Partners

- German Aerospace Center (DLR), Germany
- Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Germany
- Centre National d'Études Spatiales, France
- University of Bern, Switzerland
- Graz University of Technology, Austria
- Leibniz Universität Hannover, Germany
- HafenCity University Hamburg, Germany
- Université du Luxembourg, Luxembourg
- Géode & Cie, France

Climate, environment and resource efficiency

Water Management and Climate Change Monitoring

Enlarging the user community

Satellite-based gravity observations provide added value for water-related Copernicus Services by giving information on the amount of water that is stored in a river basin, in an aquifer or in the ocean. This includes the **Climate Change and the Emergency Management Services**, with the examples of EFAS (European Flood Awareness System) for flood forecasting, EDO (European Drought Observatory) for drought monitoring and DLR/ZKI (Center for Satellite Based Crisis Information) for rapid satellite tasking during environmental disasters.

Water storage from gravity data will appeal to management agencies when it comes to improved **seasonal runoff forecasting** for irrigation or hydropower water allocation, and to groundwater protection authorities for guiding **sustainable water use from the subsurface**.

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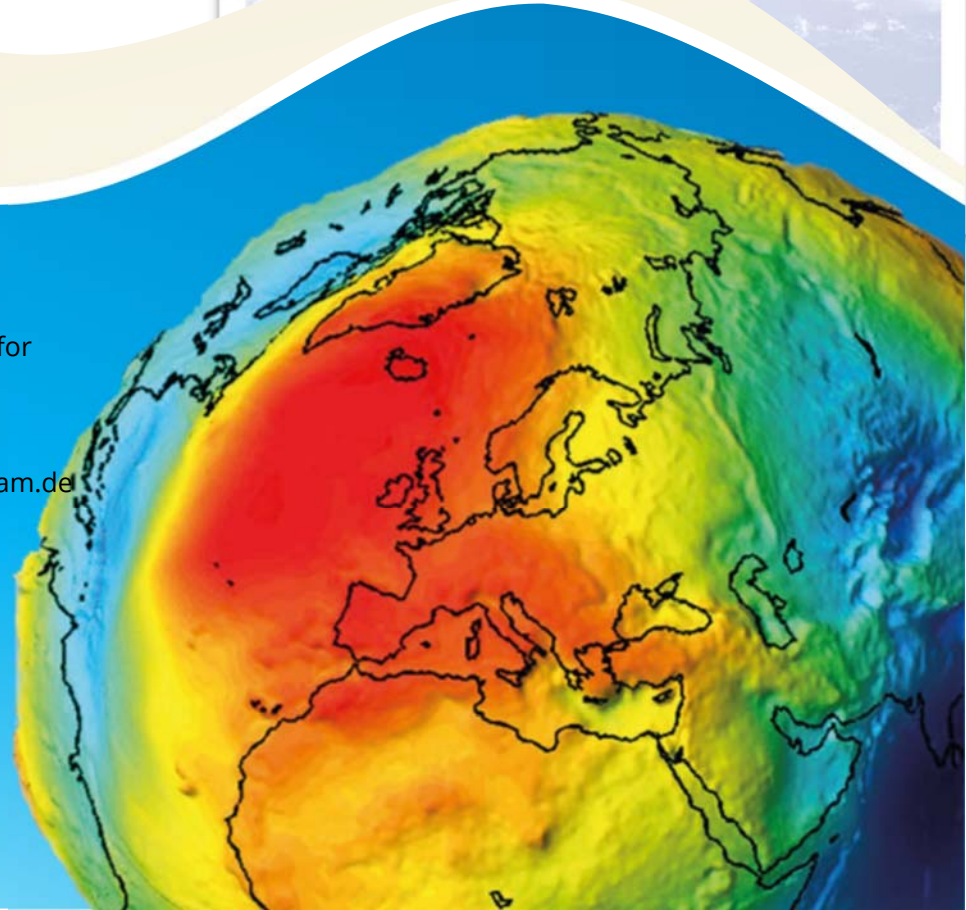


Water Resources under Threat

Without water our biosphere would be a vast and empty desert where no life can develop. Water is the base for any growth in environment and economy. It is the most precious and vulnerable natural resource and has an immense geopolitical dimension.

