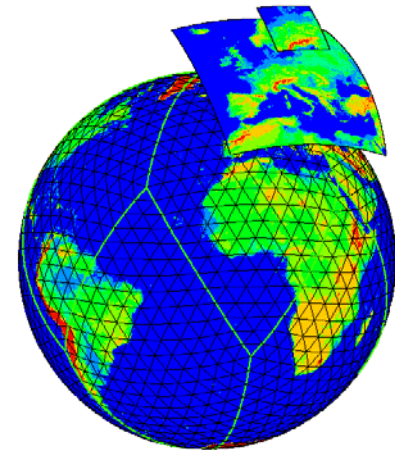


Consolidation of software for the generation of External Parameters and extension with new raw data sets

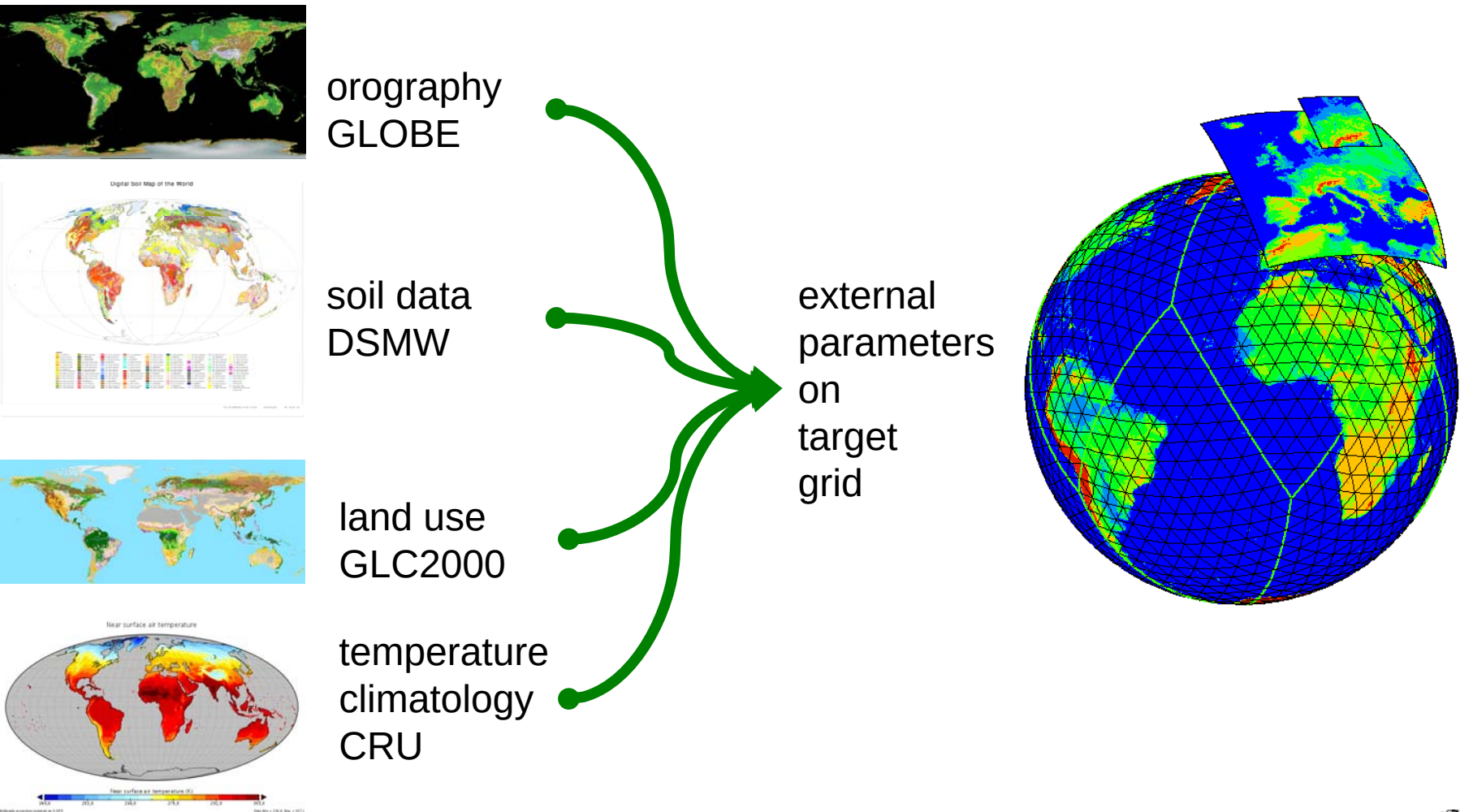
Hermann Asensio



Outline

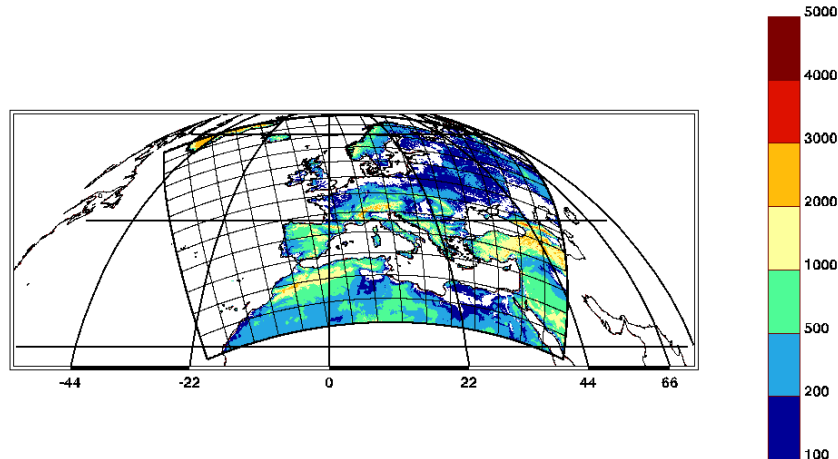
- current status of software system for external parameters
- Software Requirements Specification for new software
- planned extensions

