The COSMO-CLM Preprocessor PEP

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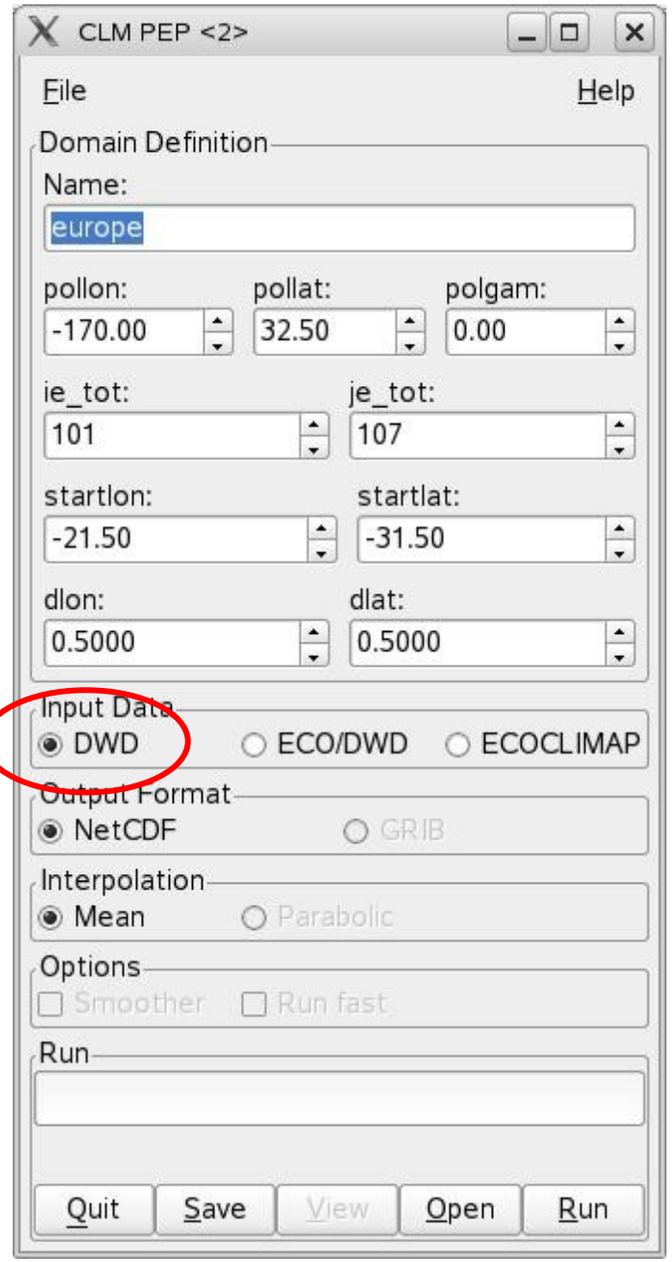
Preprocessor PEP Version 0.5

