Extpar

New datasets, technical changes and outlook

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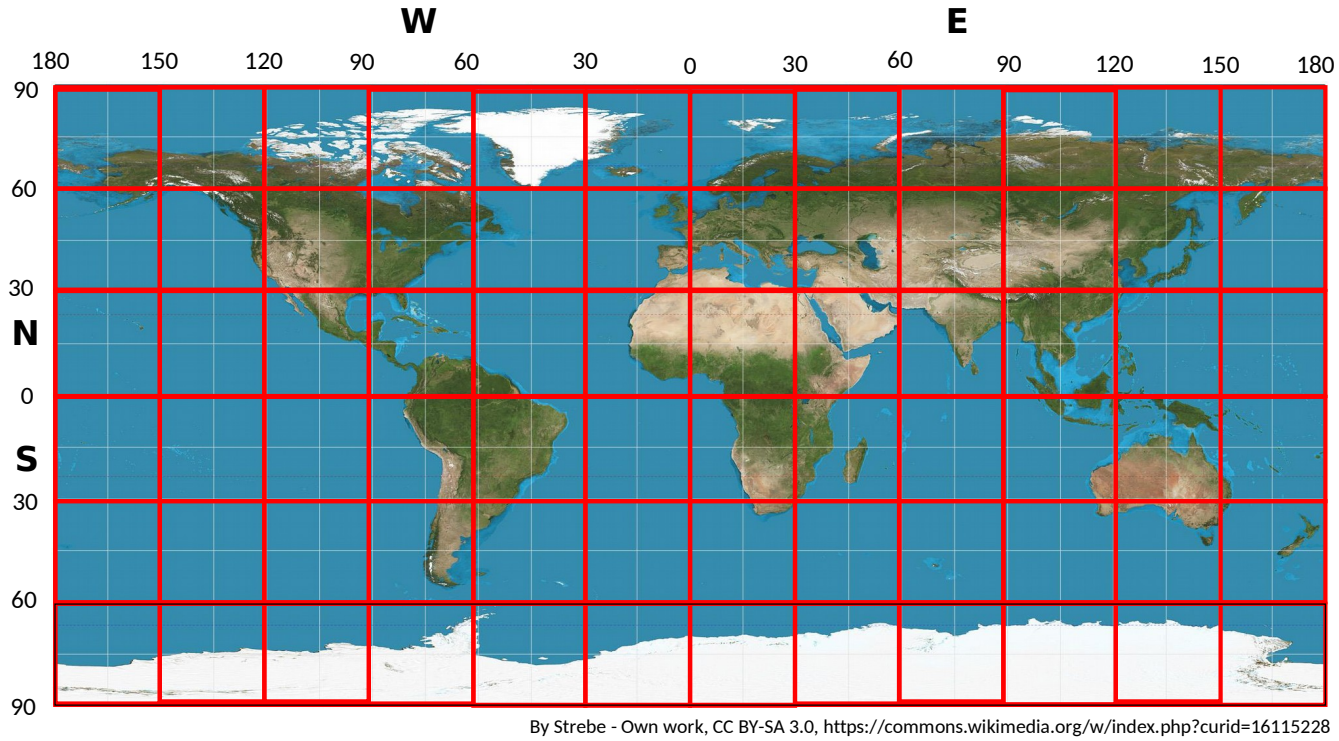
Merit-Rema topography

- Global topography dataset with ~100m resolution
- Antarctica (Rema)
- Rest of the world (Merit)
- Namelist switch itopo_type = 3
- Available for COSMO and ICON



By Strebe - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=16115228

Other new datasets

CAMS aerosols

- Aerosol climatology (2003-2013)
- Namelist switch iaot_type = 5
- Due to unresolved bug, only with Intel compiler on Mistral at DKRZ
- Available for ICON only

ERA climatologies

- New Python-CDO script *extpar_era_to_buffer.py*
- Replace remapping of ERA-climatologies with DWD-Icontools
- Namelist switch iera_type = 1 for ERA5, iera_type = 2 for ERA-I
- Extpar finally provides ALL necessary external parameters for ICON

