

Non-gravitational Perturbations acting on GRACE

Toshihiro Kubo-oka[1]; Toshimichi Otsubo[2]; Tadahiro Gotoh[1]

[1] NICT; [2] Hitotsubashi Univ

In the GRACE mission, accelerations due to non-gravitational perturbations (atmospheric drag, solar radiation pressure, and Earth radiation pressure) are measured by on-board precise accelerometers. Attitudes of two satellites are also measured by the star camera assembly. According to the observations, the satellite X-axis (directed to other GRACE satellite) shifts from the along-track direction (parallel to the velocity vector) by about one degree. Moreover, their attitudes are different between leading and trailing satellite.

In this work, scale factor and bias of the accelerometer were estimated through the precise orbit determination using on-board GPS data. We also computed the non-gravitational acceleration from Macro Model that consists of the combination of eight flat plates and one column. Then, observed acceleration corrected by use of scale factor and bias was compared with the computed one. Through this analysis, the effect of (1) differences in the attitude of GRACE-A and B, and (2) the maneuver to switch the positions of the leading and trailing satellites (December, 2005) on the non-gravitational perturbations was investigated.