EOP Prediction with special focus on SLR

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The Earth orientation parameters (EOP) became a significant interest in various fields of Earth sciences, astronomy, and climate change studies, as their variations are related to mass redistribution, gravitational, and geodynamic processes in the Earth system. Moreover, realtime EOP information is needed for many space geodetic techniques applications, including satellite navigation on ground and for low-Earth-Orbiters, as well as real-time tracking and navigation of interplanetary spacecraft, and climate forecasting. Currently, the EOP can be estimated at the best possible accuracies with modern high-precision space geodetic techniques like Very Long Baseline Interferometry (VLBI), Global Navigation Satellite Systems (GNSS), and Satellite Laser Ranging (SLR). However, the complexity and time-consuming data processing always lead to time delays. Consequently, predicting EOP is of great scientific and practical importance. Accordingly, several methods have been developed and applied for EOP prediction. However, the accuracy of EOP prediction is still not satisfactory even for prediction of just a few days in the future. Therefore, new methods or a combination of the existing approaches are investigated to improve the accuracy of the predicted EOP. Such in-depth investigations are currently conducted within the “EOP Prediction Comparison Campaign (EOP-PCC)” organized by IAG and IERS. We will briefly present the EOP-PCC and show our 8 contribution. In this study, we investigate a new prediction package (input data and method) to improve the possibility of bridging the existing gap between the observation and the final estimated product. We run our prediction algorithm with official IERS EOP series as well as with our BKG’s single-technique analysis products for VLBI and SLR using the combination of a deterministic and a stochastic method. This method consists of a deterministic part estimated by SSA, whereas Copula is used for modeling the stochastic component. We will show the potential of using the SLR technique to obtain real-time EOP estimates.