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Analysis of telemetry laser measurements: a tentative of improving the analysis and evaluation methods

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The anlaysis of telemetry laser at millimeter level challenges us in many aspects: the observations, the orbit calculation, the reference system etc. In this study we tried a modified analysis approach based on the standard Least-Square method, with a successive filtering scheme, in order to obtain the observation data set of a better quality. Several evaluation methods have been applied in order to understand which analysis approach may be better.

Observations for four satellites, Lageos1 and 2, Stella and Starlette, have been studied. They are the classical geodetic satellites in the Mid- and Low-orbit respectively. The GINS/DYNAMO package developed at OMP-CNES is used for the orbit calculation and the inversion. The CATREF is applied for the transformation of reference systems. More distinct improvements are seen in the analysis of Starlette and Stella data (orbit as well as the results of inversion), than of Lageos Satellites, in using our analysis method. We summarize here what we have tried and the best possible method that we have found, from using an one-year study of telemetry laser data as well as of a colocalisation campaign in Tahiti.