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Testing new geopotential models through comparison of high-resolution quasi-geoid models with GPS/levelling data

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Current gravity-dedicated satellite missions have been providing highly accurate data that can be inverted into Stokes coefficients of the geopotential. Although their mean square errors are also being estimated, their real performance, thus also the accuracy of all parameters synthesized from these coefficients, remain largely unknown. This article discusses validation of six current geopotential models derived from CHAMP and GRACE data through their comparison with independent data represented by a set of GPS/levelling stations in the area of Central Europe. Due to a different spectral content of height anomalies computed from the model and those derived from a combination of ellipsoidal and normal heights, the GGM-based solution is completed for a high-frequency component based on a detailed and highly accurate database of ground gravity and elevation data. Comparing obtained differences with those for the EGM96 reveals some problems of the new models namely with their low-frequency spectrum. These results agree well with conclusions of recent independent tests based on long-term averaged crossover altimetric data.