Project title: COSMO-REA (COSMO Regional Reanalysis)

Project acronym for link in /pool/data: COSMO-REA

Principal investigator (long-term responsible contact): Martin Schupfner

Applicant (if not the same as above):

Allocation period: 01-2024 to 12-2033

Allocation Period	01-2024 to 12-2033
Volume	56 T
Expected Volume Change	-
Total Volume requested	56 T
License allows usage on DKRZ resources	Yes (CC By 4.0)

Project overview

The high-resolution reanalysis system COSMO-REA6 has been developed based on the NWP model COSMO in a cooperation between Hans-Ertel-Centre for Weather Research (HErZ) and the German Meteorological Service (DWD). Initially, COSMO-REA6 was produced for 1995-2014 at University of Bonn, Hans-Ertel-Centre for Weather Research (HErZ), see https://www.herz.uni-bonn.de/wordpress/. It was extended from 2015 onwards by DWD.

The DWD provides selected COSMO-REA6 output under https://opendata.dwd.de/climate_environment/REA/. The data provided via ESGF and WDCC underwent an additional CMIP/CORDEX-like standardisation ("CMORisation"), conducted in a cooperation between DKRZ and DWD within the OcMOD (Observations closer to MOdel Data) NFDI4Earth Pilot, and also comprises a different selection of parameters that was determined through a community survey.

The regional reanalysis system for Continental Europe matches the domain of the CORDEX EURO-11 specifications, albeit at a higher spatial resolution, i.e., 0.055° (6 km) instead of 0.11° (12 km). It comprises the assimilation of observational data using the existing nudging scheme of COSMO complemented by snow, SST and soil moisture analysis modules and uses ERA-Interim data as lateral boundary conditions. The reanalysis data set covers the period 1995 to August 2019. Due to the end of production of the forcing global reanalysis ERA-Interim, COSMO-REA6 has also been discontinued. A second version of COSMO-REA6, labeled "R6G2", that uses the data of the global reanalysis ERA5 as lateral boundary conditions, is currently under development at DWD.

References:

Bollmeyer, C.; Keller, J. D.; Ohlwein, C.; Wahl, S.; Crewell, S.; Friederichs, P.; Hense, A.; Keune, J.; Kneifel, S.; Pscheidt, I.; Redl, S.; Steinke, S. (2015). Towards a high-resolution regional reanalysis for the European CORDEX domain. doi:10.1002/qj.2486

Kaspar, Frank; Niermann, Deborah; Borsche, Michael; Fiedler, Stephanie; Keller, Jan; Potthast, Roland; Rösch, Thomas; Spangehl, Thomas; Tinz, Birger. (2020). Regional atmospheric reanalysis activities at Deutscher Wetterdienst: review of evaluation results and application examples with a focus on renewable energy. doi:10.5194/asr-17-115-2020

Weblinks:

https://www.dwd.de/DE/klimaumwelt/klimaueberwachung/reanalyse/reanalyse_node.html

https://reanalysis.meteo.uni-bonn.de/?COSMO-REA6

https://nfdi4earth.de/2participate/pilots

https://nfdi4earth.de/images/22KasparObservationsclosertoModelDataOcMOD.pdf

https://gitlab.dkrz.de/dicad-pp/ocmod

https://c6dreq.dkrz.de/files/ocmod_dreq.php

Data content

The dataset includes a subset of the COSMO-REA6 output (determined by a survey - https://c6dreq.dkrz.de/files/ocmod_dreq.php), consisting of atmospheric and soil/land variables of the COSMO model with frequencies: hourly, 6-hourly, daily and monthly. The model output covers the time period 1995-01 to 2019-08 for Europe (EUR-11 domain, but with 6km horizontal resolution).

Range of planned scientific data usage

The data is provided under a CC By 4.0 license. In a survey, conducted by DWD and DKRZ to determine the scientific parameters to provide and the use cases, the following use cases were identified:

- Reference Data
- Energy Application
- Climate Dynamics
- Extreme Events
- Evaluation
- Forcing Data
- Impact Modeling

The survey results are available here: https://c6dreq.dkrz.de/files/ocmod_dreq.php

Data Storage Usage Plan

The data shall be offered for 10 years, unless this version becomes obsolete (eg. by the users only relying on the to-be-provided successor R6G2 in the future). In this case the COSMO-REA6 data will still be available via the WDCC and DOKU long term archives while R6G2 would be provided on disk and via the DKRZ and DWD ESGF nodes.