Overall description of the External Parameter System

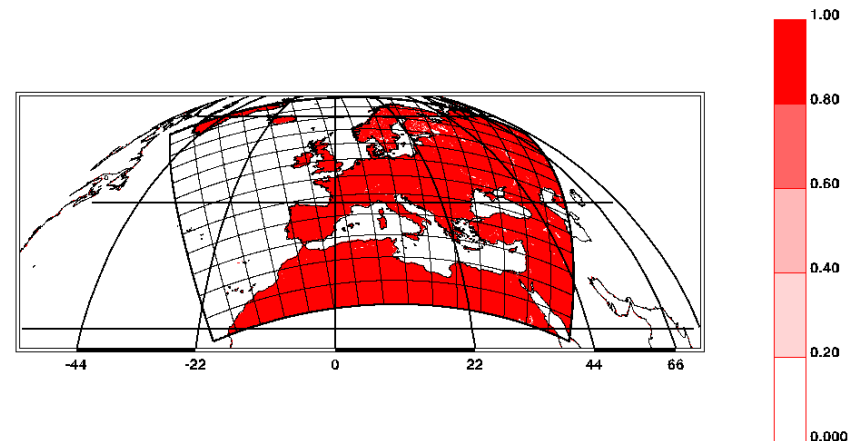


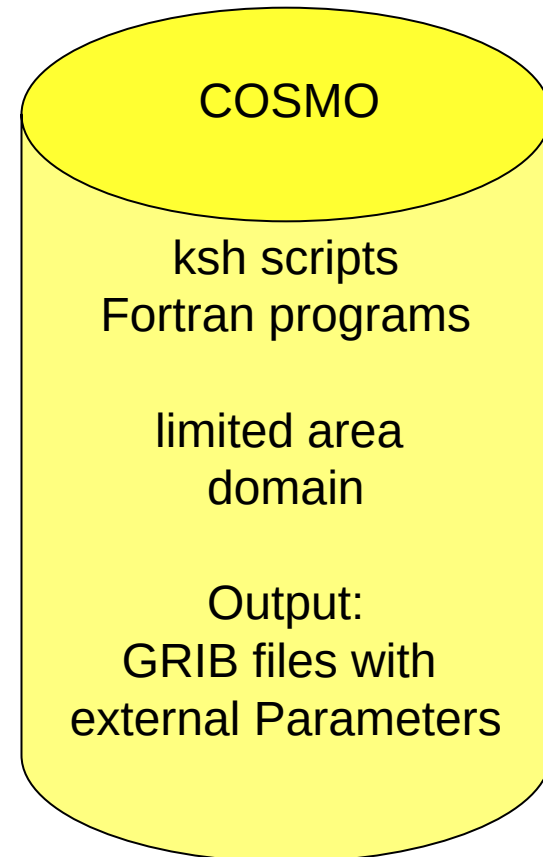
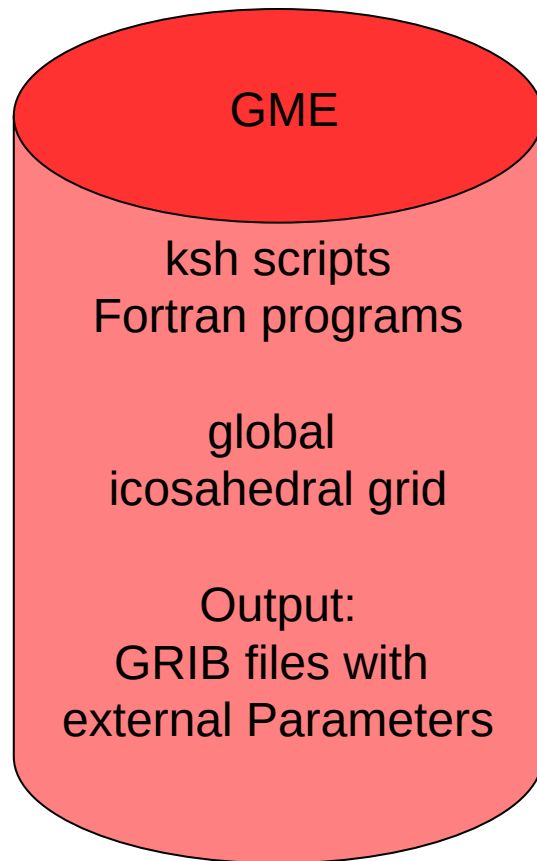
Examples for external parameters: surface geometrical height [m] and fraction of land cover (land-sea mask)

Z [m] 2001010100 + 000h DWD Routine
mean: 221.99 std: 412.42 min: -405.00 max: 3935.88

