



The response of the Earth-ocean system to zonal tidal forcing estimated within a VLBI global solution

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The reaction of the Earth-ocean system to zonal tidal forcing is characterized by the so-called zonal response coefficient κ defined by Agnew & Farrell (1978). The frequency dependent zonal response coefficient is an extension to the concept of the Love number k_2 which allows for a response of the Earth to tidal forcing, deviating from purely elastic behavior and thus taking into account effects of ocean tides, a fluid core and mantle anelasticity. A change of the rotation rate of the Earth and consequently of UT1 induced by zonal body and ocean tides is proportional to the tide-generating potential through the zonal response coefficient κ . Variations of UT1 can be obtained directly from VLBI observations. If atmospheric and oceanic variations of UT1 are considered accordingly, the proportionality factor κ can be estimated within a VLBI global solution. A global solution is a common adjustment of the observations of several sessions with a simultaneous estimation of global parameters, such as station positions and velocities.

The global solution of the Vienna VLBI Software (VieVS) was employed to simultaneously adjust the observations of selected sessions spanning 1984-2012 and derive the zonal response coefficients for periods up to 35 days. The directly estimated fortnightly and monthly zonal response coefficients are discussed in comparison with theoretical values and the corresponding results of a straight time series approach.