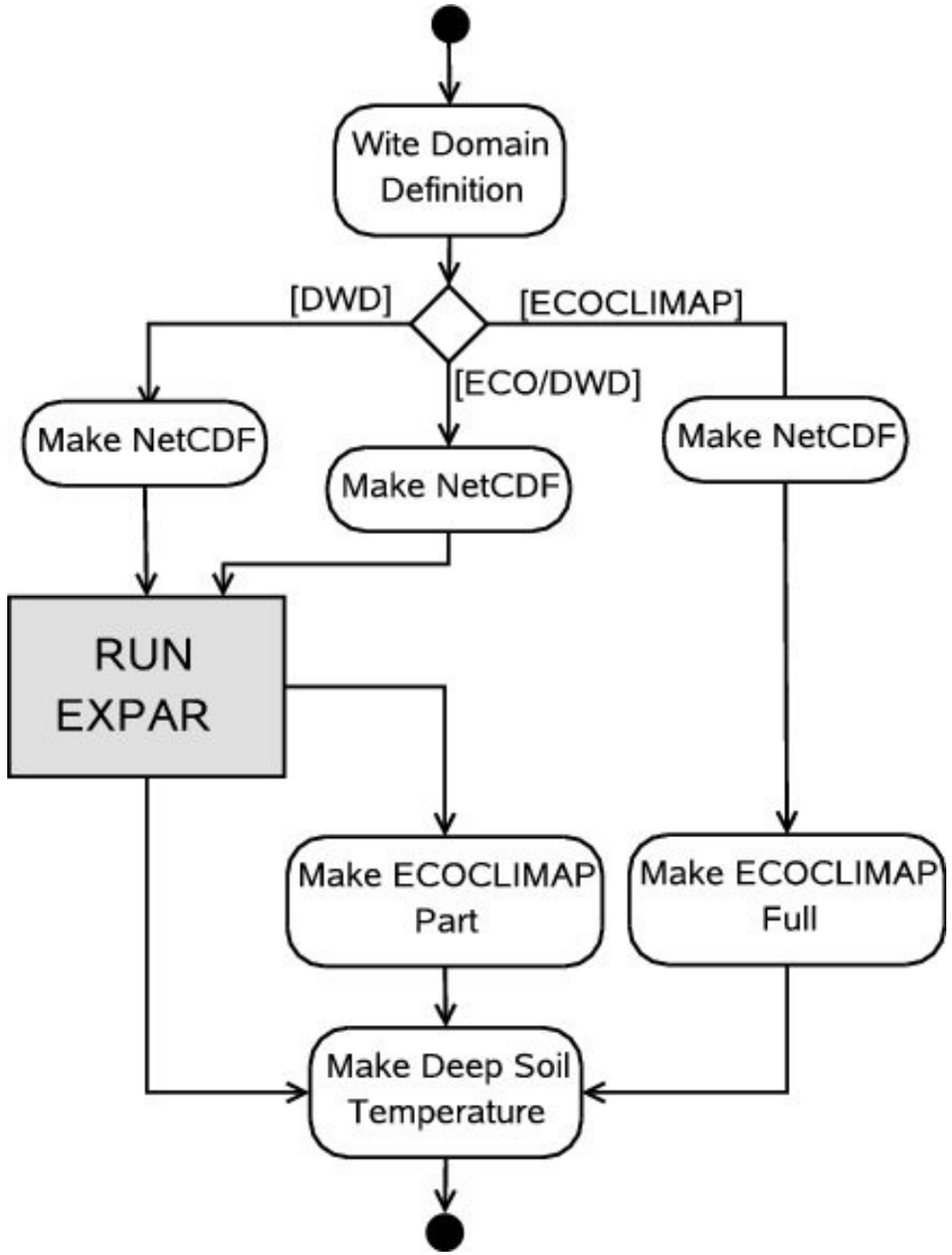
Provision of time invariant boundary data:
Topography, vegetation, soils and others

- Option DWD (operational):
- Option ECO/DWD
  - monthly resolution of the vegetation parameters + FAO/DWD Soil
- Option ECOCLIMAP
  - Monthly resolution + FAO/STASGO Soil

Requirements: Fortran Compiler, NetCDF library, Perl, Perl-NetCDF, PerlGTK2



Preprocessor PEP Version 0.5



IN DWD Option Makefiles for

- PGF90
- GNU Fortran (Intel, AMD)
- GNU Fortran /Mac

Available parameter data

Variable	Description	Unit	DWD	Option DWD/ ECOCLIMAP	ECO-CLIMAP
HSURF	Surface height	m	●	●	●
Z0	Surface roughness length	m	●		
Z0_VEG	Surface roughness length due to vegetation	m	○		
Z012	Monthly Surface roughness length	m		●	●
Z012_VEG	Monthly surface roughness length due to vegetation	m		●	●
LAI_MX	Leaf Area Index vegetation period		●		
LAI_MN	Leaf Area Index resting period		●		
LAI12	Leaf Area Index monthly values			●	●
LANDUSE	Land use category		○	●	●
FR_LAND	Land-sea fraction		●	●	●
FR_DECI	Fraction deciduous forest		●	●	●
FR_EVER	Fraction evergreen forest		●	●	●
FR_LAKE	Lake area fraction		○	●	●
PLCOV_MX	Vegetation area fraction vegetation period		●		
PLCOV_MN	Vegetation area fraction resting period		●		
PLCOV12	Monthly vegetation area fraction			●	●
ROOTDP	Root depth	m	●	●	●
SOILTYP	Soil texture		●	●	
SOILTYP	Soil texture 0 -30 cm				●
SOILTYP	Soil texture 30 -100cm				●
T_CL	Deep soil temperature	K	●	●	●
ALBEDO	Surface albedo			○	○
DEPTH_LK	Lake depth	m	○	○	○

