REFAG 2022 THESSALONIKI - GREECE
17-20 October 2022
IAG

Operational prediction of Earth orientation parameters and effective angular momentum at ETH Zurich

Benedikt Soja (ETH Zurich), Mostafa Kiani Shahvandi (ETH Zurich), Matthias Schartner (ETH Zurich) and Junyang Gou (ETH Zurich)

Abstract. Earth orientation parameters (EOP) define the transformation between terrestrial and celestial reference systems and are needed for precise navigation on Earth and in space. EOP are typically determined by different space-geodetic techniques and combinations thereof. In order to overcome latencies in the processing and combination of space-geodetic observations, accurate predictions of EOP are essential for many real-time applications.

The Space Geodesy group at ETH Zurich has recently established its Geodetic Prediction Center (GPC; https://gpc.ethz.ch) to operationally provide predictions of several geodetic variables, including EOP. The prediction of EOP is performed based on past values of EOP and effective angular momentum (EAM) time series, as well as forecasts of EAM. Data sources for the EOP time series include products provided by IERS, SYRTE and JPL. EAM data is obtained from GFZ Potsdam. Furthermore, we now also provide EAM predictions to enhance and expand the products provided by GFZ. Our predictions are based on various novel machine learning approaches, which are specifically tuned for the respective EOP components and forecast horizons.

In this contribution, we will give an overview of the activities at ETH related to the prediction of EOP and EAM. In particular, we will focus on a comparison of predictions based on different EOP and EAM input time series. The underlying EOP time series are derived with different space-geodetic data sets and combination strategies and a quality assessment will thus be beneficial for improving EOP products. Furthermore, we will investigate the impact of different EAM data sources on the prediction of EOP.