Zur Anregung der Chandler-Schwingung

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Abstract:
In order to increase the understanding of both geophysically induced global mass transports and the dynamical response of the Earth, the non-linear dynamic Earth system model DyMEG has been developed at Deutsches Geodätisches Forschingsinstitut (DGFI). The model is forced by time series of consistent atmospheric and oceanic angular momentum variations. Besides, gravitational effects and deformations due to loading and rotational variations are regarded. The numerical results for polar motion from DyMEG are significantly related with geodetic observations. Depending on the quality of the excitations, the correlation coefficients between the unconstrained model time series and the observations amount to 0,99. Analyses of the polar motion series show, that the Chandler wobble from DyMEG is excited by the atmospheric and oceanic mass redistributions over more than two decades. This study demonstrates that the damping of the Chandler amplitude is counteracted by noise, which is contained in the atmospheric and oceanic excitation series due to stochastic weather processes. Numerical experiments with synthetic white noise excitation series show, that the noise level which is necessary to perpetuate the Chandler amplitude is just as high as the noise level which is provided by the atmospheric and oceanic forcing fields.