Performance of GPS-based accelerometry: CHAMP and GRACE

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Abstract: Extensive recovery experiments based on GPS satellite-to-satellite tracking data from the CHAMP and GRACE-A satellites show that the performance of GPS-based accelerometry is comparable for both satellites. Several different quality measures like the recovery error, correlation and the contribution measure are used to assess the performance of GPS-based accelerometry and these quality measures indicate that the best performance is obtained in along-track direction. In cross-track direction the performance is slightly worse and due to correlations between the accelerations and the initial conditions in cross-track direction, a bias in this direction seems hardly observable. Unfortunately, GPS-based accelerometry is hardly sensitive in radial direction, due to correlations between the accelerations in the radial direction and the initial conditions in radial and along-track direction. It is shown that predominantly the longer wavelengths are well determined and high-frequency accelerations, caused by e.g. geomagnetic storms, are not well recovered. © 2007 COSPAR.

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