However, the natural cycle of water availability is threatened by extensive water consumption, land use and natural and human induced climate change. **The warming climate is expected to make wet regions to become wetter and dry regions to become drier**, leading to more frequent extreme events such as droughts, floods and storm surges, and thus to migration pressure in parts of the world.

Reliable information on water resources is needed for sustainable water management and for securing water-related ecosystem services.

Satellite gravimetry is the only available technique for global groundwater monitoring.

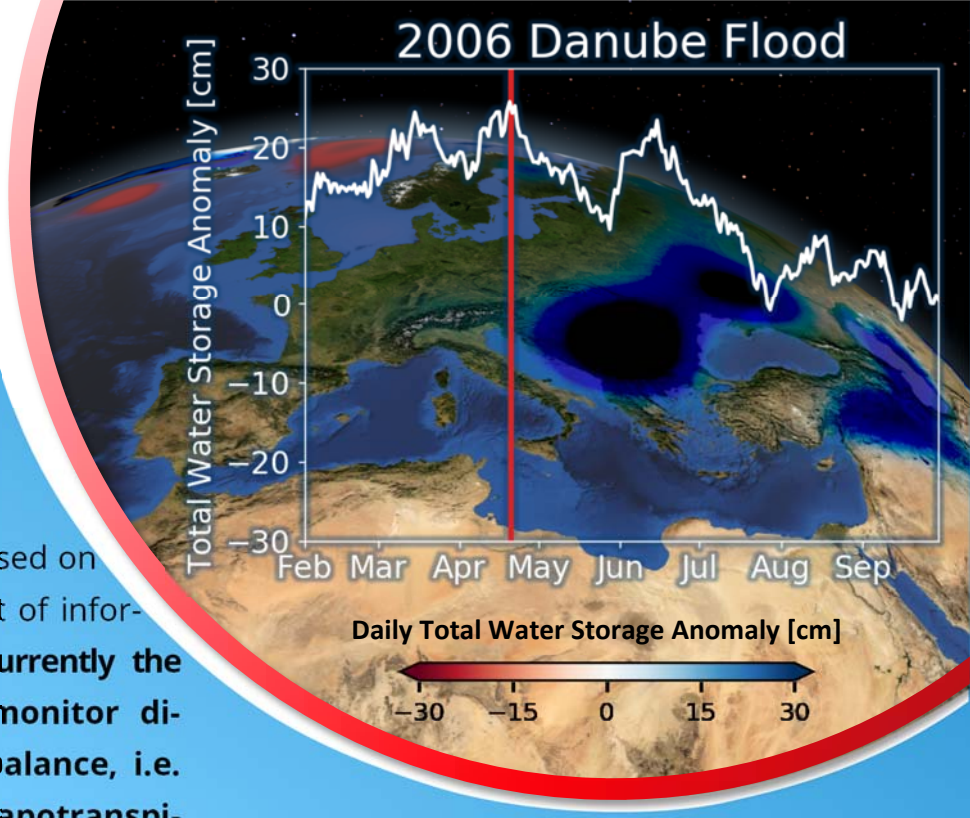
Sustainable Water Management

Current water management is based on an inaccurate and incomplete set of information. **Satellite gravimetry is currently the only available technique to monitor directly the continental water balance, i.e. the balance of precipitation, evapotranspiration, and runoff.** It is the only observation technique that allows for quantifying subsurface water storage changes.

Climate Change and Sea Level

Satellite-observed mass changes contribute to Essential Climate Variables (ECV), e.g. sea level, river discharge and lake levels, groundwater, snow cover, glaciers, ice caps and ice sheets.

Monitoring and predicting sea level change (together with satellite altimetry) is essential for tackling threats to coastal infrastructure and livelihoods, and to enable sustainable resilience plans.



Increasing Disaster Preparedness

Weather extremes are constantly increasing, causing more frequent droughts and floods. Flooding in Europe has doubled since 1980, often claiming a high toll on infrastructure, economy and human lives. Droughts especially threaten the world-wide food production causing regional hunger crises and triggering migration.

The observation of water storage by satellite gravimetry supports an early awareness of such threats. It will enable permanent monitoring, early preparedness and better crisis management.