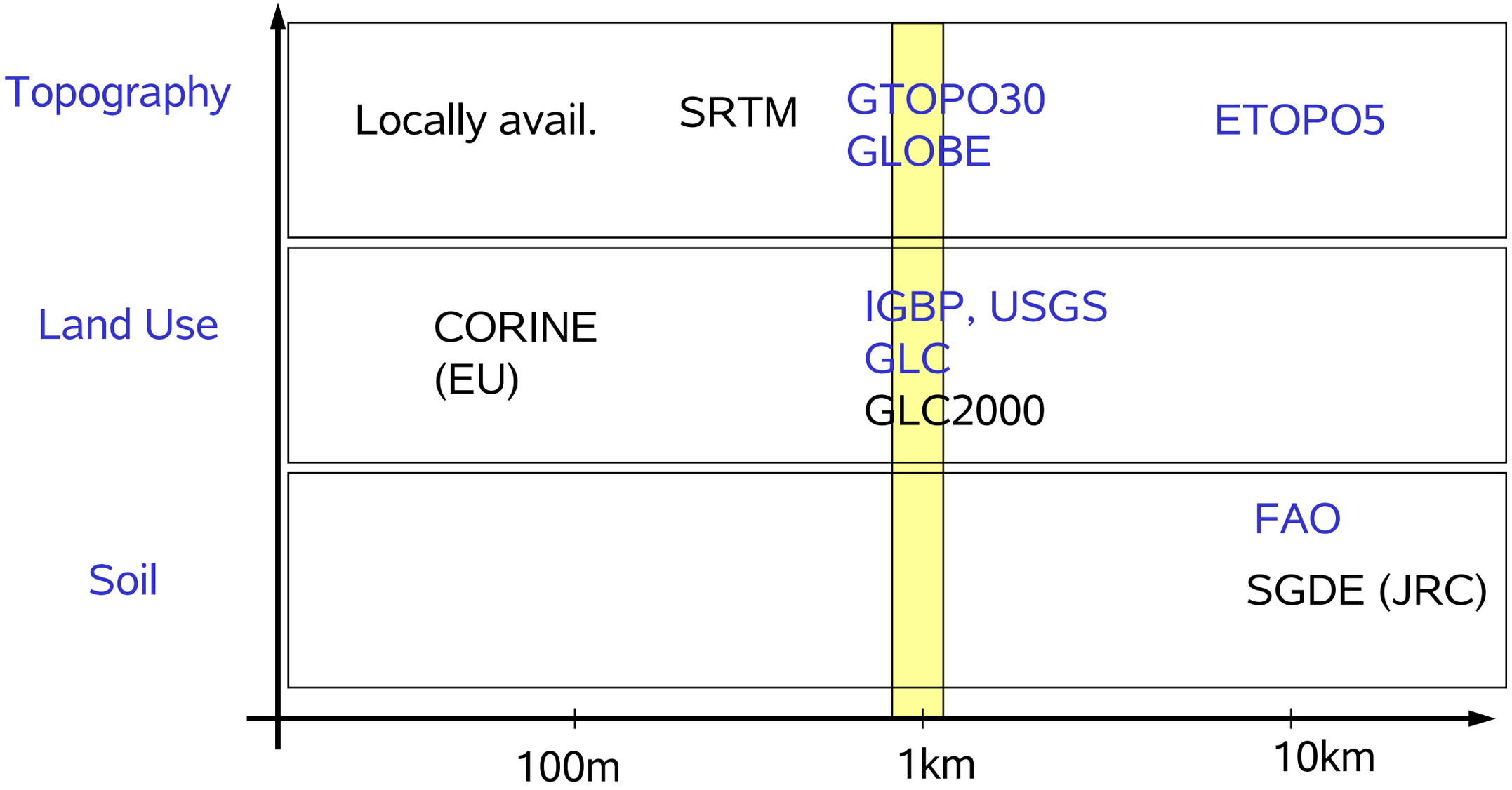
System parameter data in COSMO-CLM

Parameter	Source	Status
Topography	GTOPO30 GLOBE	Very good
Land use	GLC2000 ECOCLIMAP	good
Soil Texture	FAO, STATSGO/FAO	poor
Lake-Parameter	-	No data yet
Deep Soil Temperature	CRU	Rather poor

