UP 11: Methods 2

Time: Thursday 9:30–10:00 Location: HFT-FT 131

UP 11.1 Thu 9:30 HFT-FT 131

Inter-satellite laser interferometry for a GRACE follow-on mission — •Christoph Mahrdt, Benjamin Sheard, Daniel Schütze, Gunnar Stede, Vitali Müller, Oliver Gerberding, Marina Dehne, Nils Brause, Gerhard Heinzel, and Karsten Danzmann — Max-Planck Institut für Gravitationsphysik (Albert-Einstein-Institut), Hannover

The Gravity Recovery and Climate Experiment (GRACE) is the first mission to monitor mass changes within the Earth system on a global scale. Launched in 2002 GRACE produced measurements of Earth's time varying gravitational field with unprecedented accuracy, revealing mass changes in the Cryosphere and Hydrosphere. Continuation of the measurements after the expected end of orbit lifetime in 2015 is important to gain knowledge on long term trends and climate change. Therefor a GRACE follow-on mission is planned for 2016. The design will be a copy of the current GRACE mission with some minor improvements to reduce development costs and risk. A way to improve the estimates of the gravitational field in future missions is to use inter-satellite laser interferometry to increase the ranging precision. To test the new technology in space a laser interferometer demonstrator is planned to be placed additionally to the microwave instrument on board the two satellites. This talk will give an overview of the planned design and the current status of its development.

UP 11.2 Thu 9:45 HFT-FT 131

Complex networks from irregularly sampled time series of palaeo data — •Kira Rehfeld[1,2], Norbert Marwan[1], Sebastian Breitenbach[3], and Jürgen Kurths[1,2] — [1]Potsdam Institute for Climate Impact Research, Potsdam, Germany — [2]Department of Physics, Humboldt University Berlin, Berlin, Germany — [3]Department of Earth Sciences, Swiss Federal Institute of Science and Technology (ETH), Zürich, Switzerland

In order to understand regional climate changes in spatially extensive and complex regions, combined information from palaeo archives, such as stalagmites, tree rings and sediment records is necessary. To this end, complex networks present a powerful and increasingly popular tool for the description and analysis of interactions within complex spatially extended systems in the geosciences. Such a network is typically constructed by thresholding a similarity matrix which in turn is based on a set of time series representing the (Earth) system dynamics at different locations. Regarding the pre-instrumental past, information about the system's processes and thus its state is available only through the reconstructed time series which – most often – are irregularly sampled in time and space. Interpolation methods introduce strongly sampling-dependent additional errors, thus we use our recently developed methods to quantify linear (Pearson correlation) and non-linear (mutual information) similarity in presence of heterogeneous sampling. We illustrate our approach in the assessment of Holocene Asian monsoon dynamics from stalagmite records.