Technical Changes

Python rewrite of Fortran code

- *exptar_ahf_to_buffer.py* and *extpar_isa_to_buffer.py* latest replacements
- Drastical reduction of code-complexity and maintenance effort
- Memory issues for large input datasets
- *extpar_flake_to_buffer* still written in Fortran

Testsuite

- Enhanced tolerance testing, optional threshold defined for each test/field
- Identical testcases on all target machines
- OpenMP-support for CSCS machines
- Remove COSMO-D2 test
- Script to extract datafiles from namelist before test-runs

Outlook

Reduce redundancy in testsuite

- About 80% of all settings identical
- Goal is at least one test per namelist-switch

Container

- Provide Docker container to be platform independent

Python rewrite of Fortran code

- Rewrite exptar_flake_to_buffer with Python-CDO
- Find solution for processing large input data (> 4 GB) for global grids

Bugs

- Fix CAMS aerosols for GCC

Information about Extpar

GitHub

- Readme: https://github.com/C2SM-RCM/extpar/blob/master/README.md
- Release Notes: https://github.com/C2SM-RCM/extpar/blob/master/ReleaseNotes.md
- Full documentaion: https://github.com/C2SM-RCM/extpar/blob/master/doc/user_and_implementation_manual.pdf
- Issues: https://github.com/C2SM-RCM/extpar/issues
- Open Pull Requests: https://github.com/C2SM-RCM/extpar/pulls

C2SM-Wiki

- https://wiki.c2sm.ethz.ch/MODELS/IconCosmoExtpar

Source-Code Administrator

- Jonas Jucker, jonas.jucker@c2sm.ethz.ch

Discussion

Consistency between NetCDF and GRIB

- Earth surface height: topography_c vs. HSURF
- UV albedo: ALUVD [%] vs. ALB_UV12 [no unit]
- T_2M_CLIM: long_name="monthly mean T2M climatology 1990-2019" ; no data source provided! Is it the same as T_CL(CRU)?

Urban

- New urban parameters
- Developments from PP CITTA

JSBACH 4 Extpar

- Status?

Discussion – Appendix I

Some examples: *Earth surface height*:
EXTPAR variable name: topography_c ; GRIB 2 short name : HSURF

Fraction of impervious surface area:
EXTPAR variable name: ISA ; GRIB 2 short name : FR_PAVED

Land use class fraction:
EXTPAR variable name: LU_CLASS_FRACTION ; GRIB 2 short name : FR_LUC

2m temperature climatology:
EXTPAR variable name: T_2M_CLIM , T_CL ; GRIB 2 short name : T_2M_CL ... Furthermore T_CL is also defined as soil temperature at 36cm depth

Long wave surface emissivity:
EXTPAR variable name: EMISS_RAD, EMISS ; GRIB 2 short name : EMIS_RAD

the units used in the NetCDF output do not always match the units used in the equivalent GRIB 2 field. Some examples:
UV albedo :
EXTPAR name and units: ALUVD in % ; GRIB 2 name and units: ALB_UV12 without units (i.e. in [0,1]).

The long name used for some variables is now always very descriptive. Some examples:

T_2M_CLIM : long_name="monthly mean T2M climatology 1990-2019" ... but what is the data source? Is it the same as T_CL (CRU)?

EMISS_RAD : long_name="long wave surface emissivity" ... but what is the data source (it is specified for EMISS but not for EMISS_RAD)?

Discussion – Appendix II

My questions:

wouldn't it be meaningful to harmonise the EXTPAR NetCDF and the GRIB 2 nomenclatures and units? And to follow a stricter naming convention? Who can do that?
wouldn't it be meaningful to use a more systematic and descriptive approach to set the long name?

I thought that the DWD wanted to have the possibility to convert the EXTPAR NetCDF output into GRIB 2. Is it still the case? What about the variables which do not have a GRIB 2 equivalent