



Joint analysis of GPS and Gravity seasonal variations in eastern Belgium

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GPS measurements have been carried out in eastern Belgium since 1999, and since 2003 they are complemented with simultaneous gravity measurements. In 2003 and 2004, the GPS and gravity campaigns were performed twice a year, in spring and fall. The network consists of 6 GPS points and 12 gravity points linked to one absolute point. The GPS data have been processed with the GAMIT/GLOBK software in the framework of ITRF2000. They show several apparent vertical ground displacements in the order of 10 mm. The gravity data are referenced to an absolute point where the gravity variations are known. To be significant the gravity variations should exceed 10 μgal . We interpret the data by assuming that every significant change in ground height or g is linked to the watertable variations. Unfortunately, no direct watertable data are available and we had to use the rainfall integrated over a six month period as a proxy.

The GPS data seems to show that the ground displacements are mainly related to the watertable loading effect. However, this relation does not hold for the last fall campaign, perhaps due to the limitations of the watertable indicator. Its value in fall 2004, resulting from the exceptionally high summer rainfall, is probably biased by neglecting the enhanced evaporation during the summer months.

The variations are negligible in most of the gravity points. Some interesting correlations between gravity and rainfall are observed in a few stations.