Satellite Laser Ranging Network: Where Should a New Station Be Placed? [Part II] For Better Satellite Orbits

*Toshimichi Otsubo[1], Yuichi Aoyama[2], Urs Hugentobler[3], Rolf König[4]

1. Hitotsubashi University, 2. National Institute of Polar Research, 3. Technische Universität München, 4. Deutsches GeoForschungsZentrum GFZ

Precise orbits of artificial satellites are not only useful for flight dynamics and geodetic products but also important for monitoring the phenomena of the changing Earth such as sea level rise and ice melting. Satellite Laser Ranging (SLR) is one of the most precise techniques to determine the orbits of satellites. About 35 SLR stations are being operational all over the world but the distribution of the current station network is not uniform. In particular, there are only 7 stations in the Southern hemisphere and there is no stations below 37 degrees latitude. It is found that this results in relatively less accurate orbit determination in the southern hemisphere.
A virtual station is added to the existing SLR network to evaluate the impact of a future station. The simulation procedure is similar to our previous study (Otsubo et al., EPS, 2016). Combining a simulated data set of a virtual station to the real existing data set, orbit determination procedures are simulated. For instance, assuming an active SLR station at Syowa (69S, 39E), the time-varying formal errors of Jason-2 and Cryosat are improved in the southern high latitude region by 20 to 30%.

Keywords: GGOS, Satellite Laser Ranging, Precise Orbit Determination