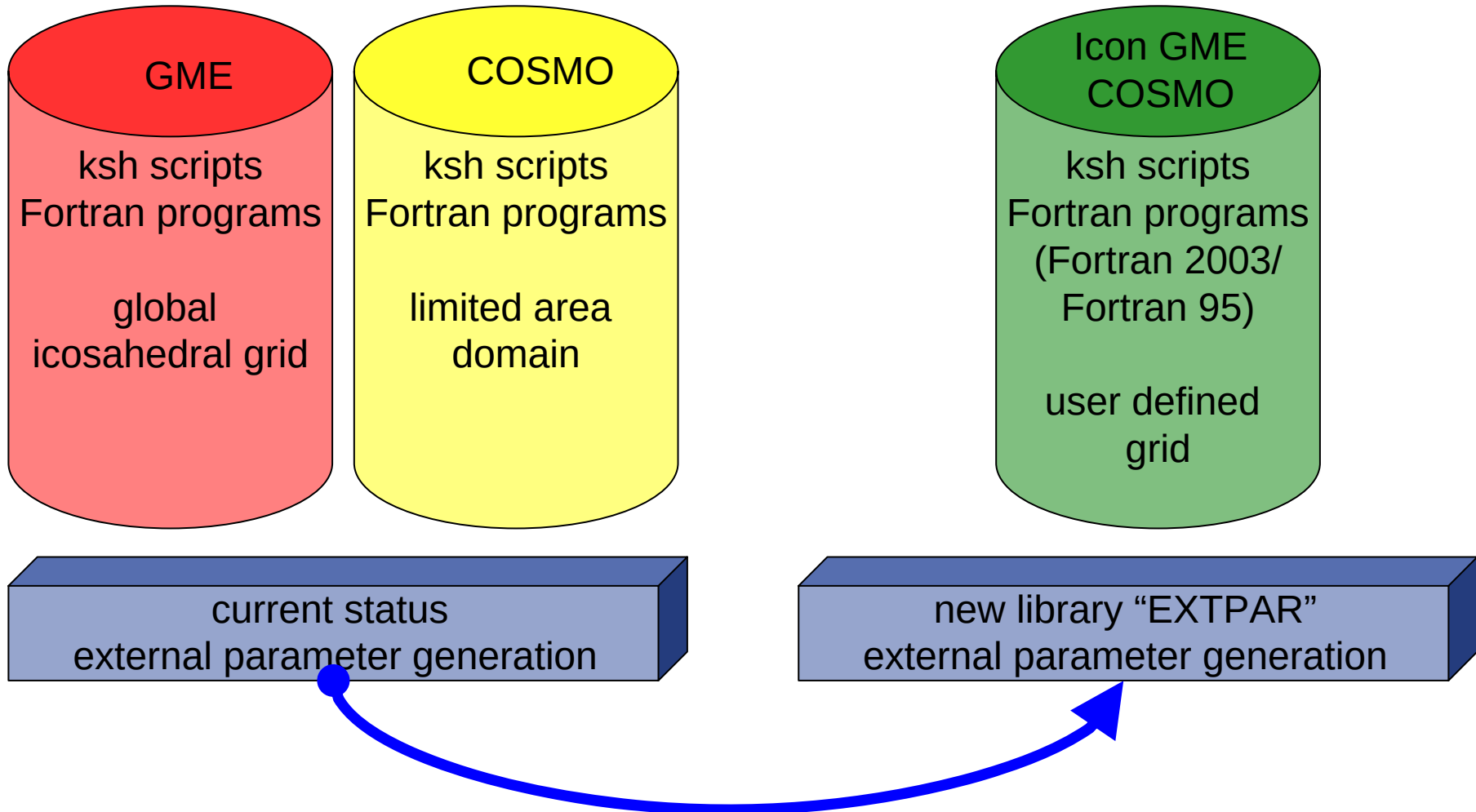


FR_LAND [proportion] 2001010100 + 000h DWD Routine
mean: 0.52 std: 0.49 min: 0.00 max: 1.00





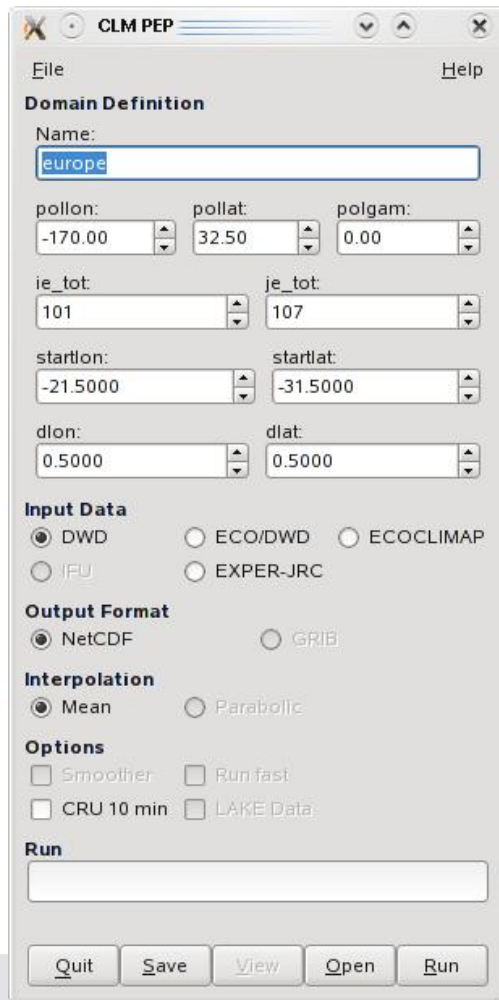
➔ Both systems use the same raw data sets.



EXTPAR and PEP

Usage of PEP

GUI Version



CLM PEP

File Help

Domain Definition

Name:

pollon: pollat: polgam:

ie_tot: je_tot:

startlon: startlat:

dlon: dlat:

