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Combination of satellite and terrestrial gravity field data in a domain of mild flattening

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The purpose of the presentation is to discuss the combination of satellite and terrestrial gravity field data and to show its spectral and space domain interpretation. The aim also is to demonstrate the effect of the two different data sources on the resulting solution. The problems discussed are overdetermined by nature. Therefore, methods typical for the solution of boundary-value problems of potential theory will be applied together with an optimization approach, target function and regularization techniques. In particular, the aim is to use gravity field information contained in satellite-only models of the gravity field of the Earth or in data coming from satellite missions, especially GOCE launched by ESA, in common with terrestrial gravity measurements. Results achieved so far are briefly reviewed. Subsequently, the approach is amplified and generalized. The effect of a global flattening of the Earth is taken into account, which leads to the use of the apparatus of ellipsoidal harmonics. For the results reached in the spectral domain series summation techniques will be applied in order to find the interpretation of the results in terms of Green's functions related to the particular combination scheme. This will also enable to show the tie between the global and the local modelling of the gravity field.