GGOS D-A-CH – Status Report

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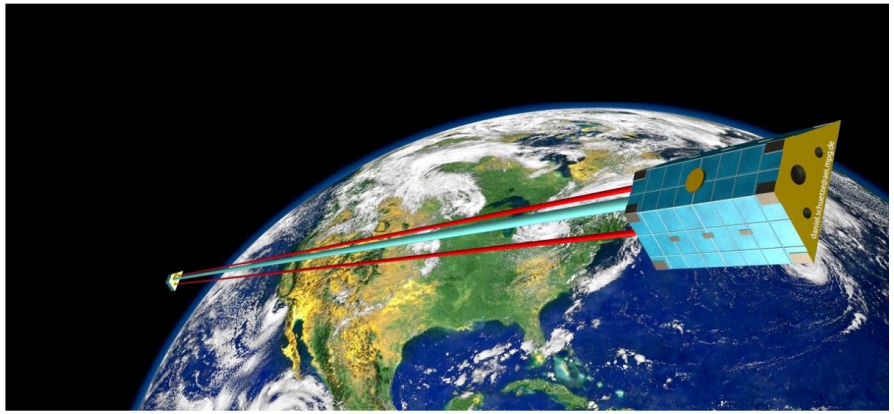
GGOS CB Meeting, 16 May 2022

Present state of GGOS D-A-CH

- GGOS D-A-CH was approved as GGOS Affiliate on 19 May 2021 (Chair: H. Kutterer)
- Basis and forum for GGOS-related activities in the D-A-CH region; stimulator and incubator for GGOS-related coordinated research
- Call for Participation in 2021: 19 expressions of interest from all three countries
  - Universities in Berlin, Bern, Bonn, Dresden, Hannover, Karlsruhe, Munich, Stuttgart, Vienna, Zurich
  - Research institutions and national agencies: BKG, BEV, GFZ
- Organization of a DFG Roundtable on 19-20 May 2022 in Munich: Discussion of a coordinated research proposal to advance GGOS
- Good exchange and cooperation with GGOS Japan ⇨ Presentation of GGOS D-A-CH at GGOS Japan meeting on 17 March 2022, planned joint proposal, stay of a KIT Master student at GSI Japan
- Regular reporting to GGOS CB and to national geodetic commissions (joint annual meeting in 2022 in Innsbruck, Austria, 19-22 September 2022)
- Participation in GGOS Days (14-15 November 2022 in Munich)