Input Data

☒ DWD ☐ ECO/DWD ☐ ECOCLIMAP

☐ IFU ☐ EXPER-JRC

Output Format

☒ NetCDF ☐ GRIB

Interpolation

☒ Mean ☐ Parabolic

Options

☐ Smoother ☐ Run fast

☐ CRU 10 min ☐ LAKE Data

Run

Quit Save View Open Run

WEB PEP

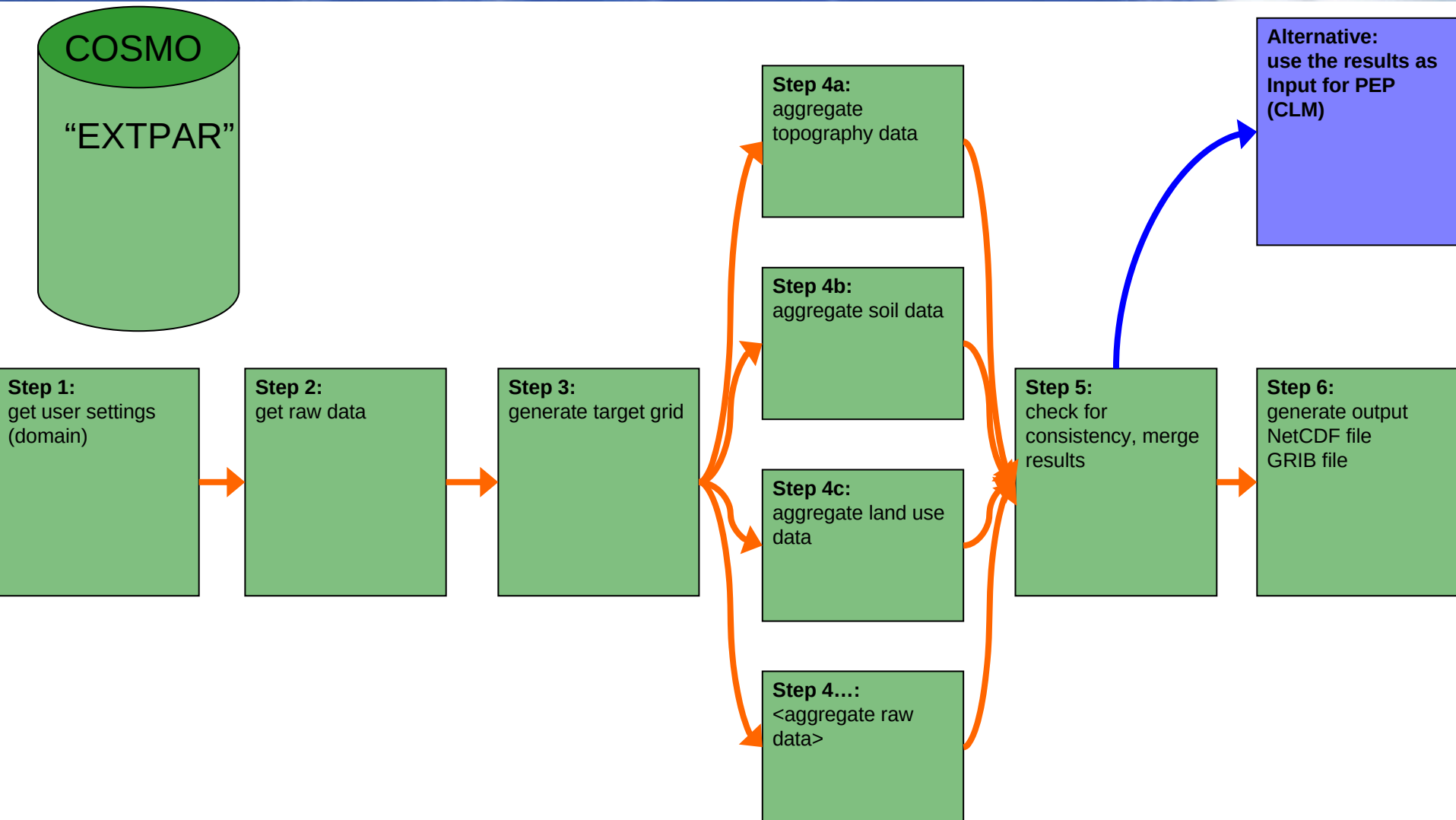
Fill out the form to create an external data set

pollon		
pollat		
polgam	0	
ie_tot		
je_tot		
startlon		
startlat		
dlon		
dlat		
Input data set	DWD	
Output format	NetCDF	
Options	☐ CRU 10min	
email address		
Submit Reset		

PEP Version 0.74 18.02.2009

Deutscher Wetterdienst

System for generation of external parameters



Software Requirements Specifications for EXTPAR

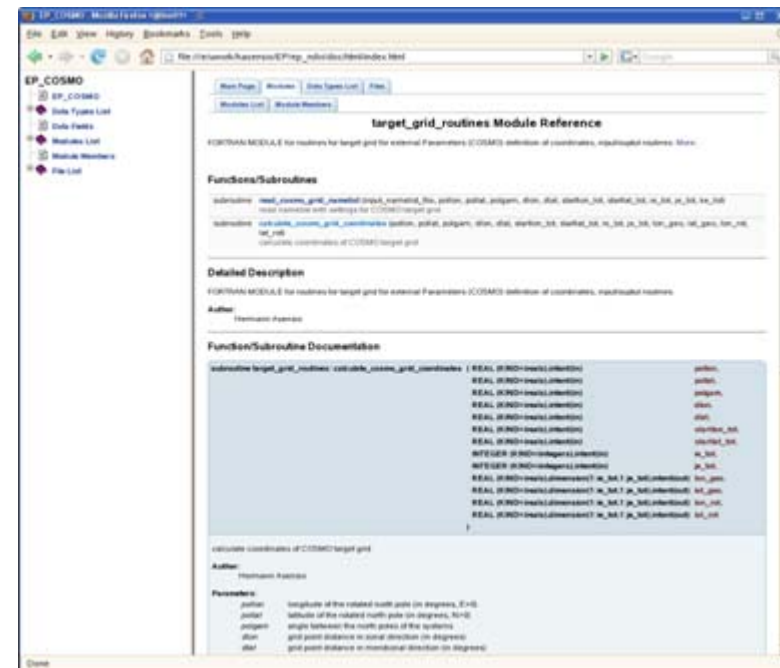
user requirements:

- support of variable domains (including poles) on the earth
- the output data should contain information on the processing software and input raw data (reproducibility)
- the EXTPAR software system should be run from a shell
- addition of further external parameter fields should be feasible

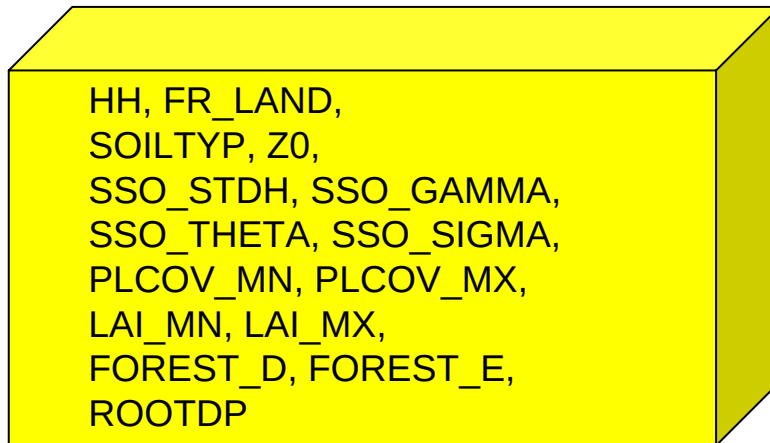
Software Requirements Specifications

technical requirements:

