How can GRACE contribute to our understanding of the Earth system?
- Satellite gravity data processing at Bonn University and geophysical applications –

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For the last 6 years, the satellite mission GRACE has enabled the determination of the static gravity field and its temporal variations with very high accuracy. This talk will introduce the GRACE gravity field solutions ITG-Grace03s (static and time variable) which are calculated at the University of Bonn. The processing method is based on the analysis of short arcs of the satellite's orbit using Newton's equation of motion formulated as a boundary value problem. To extract the signal information present in the satellite data to full content, it seems reasonable to improve global solutions by regional refinement strategies. Therefore, an approach has been developed to calculate regional solutions based on space localizing basis functions.

The knowledge of the gravity field is of substantial importance for different geophysical applications. Examples will be given, how the gravity field solutions calculated in Bonn can be applied to the analysis of, e.g., ice melting in Greenland, water withdrawal in central United States and the improvement of global ocean tide models.