



Signal and noise in four different GRACE solutions

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In this presentation we compare GRACE solutions from different processing centers which are used to generate global equivalent water heights grids. To separate signal and noise within the obtained equivalent water height grids we use an empirical orthogonal function filtering technique. Depending on the smoothing radius and the GRACE solution the EOF method shows that a significant part of the signal variance is contained in the first few EOF modes. Typical "signal" modes describe variations in e.g. continental hydrology, a Greenland ice change mode, post glacial rebound and other signals. There are several weak EOF modes that resemble interannual effects either related to climate change or due to tidal aliasing. Finally there are noisy EOF modes that always describe rapid fluctuations typically associated with a groundtrack type pattern in the calculated equivalent water height grids. The statistical significance of the EOF signal modes is validated by comparing them to calibrated covariances for potential coefficient by each center that provided the solution. A comparison to a global set of GPS stations and considering mass variations over calibration areas such as large deserts and ocean areas provides further suggestions to optimize the smoothing radius and the EOF approximation level.