To do

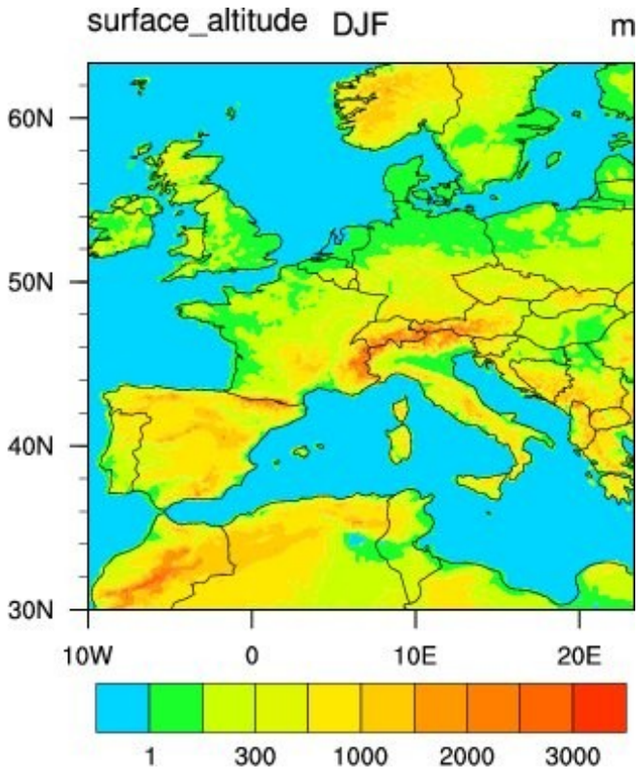
- Make look-up table for albedo
- Improve the parameter upscaling
- Make world coverage for ECOCLIMAP
- Extend the soil data
- Unify topography to GLOBE data
- Verify all look-up tables
- Provide –no_gui Version of PEP
- Speed up the data calculation
- Provide data on lakes