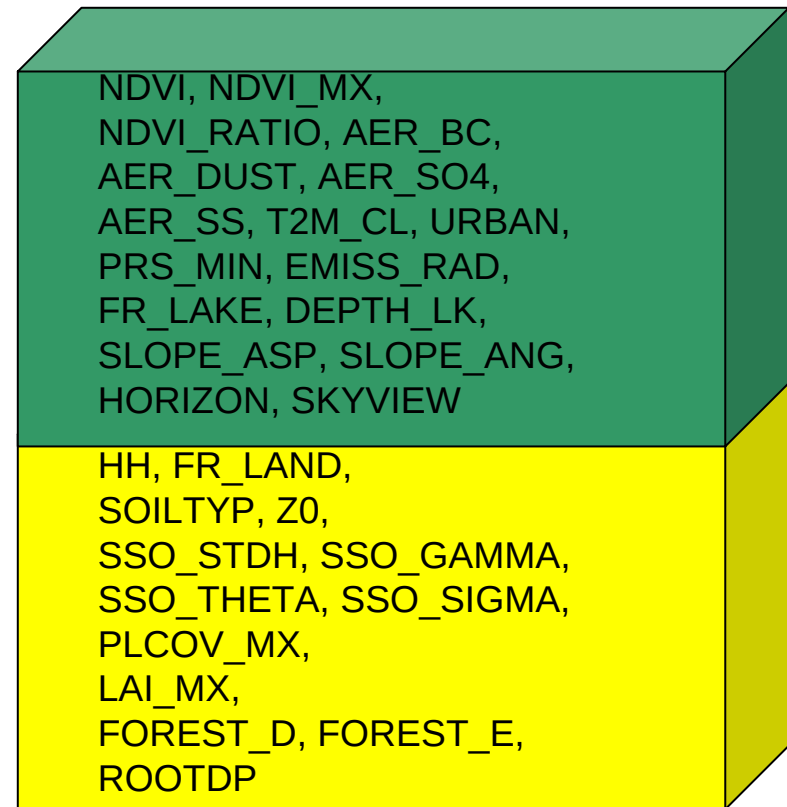
- NetCDF as basic file format for Input/Output
- source code in Fortran 2003 / Fortran 95 Standard
- technical documentation with doxygen (HTML and/or Latex style documentation generated with the help of “tags” from comments in the Fortran source code)



Additional external parameters



➔ Current external parameter fields for the COSMO model, total 15 fields

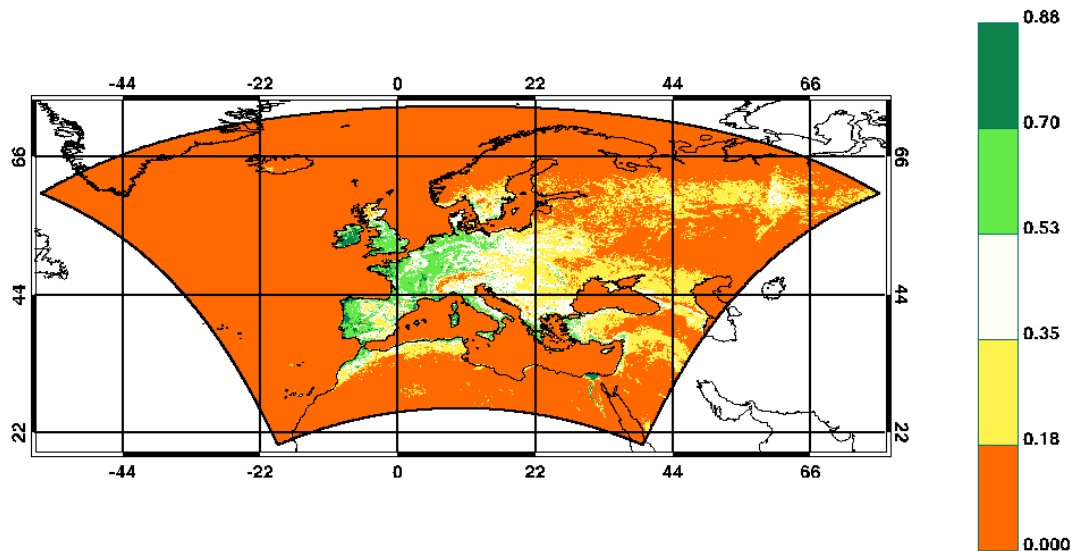


➔ planned extensions for the COSMO model, total 30 fields

Additional external parameters Normalized Differential Vegetation Index (NDVI) (seasonal cycle)

NDVI [1] 2001010100 + 000h DWD Routine

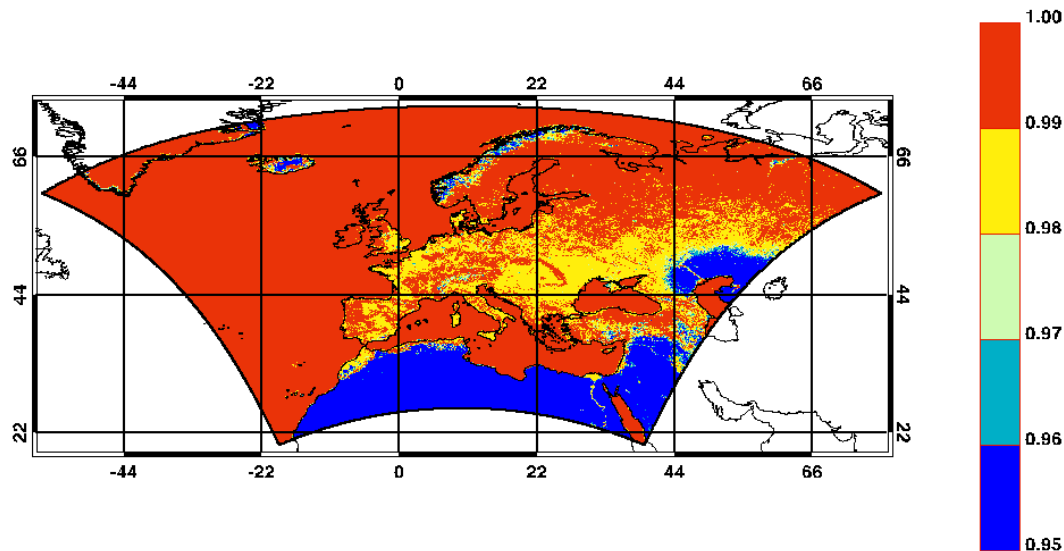
mean: 0.11 std: 0.16 min: 0.00 max: 0.88



