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How to Prepare Atmospheric Model Data for Publication with the ATMODAT Standard

Angelika Heil¹, Andrea Lammert¹, and Anette Ganske²

¹Data Management Department, German Climate Computing Center (DKRZ), Hamburg, Germany

²TIB – Leibniz Information Centre for Science and Technology, Hannover, Germany

Atmospheric Models are a relevant element of Climate Research. Access to this atmospheric model data is not only of interest to a wide scientific community but also to public services, companies, politicians and citizens. The state-of-the-art approach to make the data available is to publish them via a data repository that adheres to the FAIR (Findable, Accessible, Interoperable, and Reusable) principles⁽¹⁾. A FAIR publication of research data implies that the data are described with rich metadata and that the data and metadata meet relevant discipline-specific standards.

A very comprehensive data standard has been developed for the climate model output within the Climate Model Intercomparison Project (CMIP)⁽²⁾, which largely builds upon the Climate and Forecast Metadata Conventions (CF Conventions)⁽³⁾. Nevertheless, there are many areas of atmospheric modelling, where data standardisation according to the CMIP standard is not possible or very difficult. To facilitate this task, the ATMODAT standard⁽⁴⁾, a quality guideline for the FAIR and open publication of atmospheric model data, was recently established.

The ATMODAT standard defines a set of requirements that aim at ensuring a high degree of reusability of published atmospheric model data. The requirements include the use of the netCDF file format⁽⁵⁾, the application of the CF conventions⁽³⁾, a data publication with a DataCite DOI⁽⁶⁾, and rich and standardised metadata for the data files, the DOI and on the landing page.

The *atmodat data checker*⁽⁷⁾ was developed to support data producers in checking if their file metadata comply with the ATMODAT standard.

We demonstrate the application of the ATMODAT standard to selected datasets from a building-resolving atmospheric model, the "grassroots" AEROCOM MIP, and weather pattern data derived from an atmospheric reanalysis. We explain the practical workflow involved to achieve an ATMODAT-compliant data publication and discuss the various challenges.

⁽¹⁾ <https://doi.org/10.1038/sdata.2016.18>

⁽²⁾ <https://doi.org/10.5194/gmd-13-201-2020>

⁽³⁾ <https://cfconventions.org/>

⁽⁴⁾ https://doi.org/10.35095/WDC/atmodat_standard_en_v3_0

⁽⁵⁾ <https://www.unidata.ucar.edu/software/netcdf/>

⁽⁶⁾ <https://datacite.org/>

⁽⁷⁾ https://github.com/AtMoDat/atmodat_data_checker