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Forecast products for flight planning from a researchers' perspective

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The scientific aim of the North Atlantic Waveguide and Downstream Impact Experiment (NAWDEX; Schaefer et al. 2018) was to increase the physical understanding and to quantify the effects of diabatic processes on disturbances of the jet stream and their influence on downstream high-impact weather. The field campaign in September/October 2016 involved four research aircraft which performed in total 49 research flights. In preparation of NAWDEX and previous related field campaigns such as T-NAWDEX Falcon (Schaefer et al. 2014) and ML-Cirrus (Voigt et al. 2017), researchers at ETH Zurich developed web-based forecasting tools using output of ECMWF's high-resolution and ensemble forecasting system. These tools allowed to identify regions where diabatic processes were at work and where they interacted with the jet stream. For example, the computation of warm conveyor belt trajectories from the ensemble forecasting system helped to assess the probabilities of these rapidly ascending air streams and to design preliminary flight plans a few days in advance. The flight plans were then refined using the high resolution deterministic forecast. The use of web-based vertical cross-section tools as well as the computation of trajectories starting from the envisaged flight path were particularly helpful. Accordingly, this talk will demonstrate the variety of forecasting products and will provide examples on how they were used during NAWDEX and related campaigns.

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