

Novel Data Analysis Strategy at the SwissOGS Zimmerwald (7810)

Julian Rodriguez-Villamizar and Thomas Schildknech

Astronomical Institute University of Bern, Bern, Switzerland

A standard figure of merit to assess the quality of satellite laser ranging (SLR) observations, for a given station, may be a time dependent average describing the root-mean-square (RMS) after the formation of the so-called normal points. The nominal RMS per normal point depends on the station technical specifications and target characteristics, such as the so-called target depth, which describes the location of the target's reflective elements with respect to the target's centre of mass and their orientation with respect to the observing station. However, other information affecting the quality of the observations, e.g. the return rates, are presumably not analysed even though those quantities potentially provide useful information about the health, or status, of specific system components. In this work, we will use the latter as the observables from which we want to infer indicators for the status of the system, and therefore the quality of the observations.

Specifically, the questions addressed by the present work are: how can we make use of historical raw data to derive and define key performance indicators (KPIs)? To which specific system components might these KPIs relate?

Is there any benefit on using such KPIs for detecting system flaws? To answer these questions, we analysed passes to the target Lageos-1 during one year, considering the correct discrimination of the target's backscattered photons from the background noise. One outcome shows a decreasing return rate per month matching with independent in situ laser power measurements utilizing a power meter. In this case, the KPIs helped to identify health issues related to our laser source.