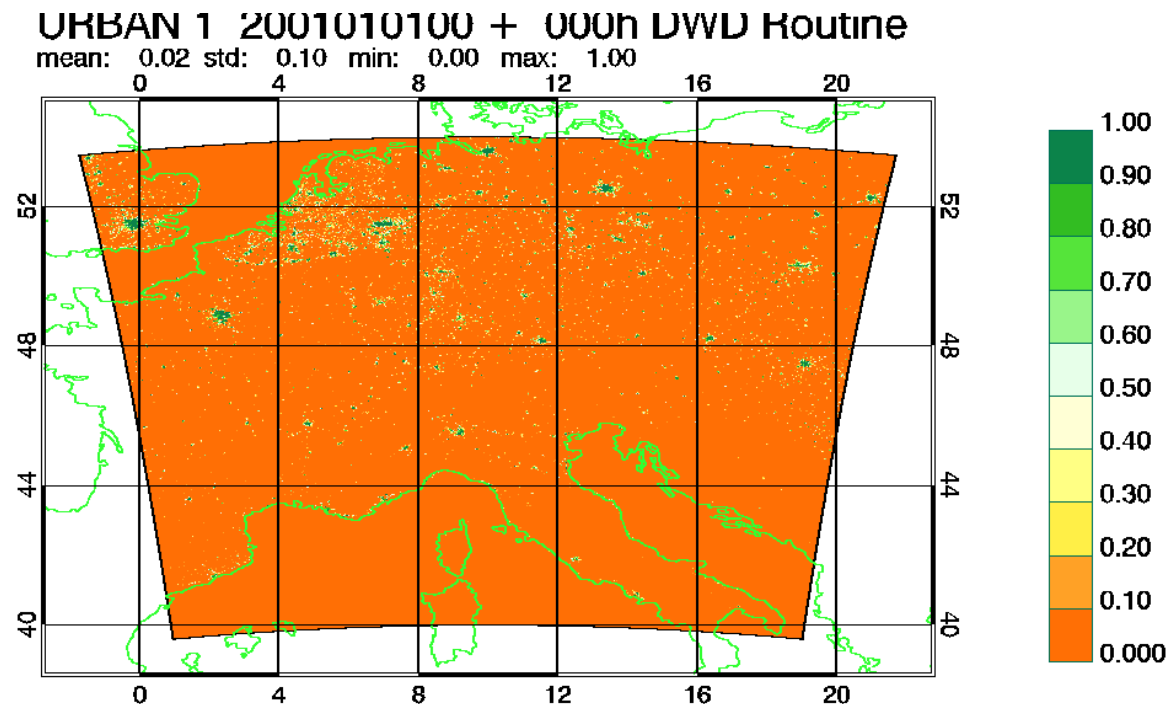
Additional external parameters longwave surface emissivity

EMIS_RAD [1] 2001010100 + 000h DWD Routine

mean: 0.98 std: 0.02 min: 0.95 max: 1.00

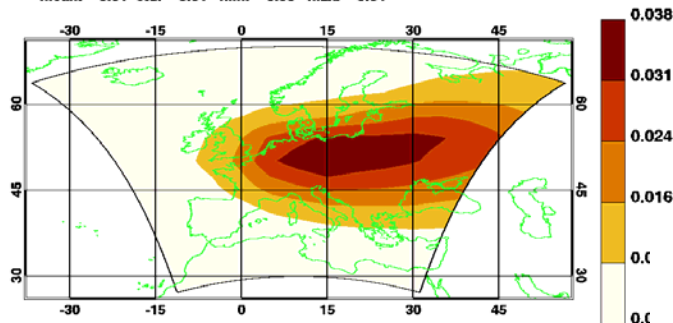


Additional external parameters urban fraction

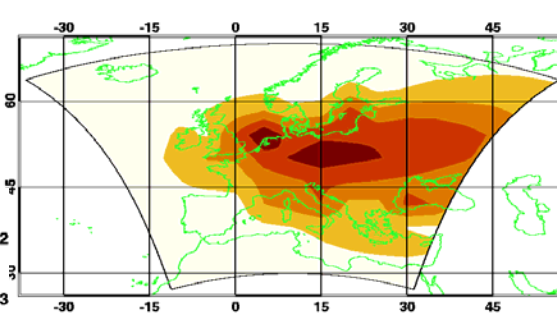


Additional external parameters aerosol optical thickness (seasonal cycle)

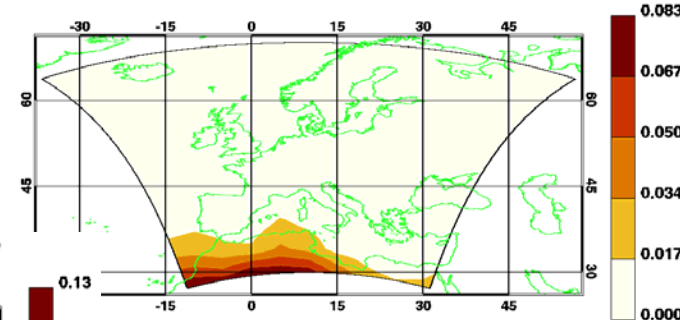
AER_BC 1 1111011111 + 000h DWD Routine
mean: 0.01 std: 0.01 min: 0.00 max: 0.04



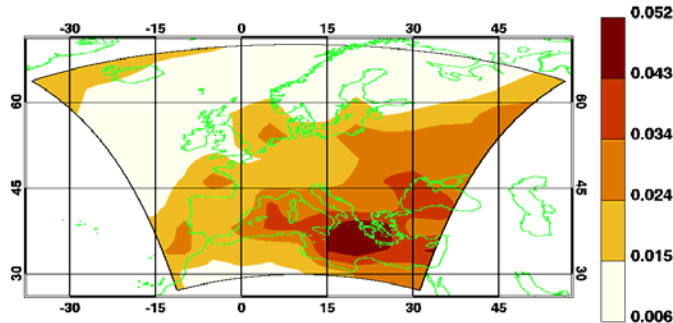
AER_ORG 1 1111011111 + 000h DWD Routine
mean: 0.04 std: 0.03 min: 0.01 max: 0.13



