

Vertical Deformation of GPS Stations Detected from GRACE

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ABSTRACT:

Long-term continuous Global Positioning System (GPS) observations have become an important tool for studying the various geodynamic processes. To fully study the geodynamic processes at GPS stations, the temporal movements of GPS stations induced by geophysical fluids such as atmosphere, ocean and hydrology, need to be considered in detail. Instead of using general circulation modes to capture the above geophysical effects on vertical deformation of GPS stations, we here using geophysical mass variations inversed from GRACE time variable gravity fields to retrieve the vertical deformations of GPS stations. First, we show theoretically that the large-scale GRACE data can be used to detect the local vertical deformation of GPS stations induced by geophysical fluids. Second, we show that the seasonal vertical deformation of GPS stations can be better retrieved from GRACE to compare with the general circulation models. And finally, we point out the advantages and disadvantages for using the GRACE data to retrieve the vertical deformation of GPS stations.