Estimation of tidal ERP variations

It is possible to estimate tidal variations in the Earth rotation parameters (xp,yp,dUT1) within a global solution. Tidal variations in this case means diurnal and sub-diurnal variations at tidal periods.

Set up partials

If you set up the N_global and b_global for a global solution (Menu:Estimation→Global parameters) you have to select also "Tidal ERP variations" from the "Add extra parameters to N matrix" panel.

This enables the calculation of the partials for all tidal terms listed in VLBI/DATA/GLOB/tidalERPvar_list.txt. Per default 40 diurnal and 30 semi-diurnal terms are set up as well as the ter-diurnal M3 term and 6 so-called "zero" terms (3 in each band) which serve as an indicator of the accuracy/noise level, because at the respective periods no significant tidal signal is expected.

Global solution

In order to estimate the tidal ERP variations in the global solution (Menu:Global solution→Select special parameters) you have to click the checkbox "tidal ERP variations".
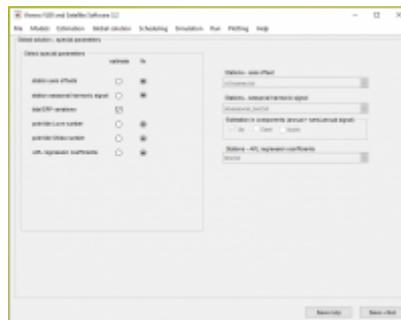
Per default all 77 tidal terms mentioned above are estimated in the global solution. In case you would like to estimate less than the default terms, you have to comment (%) the ones you do not want to estimate in the file: VLBI/DATA/GLOB/tidalERPvar_globest.txt.

Results

The results of the global solution are generally stored in VLBI/OUT/GLOB/_ESTIMATES/ in the file globsol_outputdirname.mat, which contains a structure array "globsol". The results for the prograde

tidal terms in polar motion are stored in the fields "tidAp" and "tidBp" the retrograde terms in "tidAm" and "tidBm". The dUT1 terms are saved in "tidutc" and "tiduts". The naming follows the definitions set in the dissertation of S. Böhm (2012). The estimated terms and the multipliers for the fundamental arguments are additionally written to text files tidpm_outputdirname.txt and tidut_outputdirname.txt.

Tips and tricks

If you want to estimate the full set of tidal terms listed in the above mentioned file (tidalERPvar_list.txt), you should include at least 19 years of observations in the solution, otherwise the terms which are closely together in frequency cannot be separated and the results become unreliable. When processing a shorter time span the number of estimated terms has to be reduced accordingly (in tidalERPvar_globest.txt).
It is recommended to set up all five EOP as parameters in 24h intervals with tight constraints in the single session solution and reduce them in the global solution.
Note that there will be less retrograde terms than prograde terms, because retrograde diurnal polar motion is regarded as nutation per convention. All residual retrograde diurnal signal is absorbed by the celestial pole offsets.