efforts GGOS has made in recent years and the plans for the future to raise awareness of the important value of Geodesy.

Keywords: GGOS, Geodesy, portal, outreach, website

Kurzfassung

GGOS ist das weltweite geodätische Beobachtungssystem der internationalen Vereinigung für Geodäsie (IAG). Die darin weltweit tätigen Geodäten stellen einen wesentlichen Beitrag zur Beobachtung und Überwachung des Systems Erde dar. Geodätische Beobachtungstechniken und Analyseinfrastrukturen, sowie daraus generierte hochwertige geodätische Produkte, bilden eine essentielle Grundlage für die Erforschung des Erdsystems und für verschiedenste Anwendungen. Ein wichtiges Ziel von GGOS ist es, die große Bedeutung der Geodäsie für Wissenschaft und Gesellschaft hervorzuheben und zum Verständnis und zur Lösung komplexer Probleme der globalen geodätischen Gemeinschaft beizutragen. In diesem Artikel werden die Errungenschaften von GGOS in den letzten Jahren, welche wesentlich zur Verbesserung der Sichtbarkeit der Geodäsie beigetragen haben, und die zukünftigen Pläne vorgestellt.

Schlüsselwörter: GGOS, Geodäsie, Portal, Öffentlichkeitsarbeit, Webseite

1. Introduction

Geodesy is the science of determining the shape of the Earth, its gravity field, and its rotation as functions of space and time. A prerequisite for achieving this goal are stable and consistent geodetic reference frames. They form the basis for determining the time-dependent coordinates of points or objects and for describing the motion of the Earth in space. With modern instruments and analysis techniques, Geodesy is able to detect temporal variations from large and secular scales to very small and transient deformations - with increasing spatial and temporal resolution, high accuracy, and decreasing latency.

The Global Geodetic Observing System (GGOS) is a joint contribution of the global Geodesy community to the observation and monitoring of the Earth System. GGOS seeks to facilitate and enable the production and exchange of Earth observations needed to monitor, map, and understand changes in the Earth‘s shape, rotation, and mass distribution. GGOS also advocates the global geodetic frame of reference as the fundamental backbone for measuring and consistently interpreting global change processes as well as the essential geospatial infrastructure to ensure a homogeneous and sustainable development worldwide.

GGOS works closely with its parent organization, the International Association of Geodesy (IAG), to ensure the sustainability of these fundamental geodetic contributions. The IAG Services provide the infrastructure and products on which all GGOS contributions are based, and IAG Commissions and IAG Inter-Commission Committees provide expertise and support in addressing important scientific issues within GGOS (Figure 1).

In addition, GGOS supports the IAG by strengthening external and interdisciplinary relationships and contributions to the broader geospatial information community, including relevant United Nations (UN) groups, in particular the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM), its Subcommittee on Geodesy, and the newly established UN Global Geodetic Center of Excellence (UN-GGCE), which became operational in 2023. The main contribution of GGOS in this regard is to support actions and initiatives to communicate the value of Geodesy to society and to contribute to the understanding and solving of complex issues facing the global geospatial community.

2. GGOS Coordinating Office

GGOS is administratively managed by the Coordinating Office, which is located at the Federal Office of Metrology and Surveying (BEV – Bundesamt für Eich- und Vermessungswesen) in Austria. The Director of the GGOS Coordinating Office supports the Executive Committee, the Coordination Board and the Scientific Panel as well as he ensures the coordination of the activities of the various GGOS components such as the Bureau for Products and Standards (BPS), the Bureau for Networks and Observations (BNO) and the GGOS Focus Areas (Figure 1).

The Coordinating Office ensures the flow of information, maintains documentation of GGOS activities, and manages specific support functions that enhance harmonization across all areas of GGOS, including interaction with other IAG components and organization/support of scientific and business meetings. In its long-term coordination role, the Coordinating Office secures that the GGOS components contribute consistently and continuously to GGOS and its stakeholder community. The Coordinating Office also maintains, manages, and coordinates the GGOS web and social media presence, as well as public outreach and external engagement [1].

