



Contribution ID: 82

Type: **Oral presentation**

ERA5-Land, dedicated land surface reanalysis

Thursday, 4 June 2020 10:40 (10 minutes)

ECMWF is currently producing the next generation of European Reanalysis ERA5. Among others, it will make it possible to better understand the processes and interactions between different components of the Earth System which has derived into the climate from 1950 until present. The core of ERA5 is the ECMWF Integrated Forecasting System in combination with a powerful 4D-VAR data assimilation system. The description of the land surface component is also part of the ERA5 portfolio. However, with the objective of serving (primary) the land surface community and other communities focused on land applications, an enhanced offline version of the land component is also under production, resulting into the ERA5-Land dataset. For example, a well-defined spin-up strategy has proved to provide a much better hydrological consistency over all the available period. ERA5-Land dataset is a unique dataset of its kind that provides a global scale description of the most important land variables through a single simulation driven by near-surface atmospheric fields from ERA5, with thermodynamical orographic adjustment of temperature. The synchronization with ERA5T mode will also make it possible to provide NRT updates. One of the added values of ERA5-Land with respect to the ERA5 atmospheric reanalysis is a global projected horizontal resolution of approximately 9 km (around 4 times finer resolution than ERA5), matching the ECMWF TCo1279 operational grid, and therefore providing consistent input for Numerical Weather Prediction and climate studies involving land water resources, but also for accurate hydrological and agricultural modeling. The offline nature of land reanalysis allows to incorporate forefront model developments before the production phase. For example, ERA5-Land benefits from a revision of the soil thermal conductivity, making it more accurate the heat transfer through the vertical dimension. This presentation will provide an overview of the ERA5-Land dataset and its main features.

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Session Classification: Morning session

Track Classification: UEF2020