White Paper „Geodesy 2030“
Geodetic observations and processing chains

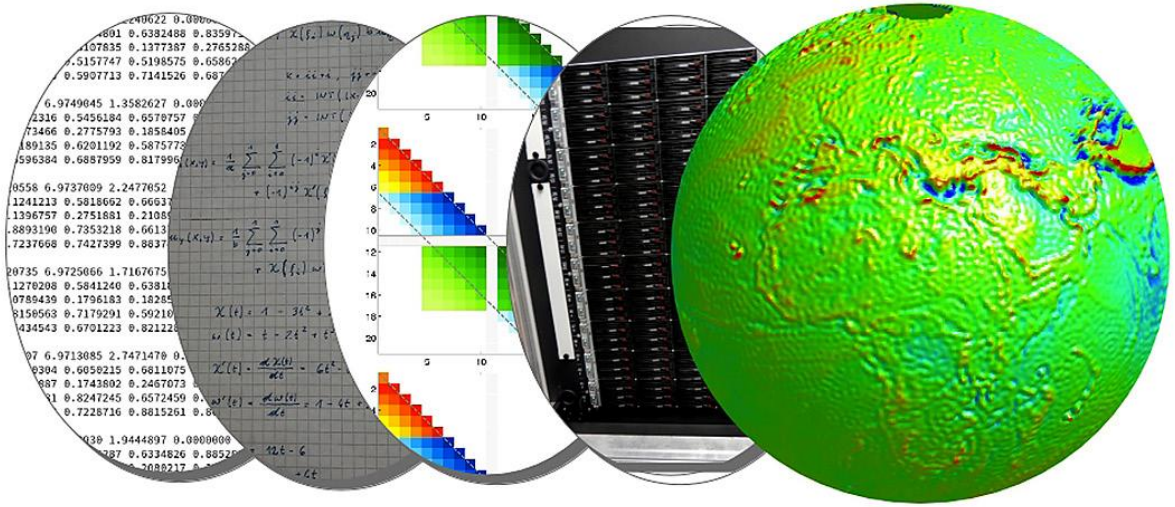
Example: Geodetic Observatory Wettzell



Example: Global observation of mass transport processes using GRACE / GRACE-FO

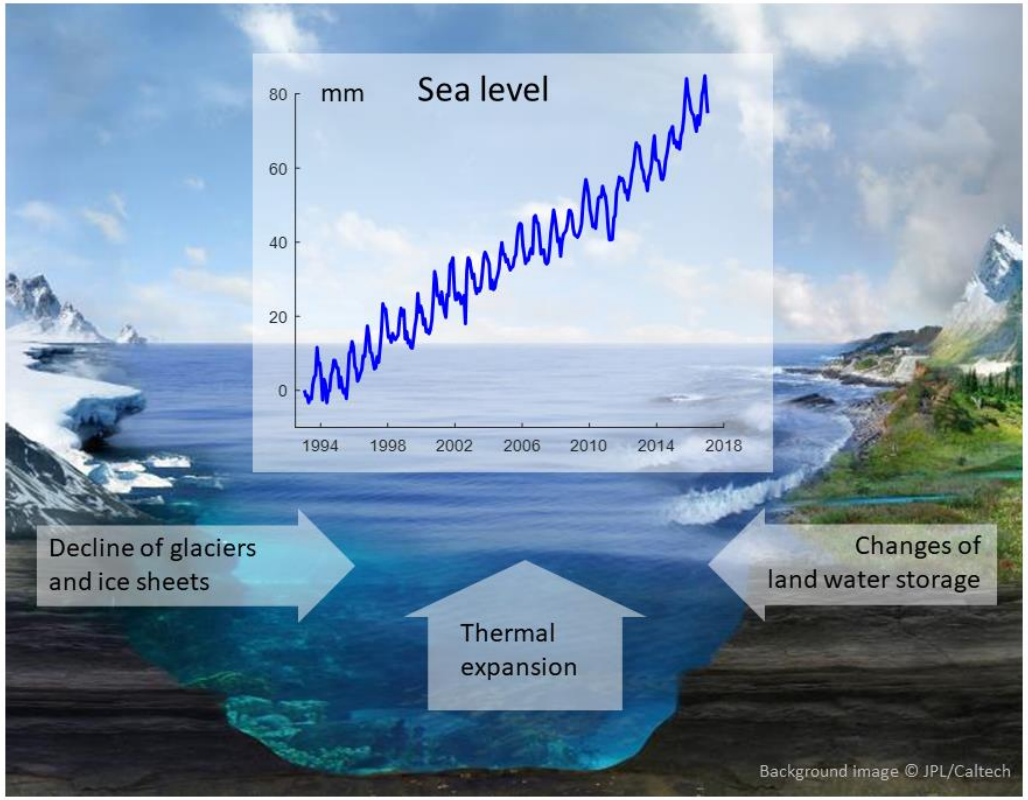
Müller, J., Pail, R. et al. (2019): Erdmessung 2030. zfv 01/2019 (soon available in English).