On behalf of the GGOS community, the Coordinating Office handles external relations and collaboration with stakeholder organizations such as the Group on Earth Observations (GEO), the Committee on Earth Observation Satellites (CEOS), and the International Science Council (ISC) World Data System (WDS). In this capacity, the Office also seeks opportunities to link Geodesy with relevant United Nations frameworks and other engagement tools, such as the Sendai Framework for Disaster Risk Reduction and the UN-GGIM and World Bank Integrated Geospatial Information Framework.

The Coordinating Office is also working to identify opportunities for improved coordination and advocacy within the geodetic community and has established the Working Group on “Digital Object Identifiers (DOIs) for Geodetic Data Sets” in 2019. This working group consists of more than 20 members associated with IAG Services who are working to establish usage parameters and advocate for consistent implementation of DOIs across all IAG Services and the larger geodetic community.

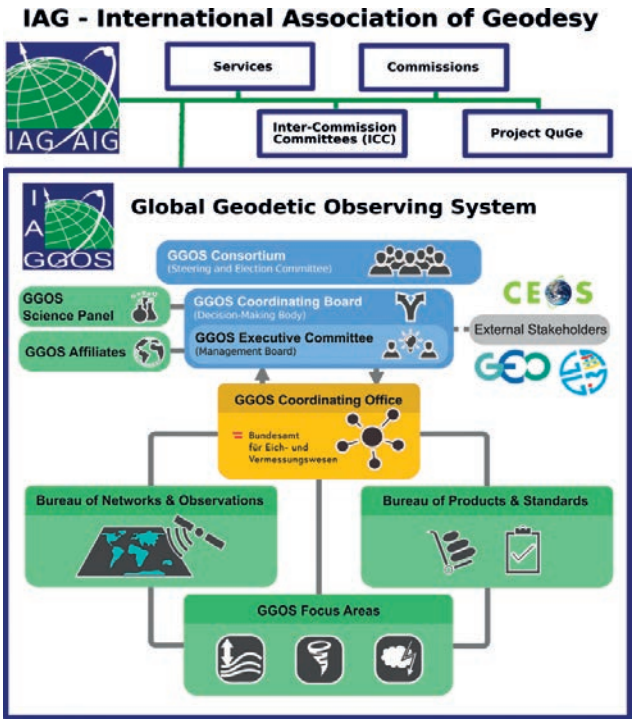

Fig. 1: Organizational structure of IAG and GGOS

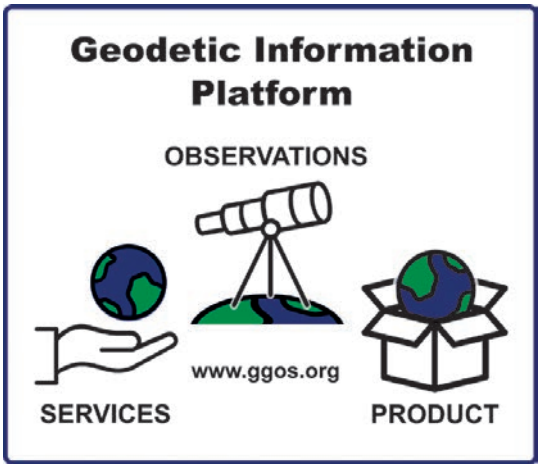

Fig. 2: Geodetic Information Platform www.ggos.org

3. GGOS Information Platform

Towards the GGOS objective to support activities and initiatives to communicate the value of Geodesy to science and society, GGOS has established and maintains its website www.ggos.org, which serves as a point of entry to Geodesy to facilitate discoverability and usability of geodetic data and products.

The redesigned GGOS website, released in December 2020, presents detailed insights of the IAG's geodetic observing system and shows how the GGOS organization is structured. In this process, the website is continually enhanced to provide a comprehensive information platform (Figure 2) that focuses on the IAG's observations (ggos.org/obs), geodetic products (ggos.org/products), and IAG Services (ggos.org/services). Visually appealing graphics (Figure 3) guide the user to easy understandable introductions about geodetic products or observing techniques (Figure 4). The descriptions of observations and products are complemented by a large selection of web links containing scientific descriptions and data repositories provided by the IAG Services and additional data sources.

