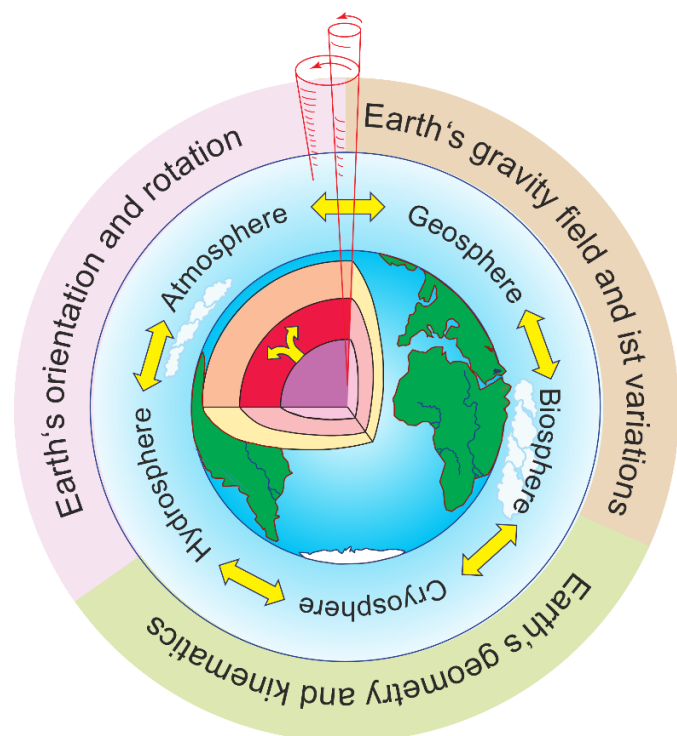


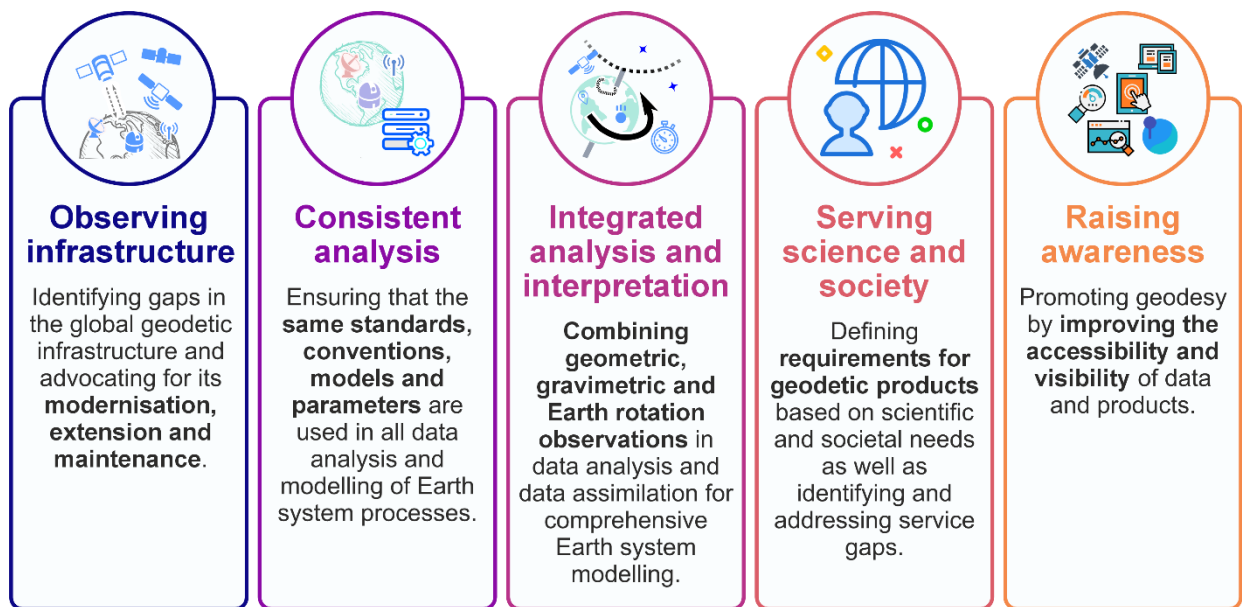
Driving challenges for the Global Geodetic Observing System

The Global Geodetic Observing System (GGOS) is the response of the international geodetic community, organised under the International Association of Geodesy (IAG), to the need to continuously monitor the Earth system. GGOS observes the time-varying shape, rotation and gravity field of the Earth with respect to precise and long-term stable geodetic reference frames. Changes to these characteristics are inherently related to changes occurring within and between the Earth's components: the geosphere, atmosphere, hydrosphere, cryosphere and biosphere. Geodesy is therefore an essential discipline for Earth system monitoring. GGOS aims to raise awareness of this new role of geodesy and to move from the provision of usual geodetic products (station coordinates, geoid, Earth orientation parameters, satellite orbits) to a consistent modelling and interpretation of Earth system processes and interactions, ensuring an integrated observing system.