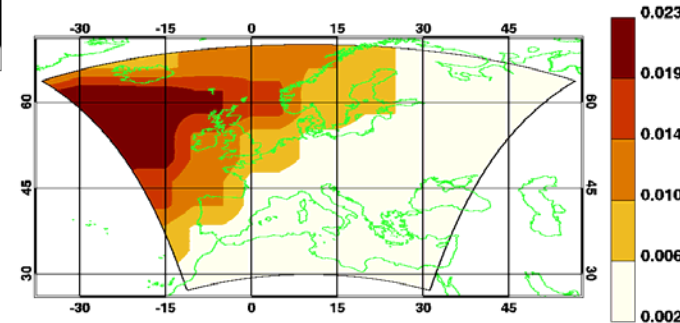
AER_DUST 1 1111011111 + 000h DWD Routine
mean: 0.01 std: 0.01 min: 0.00 max: 0.08



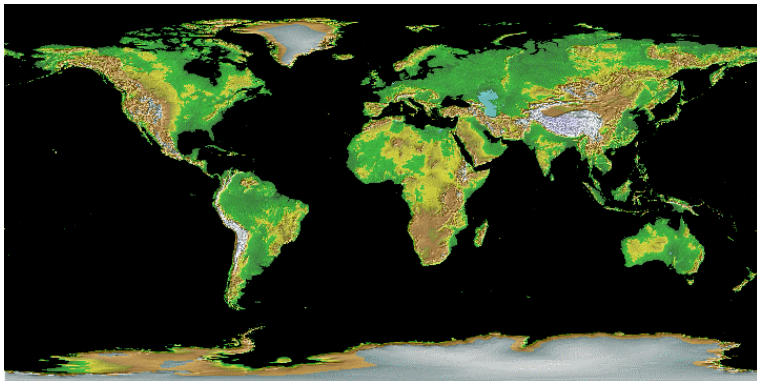
AER_SO4 1 1111011111 + 000h DWD Routine
mean: 0.02 std: 0.01 min: 0.01 max: 0.05



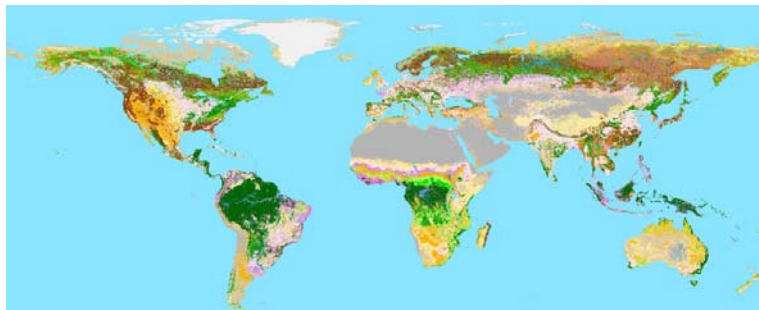
AER_SS 1 1111011111 + 000h DWD Routine
mean: 0.01 std: 0.01 min: 0.00 max: 0.02



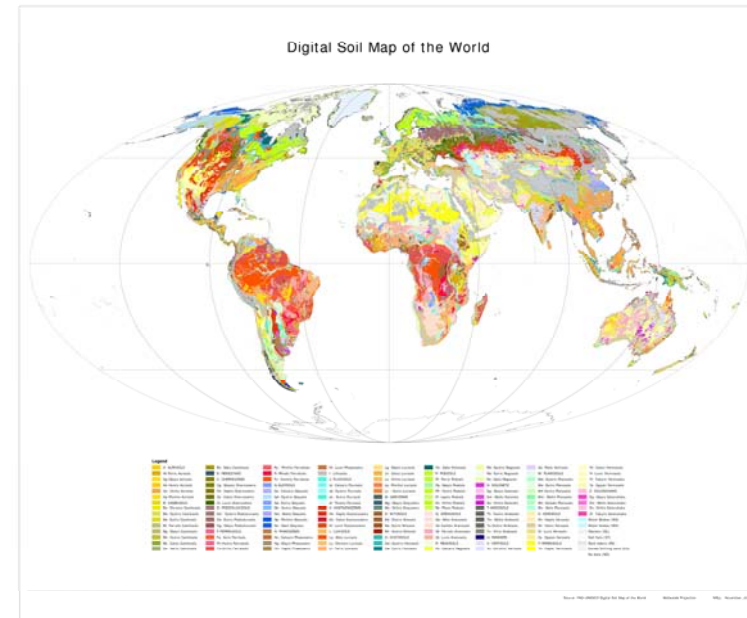
Currently used raw data for external parameters



topography
GLOBE



land use
GLC2000



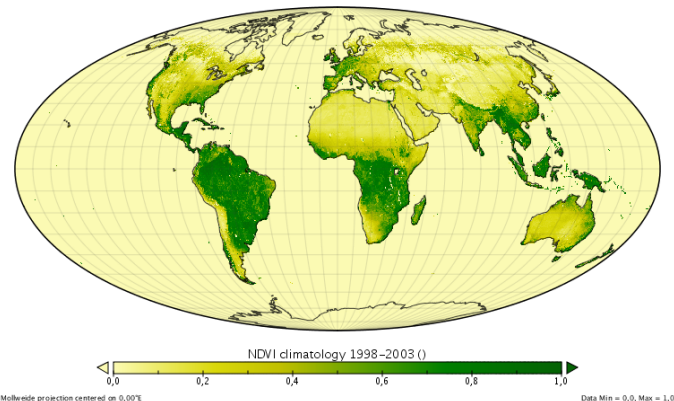
soil data
DSMW

Deutscher Wetterdienst

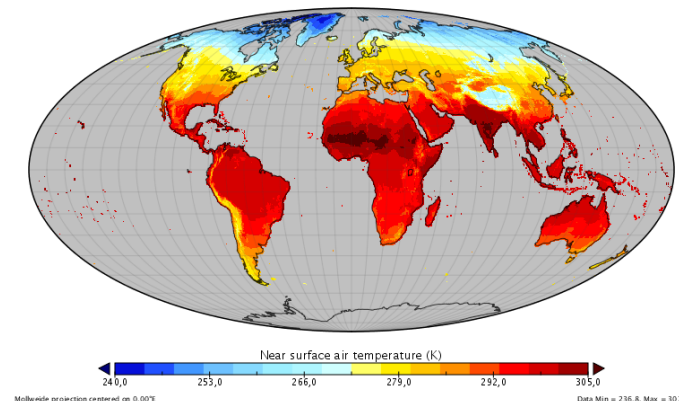
Raw data for external parameters

additional raw data sets

NDVI climatology 1998-2003

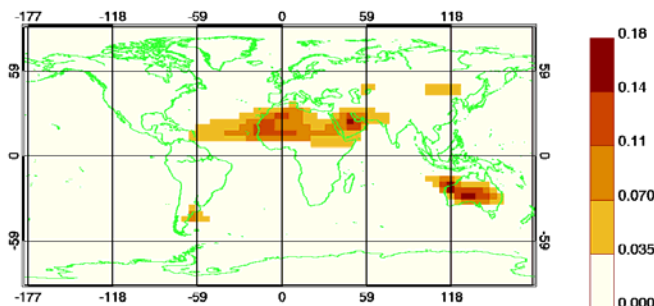


Near surface air temperature



NDVI
(SEAWiFS)