The GGOS Coordinating Office, as the primary organizational unit responsible for the GGOS website, has worked extensively with members of the GGOS Bureau of Products and Standards (BPS) [2], the GGOS Bureau of Networks and Observations (BNO), the GGOS Science Panel, and other key persons in the geodetic science community to establish and launch this information platform. The contributions of the IAG Services and other providers of geodetic products are gratefully acknowledged. The GGOS website contributes to make Geodesy more visible and to promote IAG and GGOS at global and multidisciplinary levels.

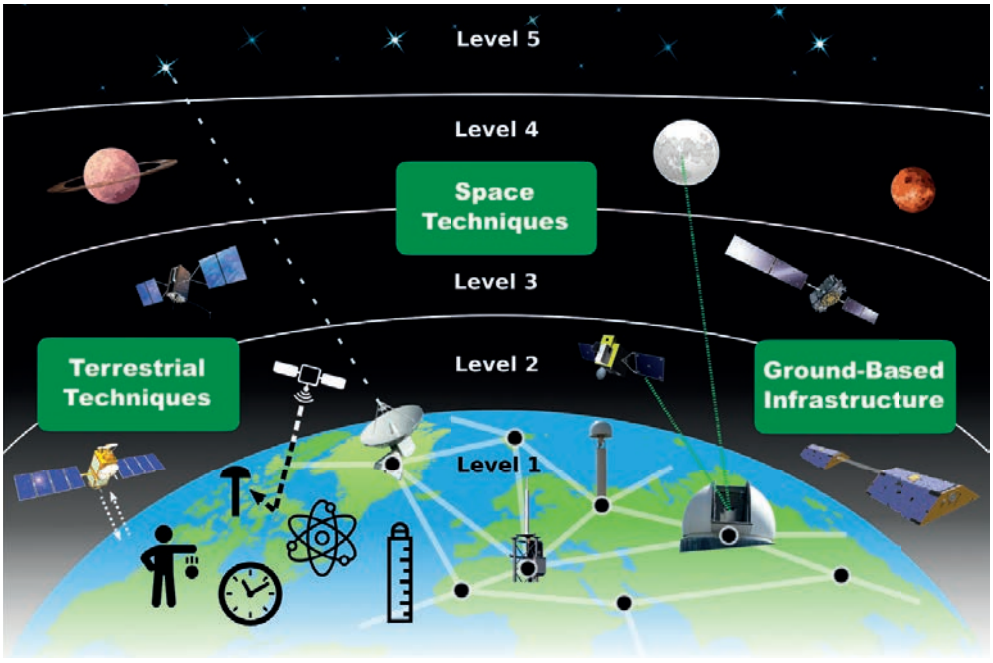

Fig. 3: Overview graphic of geodetic observation techniques on the GGOS website ggos.org/obs/

