In the framework of the GOCE data analysis, the space-wise approach implements a collocation multi-step solution for the estimation of a global geopotential model in terms of spherical harmonic coefficients and their error covariance matrix. The basic structure of this solution consists of an along-track Wiener filter, a collocation gridding at satellite altitude and a spherical harmonic analysis by integration. All these steps are iterated, also to account for the rotation between local orbital and gradiometer reference frame. Error covariances are computed by Montecarlo simulations.

The application of a collocation technique suggests the use of a prior model to reduce the signal variance and correlation length. However the need of computing a GOCE-only model prevents the use of external models computed from other satellite missions or ground gravity data. This means that the basic structure of the space-wise approach has to be complemented with a procedure for the computation of an initial solution from GOCE data and with a strategy for the treatment of polar gaps, significantly affecting the solution if no external data or models are introduced. The former problem is solved by a global collocation on a strongly under-sampled dataset, while the latter is solved by considering a proper covariance modelling of the residual signal that cannot be based on the standard degree variances.

In this paper the space-wise approach, including the proposed strategies for the initial model and the polar gaps, is applied to about one-year of SST and SGG data to compute a GOCE-only model.