



## **Operational Earth Rotation Parameters and Predictions from modelled Atmosphere-Hydrosphere Dynamics**

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Consistent simulations of mass, momentum, and heat fluxes within and exchanges between the subsystems atmosphere, oceans, and continental hydrosphere are generated daily by means of an operational processing system consisting of the Ocean Model for Circulation and Tides and the Land Surface and Discharge Model forced with global operational weather data provided by the European Centre for Medium-Range Weather Forecasts (ECMWF). Mass conservation within the modelling system is ensured by coupling via continental freshwater fluxes and by introducing an additional ocean layer compensating annual total mass imbalances. Daily updated atmospheric, oceanic and hydrological effective angular momentum functions are publicly available with a few days latency only, enabling quasi-real time interpretation of observed Earth rotation variations. Exemplarily, recent variability patterns of angular momentum as well as relevant underlying physical processes related to mass transports in the atmosphere-hydrosphere system will be presented.

By replacing ECMWF's analyses with its medium-range forecasts, the processing system also allows short-term predictions of Earth rotation parameters. As demonstrated in a hind-cast experiment using 10-day atmospheric forecasts from 2003 - 2008, short-term polar motion prediction errors can be reduced by 26%, what is mainly a consequence of taking into account short-term dynamics of geophysical fluids not considered in the current prediction approach of IERS bulletin A. Modelled forecasts reach relative explained variances between 40% and 80%, whereas bulletin A forecasts can explain only up to 40% of the observed polar motion variance within the first 10 prediction days.