

Ocean and Atmospheric Tides Standards (used for EIGEN gravity field modelling)

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Ocean tides models are originally described by grids of amplitude and phase of main tidal waves over the global ocean. For instance, the FES2004 model from LEGOS includes 4 diurnal waves (Q1, O1, P1, K1), 5 semi-diurnal waves (2N2, N2, M2, S2, K2) and is completed by 5 long period waves (Sa, Ssa, Mm, Mf, Mtm, Msqm). Some quarter-diurnal waves such M4 and MS4 are available as well.

In order to be able to use this kind of model in dynamical orbit computation one has first to transform it into spherical harmonic coefficients. Then ellipsoidal corrections can be applied for taking into account the flattening of the ocean layer. These spherical harmonic expansions are also well suited for broaden the tidal spectrum to numerous secondary waves through the admittance theory.

We propose to present the different stages of this process developed at GRGS and to deliver the adequate output which are standards in the framework of EIGEN gravity field modelling.

In addition we propose to present the S1/S2 atmospheric tides model (Biancale & Bode model) we derived from ECMWF 3-hour surface pressure fields and which is expressed in a similar form.