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Flex_extract version 7.1: Extraction and preparation of ECMWF's meteorological data for the Lagrangian atmospheric transport model FLEXPART

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The flex_extract software package is a tool to extract and prepare meteorological data from the European Centre for Medium-Range Weather Forecasts (ECMWF) as input for the Lagrangian particle transport model FLEXPART (Anonymous, 2019; Stohl et al., 1998; Stohl et al., 2005; Pisso et al., 2019). These data fields describe the state of the atmosphere relevant for transport modelling.

ECMWF provides a variety of different datasets where each dataset contains various field types, level types, forecast times etc., which need to be combined properly to construct the best input data for FLEXPART. Recently, ECMWF released new publicly available reanalysis datasets, ERA-5 and CERA-20C. This required a substantial revision of the flex_extract tool. As major differences between different datasets and a number of methods for accessing the ECMWF MARS database should be considered, a completely revised flex_extract tool has been prepared as version 7.1.

Furthermore, the flux data required by FLEXPART, especially precipitation, are accumulated over each forecast and therefore need to be de-accumulated and also disaggregated for use in FLEXPART. A realistic and conservative disaggregation and interpolation method is important for FLEXPART. A former, simple method lead to underestimation of peaks and overestimation of local minima. A new reconstruction method was therefore implemented in flex_extract's version 7.1 which introduces additional supporting grid points in each time interval (Hittmeir et al., 2018).

Flex_extract v7.1 is being introduced, possible dataset extractions and the limitations are described and the behavior of the new disaggregation method will be demonstrated by comparing old and new results with FLEXPART.

Anonymous (2019): The official FLEXPART web site. https://www.flexpart.eu/.

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