developed and written by colleagues from all three national geodetic commissions

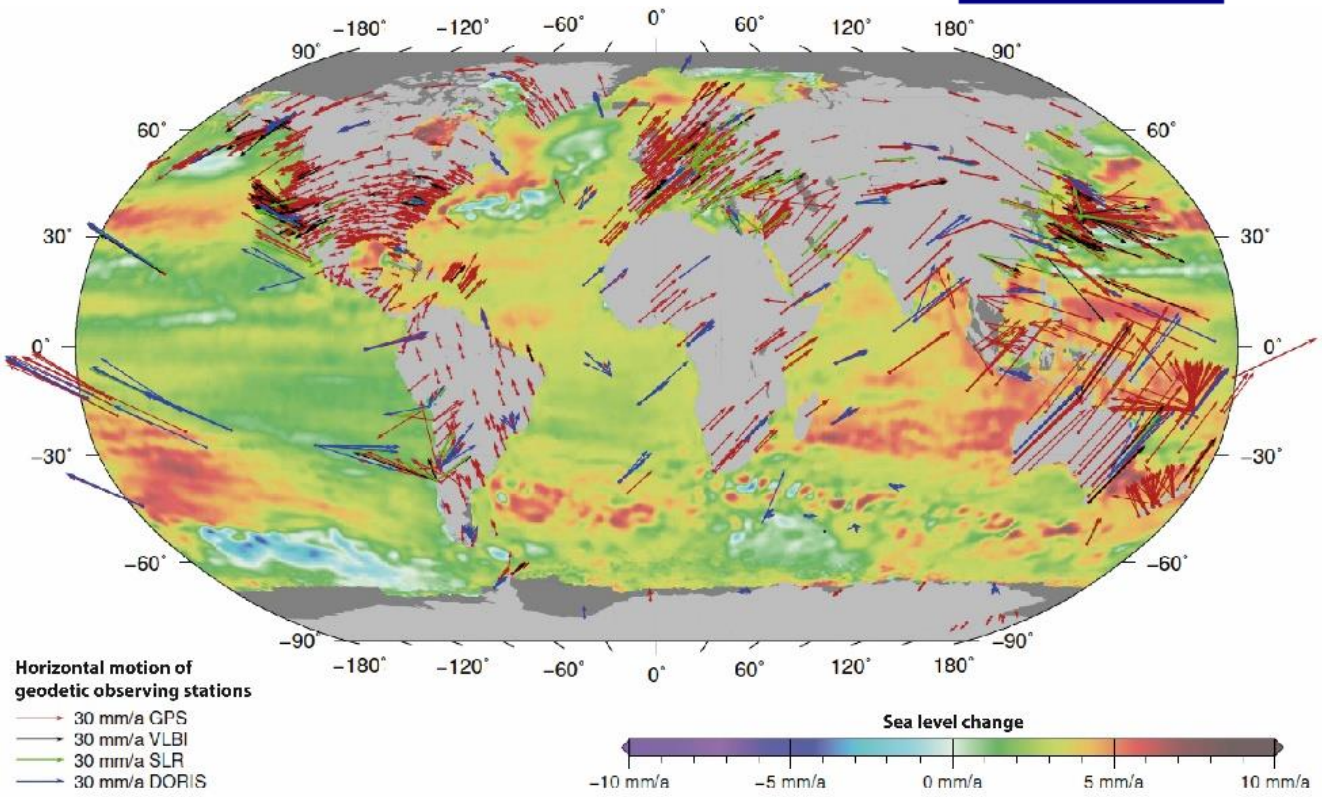


Example: Schematic processing chain from the raw observations to the gravity field model.

White Paper „Geodesy 2030“
Earth system processes and phenomena



Change in global mean sea level. The curve shows results of satellite altimetry (DGFI-TUM 2018).



Processes in the Earth system observed with geodetic methods: sea level change and drift of continental plates (courtesy: DGFI-TUM)

White Paper „Geodesy 2030“
Societal Challenges as general context

- Grand challenges to be tackled for societal, social and economic benefit
- Specific situation in geo-sciences
  - Natural hazards and disaster prevention
  - Climate change and climate protection
  - Protection and preservation of our environment
  - Sustainability assurance of natural resources
  - …

- Significant contribution to the monitoring of the Sustainable Development Goals of the United Nations such as on Climate Change (#13), Oceans (#14), and Land ecosystems (#15)

Scientific Goal: Preparation of a DFG Research Unit

Possible topic and structure

Working title

Global geodetic Earth system monitoring 2030: Integrating methodologies facing societal challenges

Motivation

Earth system, digital twin, GGRF, innovative technologies, further development and enhancement of infrastructures

Subject and methodology

Integrated determination of geodetic parameters and products according to GGOS

- Consistent combination of geometry (in terms of volume) and gravity (in terms of mass) including temporal variations
- Effective combination of the different levels of the GGOS observation architecture (in particular MEO+LEO)
- Optimization of the observing system including digital simulation (based on PLATO)
- Innovative technologies and future geodetic observation infrastructure
- Monitoring of the spatial geodetic reference frames (geometry, gravity) in near real time
- Interface to other disciplines