AER_DUST_1 1111011111 + 000h DWD Routine
mean: -0.01 std: 0.02 min: 0.00 max: 0.18



climatology
of near
surface
temperature
(CRU)

Aerosol climatology

(NASA/GISS, Global Aerosol Climatology Project, Ina Tegen)

planned extensions/ outlook

further topics/ open questions:

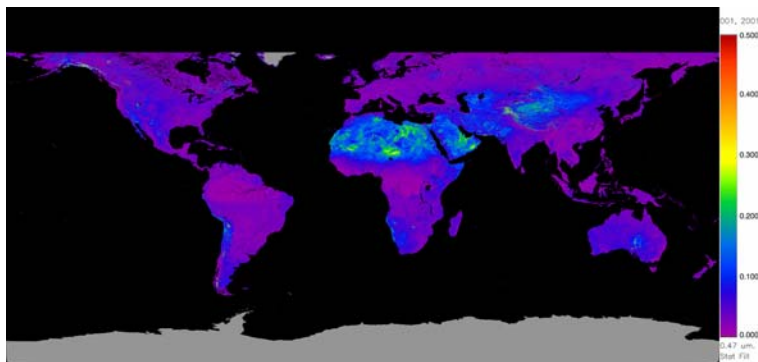
- more alternative sources of raw data
- fraction lake and lake depth
- area fraction in target grid element of each land use class
- filtering of orography (low-pass filter 2 dx)

technical issues:

- Input/output file format (netcdf, GRIB2)
- source code management (version control system etc.) and distribution

Additional/Alternative raw dataset

- Modis data for background albedo (?)
- Harmonized World Soil Database; BUEK1000 (Germany only)
- lake database (DWD); gridded dataset for lake depth from E. Kourzeneva
- (Very) high resolution orography data (SRTM, ASTER)
- Globcover for land use (?)



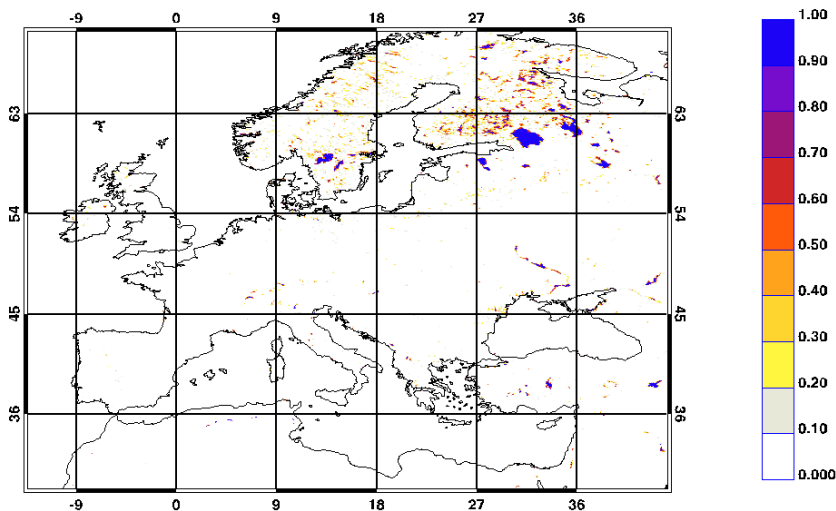
further external parameter fields

➔ Fraction Lake FR_LAKE

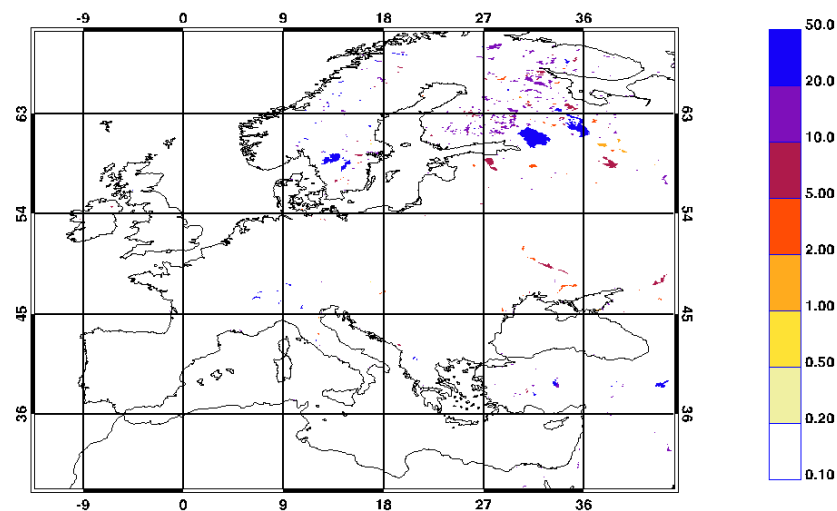
➔ Lake Depth DEPTH_LK

(currently available only for COSMO-EU)

FR_LAKE [proportion] 2001010100 + 000h DWD Routine
mean: 0.01 std: 0.07 min: 0.00 max: 1.00



DEPTH_LK [m] 2001010100 + 000h DWD Routine
mean: -0.85 std: 2.27 min: -1.00 max: 50.00



planned extensions/ outlook

further topics/ open questions:

- alternative sources of raw data
- fraction lake and lake depth
- area fraction in target grid element of each land use class
- filtering of orography (low-pass filter 2 dx)

technical issues:

- Input/output file format (netcdf, GRIB2)
- source code management (version control system etc.) and distribution

Thank you for your attention!