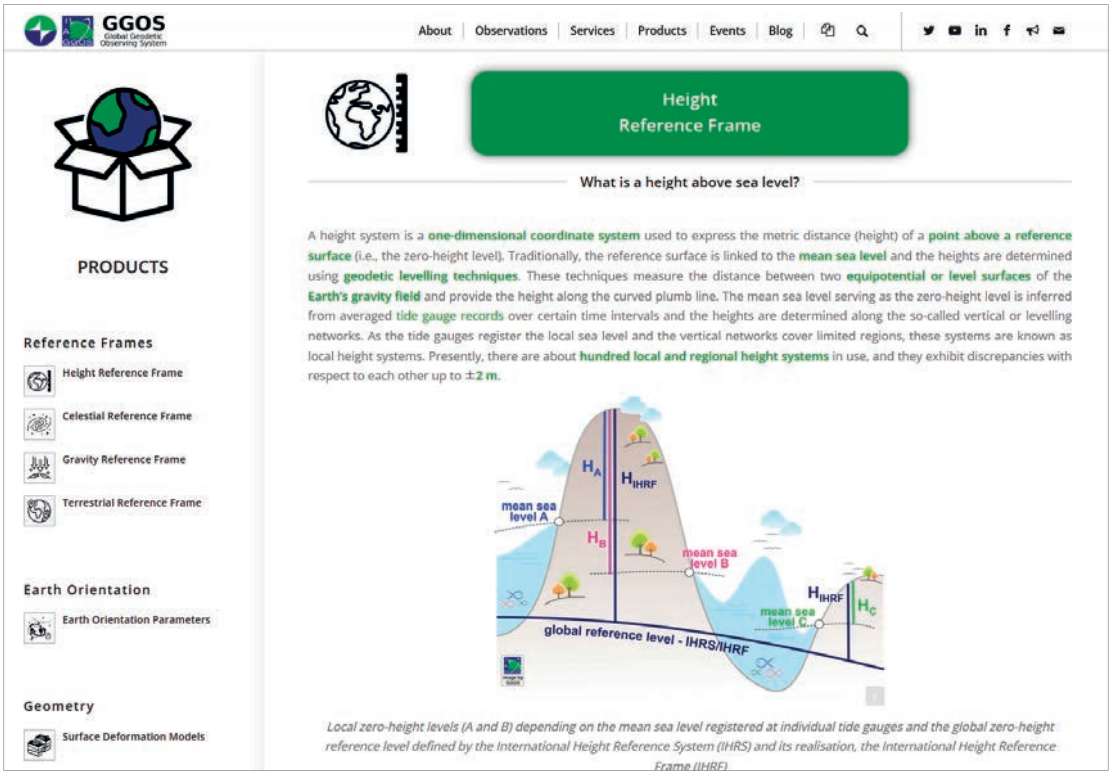

Fig. 4: Example of a product description on the GGOS website: "Height Reference Frame"

4. GGOS Film "Discover GGOS and Geodesy"

In public relations, it is important to reach the target audience through different channels and media. In addition to the existing social media channels Twitter (@IAG_GGOS), LinkedIn (iag-ggos) and Facebook (iagGGOS), GGOS has started to reach more people by launching a YouTube channel (youtube.com/@iag-ggos) in 2021 to provide existing and self-produced videos about Geodesy.

To introduce the Global Geodetic Observing System and explain the value of Geodesy to non-geodesists, the GGOS Coordinating Office recently worked together with key people of GGOS to produce a short film (Figure 5) entitled "Discover GGOS and Geodesy" [3]. With the volunteer support of many people in the geodetic community, the worldwide coverage of this film has been extended through translations into 11 languages. The GGOS film is now available in English, Spanish, French, Arabic, Portuguese, German, Farsi, Japanese, Italian, Dutch and Bulgarian. The fact that all versions of this film together have been viewed more than 11,000 times as well as the many positive comments show the great interest in such videos. Motivated by this success and to intensify its outreach activities, GGOS will create more videos in the future to explain geodetic products and observation techniques.

Fig. 5 : GGOS film "Discover GGOS and Geodesy" [3]

5. GGOS Portal – Unique Access Point for Geodetic Data and Products

The IAG Services provide very important and valuable geodetic data, information, and data products that are increasingly relevant for Earth System research, including monitoring of global change phenomena and a wide range of diverse applications such as satellite navigation, surveying, mapping, engineering, geospatial information systems, and so on.

Currently, it is difficult for many people to obtain an overview of all available geodetic products and data. GGOS aims to fill this gap by developing the GGOS Portal (ggos.org/portal), which will serve as a unique search and access point (one-stop shop) for geodetic data and products [4] (Figure 6). Data and products will be described by detailed metadata and remain physically located at their originating data centers of each contributing IAG Service and other data providers. In the long term, the GGOS Portal will provide a set of tools for organized knowledge search, including visualization to support identification and selection of appropriate resources (information, data, products).

In general, geodetic data portals are a dime a dozen. However, the GGOS portal will be much more than just a data portal for geodetic data from the IAG Services. The combination of the easy understandable descriptions of products and observation techniques with this comprehensive source of detailed geodetic metadata makes the future GGOS portal unique.

Presently, the GGOS Coordinating Office is working on the implementation of the GGOS Portal together with the Technical University of Vienna (TU Wien). To get an overview of the current availability of data products and their metadata, GGOS conducted a survey within the geodetic and geoscience community. This survey also inquired the opinions of geodetic data users on data availability and visibility, as well as desired requirements for a comprehensive and user-friendly GGOS Portal.

With this future platform and all other outreach initiatives, GGOS will help to increase the visibility of geodetic data for scientific research and raise awareness of Geodesy and its useful products to other disciplines and society.

Fig. 6 : Logo of the GGOS Portal ggos.org/portal

References

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