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<u>Brief Overview of the project</u>

Project : DAROTA – Dynamical And Residual Ocean Tide Analysis for improved GRACE de-aliasing within Special Priority Programs 1257 "Mass Transports and Mass Distribution in the system Earth"

Precise models of ocean tides are crucial because (i) the effect of ocean tides has to be removed from CHAMP and GRACE observations in order to obtain gravity field models describing exclusively the Earth gravity and (ii) altimetric sea surface heights should be „ tide-free'' in order to be comparable with each other and to be assimilated into numerical models. Deficiencies for ocean tides over continental shelves and in polar oceans are well known – even for the most recent models.

Since 1991 IFM developed data assimilation methods for the open ocean (Zahel, 1995) and the shallow sea (Taguchi, 2004) successfully. The mesh size of the former model is now refined by the author from originally 1 x 1 into 1/6 x 1/6 degree covering the north- and the south poles with good results. The rms error in the selected tide stations for the lunar semi diurnal constituent is less than 2 cm and comparable with the widely used ocean tide model FES2004. The latter will be

applied to the non-linear shallow water for over and combination tides, which are important in the coastal regions like the North-West European shelf.

Both models with data assimilation in open ocean and shallow sea are capable to overcome the deficiencies of current tide models.

+ Zahel,W. (1995) Assimilating ocean tide determined data into global tidal models. J. of Marine Systems, 6, 3-13.
+ Taguchi, E. (2004) Inverse Modellierung nicht linearer Flachwassergezeiten und ihre Anwendung auf ein Randmeer. ZMK Bericht, Reihe B, Nr. 47