Hydrodynamic Predictions of Seasonal Variations in Earth Orientation

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Short-term forecasts of atmospheric, oceanic, and terrestrial hydrospheric effective angular momentum functions (EAM) of Earth rotation excitation are combined with least-squares extrapolation and auto-regressive modelling to routinely predict polar motion (PM) and ΔUT1 for up to 90 days into the future.

Based on several experiments with more than 500 individual hindcasts from 2016 and 2017, a best-performing parametrization for the method was identified. At forecast horizons of 10 days, the prediction accuracy is 3.02 mas and 5.39 mas for PM and ΔUT1, respectively, corresponding to improvements of 34% and 44% with respect to Bulletin A. At forecast horizons of 60 days, prediction accuracies are 12.52 mas and 107.96 mas for PM and ΔUT1, corresponding to improvements of 34% and 8% over Bulletin A.

The 90 days-long EAM forecasts leading to those improved EOP predictions are routinely published once per day at www.gfz-potsdam.de/en/esmdata and are thus ready-for-use for operational EOP prediction efforts.