The task of geodesy is to determine the shape, gravity field and rotation of the Earth as a function of space and time. These properties react together, albeit in different ways, to processes in each of the components of the Earth system. This became evident in the past century with the advent of satellite-based measurements for the global observation of the entire planet, modern technologies for the acquisition, transmission and analysis of geodetic data, and the improved accuracy of geodetic measurements and products by more than three orders of magnitude compared to classical (i. e. pre-satellite) geodetic methods. These advances have given geodesy the ability to monitor the Earth system and measure global change in unprecedented ways. They have also created opportunities to use geodetic data and products to serve science and society far beyond the traditional task of measuring and mapping the Earth's surface.



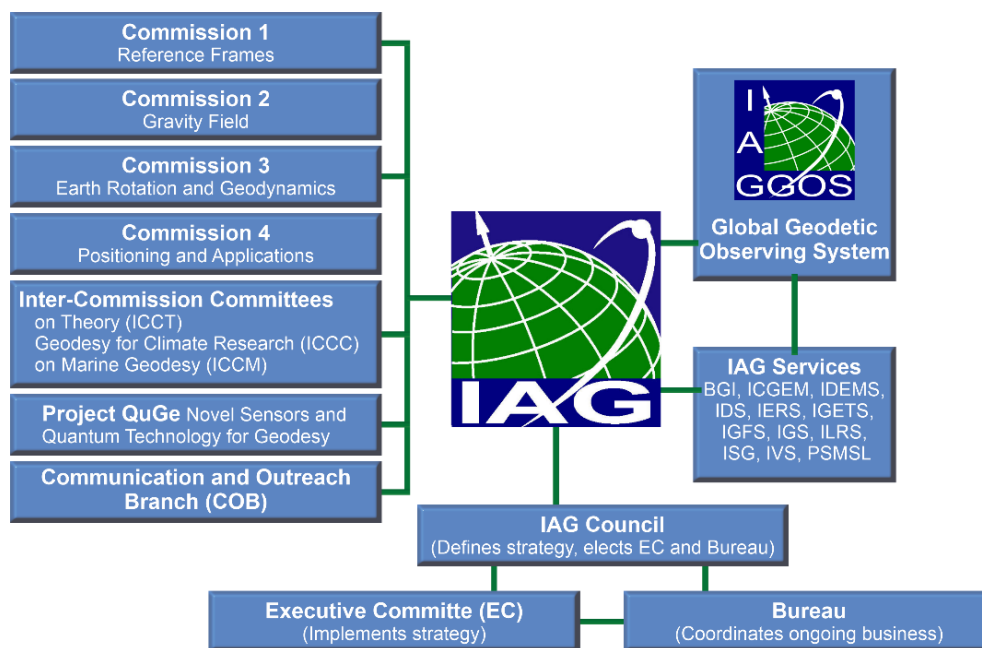
Geodesy determines the shape (geometry) of the Earth, its gravity field and its rotation, as well as how these vary across space and time. These properties respond differently but interactively to physical processes occurring throughout the Earth system, including the atmosphere, cryosphere, hydrosphere, geosphere and biosphere (Courtesy of H. Drewes).



Driving challenges for GGOS

Through GGOS, the IAG provides a common framework to encourage, coordinate and facilitate Earth-monitoring efforts based on geodesy. This framework aims to integrate observations collected by different national and international organisations and to raise awareness of geodesy and its products. GGOS builds upon existing geodetic observing infrastructure and the organisational structure of the IAG.

IAG Commissions, Inter-Commission Committees and Projects address key scientific issues, innovating methods and technologies in geodesy and providing the scientific basis for GGOS. The IAG Scientific Services facilitate global coordination of activities for collecting and analysing geodetic data, as well as providing geodetic reference frames and other relevant products for geodesists, Earth scientists, national administrations and the society in general.



Organisational structure of the International Association of Geodesy - IAG

Based on the support of the different IAG Components, the driving challenges for GGOS are:

- Promote the development of a stable, long-term, **globally distributed observing infrastructure** that ensures continuous measurement of changes in the Earth's geometry (kinematics), gravity field (mass distribution) and orientation (rotation).
- Bring together the various geodetic observation techniques, services and analysis methods to ensure that **the same standards, conventions, models and parameters** are used in all data analysis and modelling of Earth system processes.
- **Combine geometric, gravimetric and Earth rotation observations** in data analysis and assimilation to jointly estimate and model all the necessary parameters representing the different elements of the Earth system.
- Identify **scientific and societal needs that can be addressed by geodetic products** and define the accuracy, time and space resolution, and consistency requirements of these products. This includes detecting service gaps and deficiencies and developing strategies to address them.
- Promote and enhance the **visibility of geodesy** by improving the accessibility of geodetic observations, information, and products for the widest possible range of users.

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