Spatial resolution of the input data

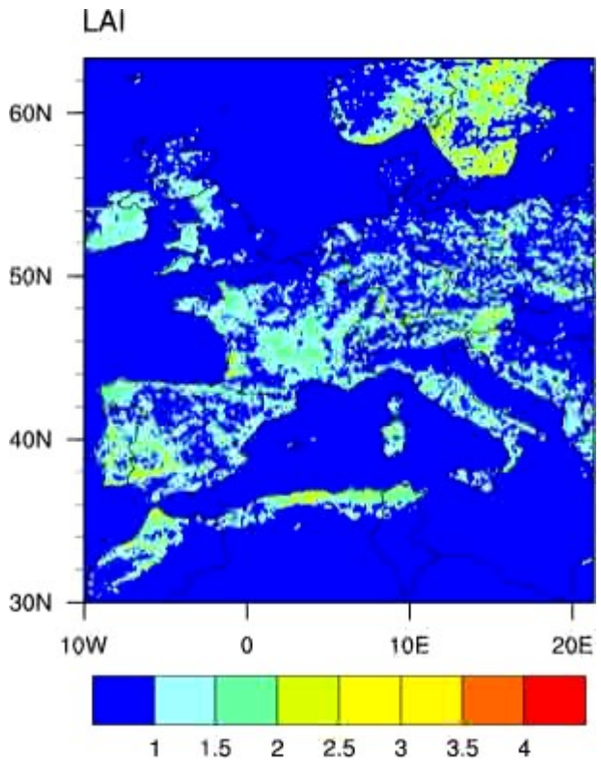


Example of the system parameters

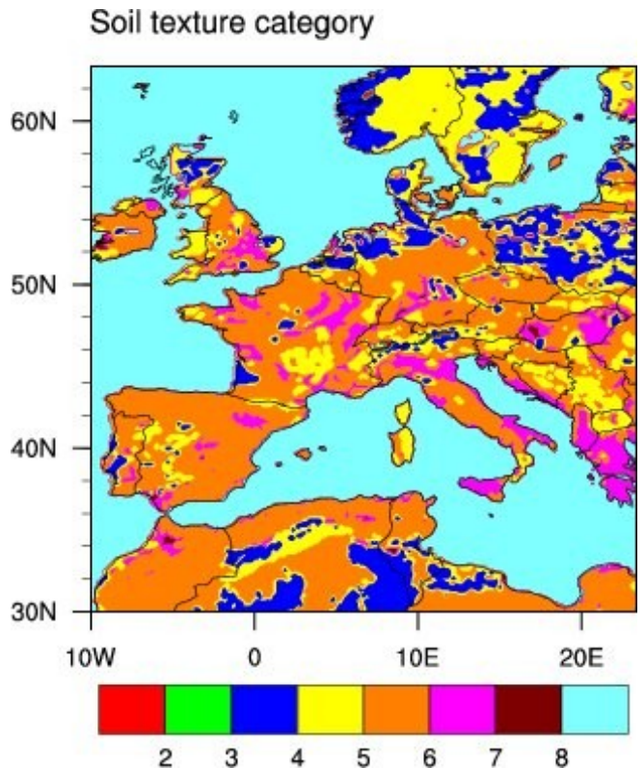
Topography



Leaf Area Index

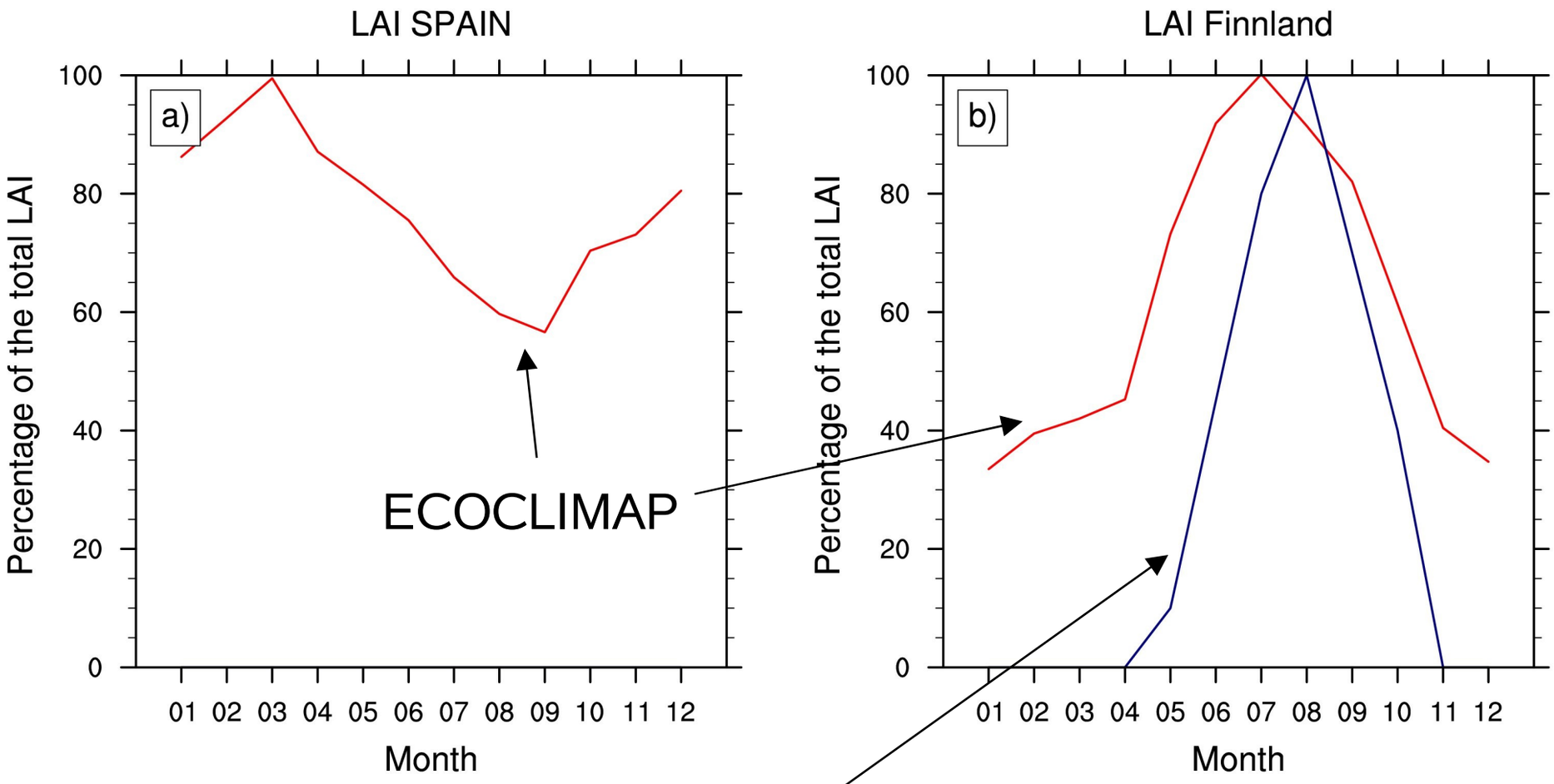


Soil Texture

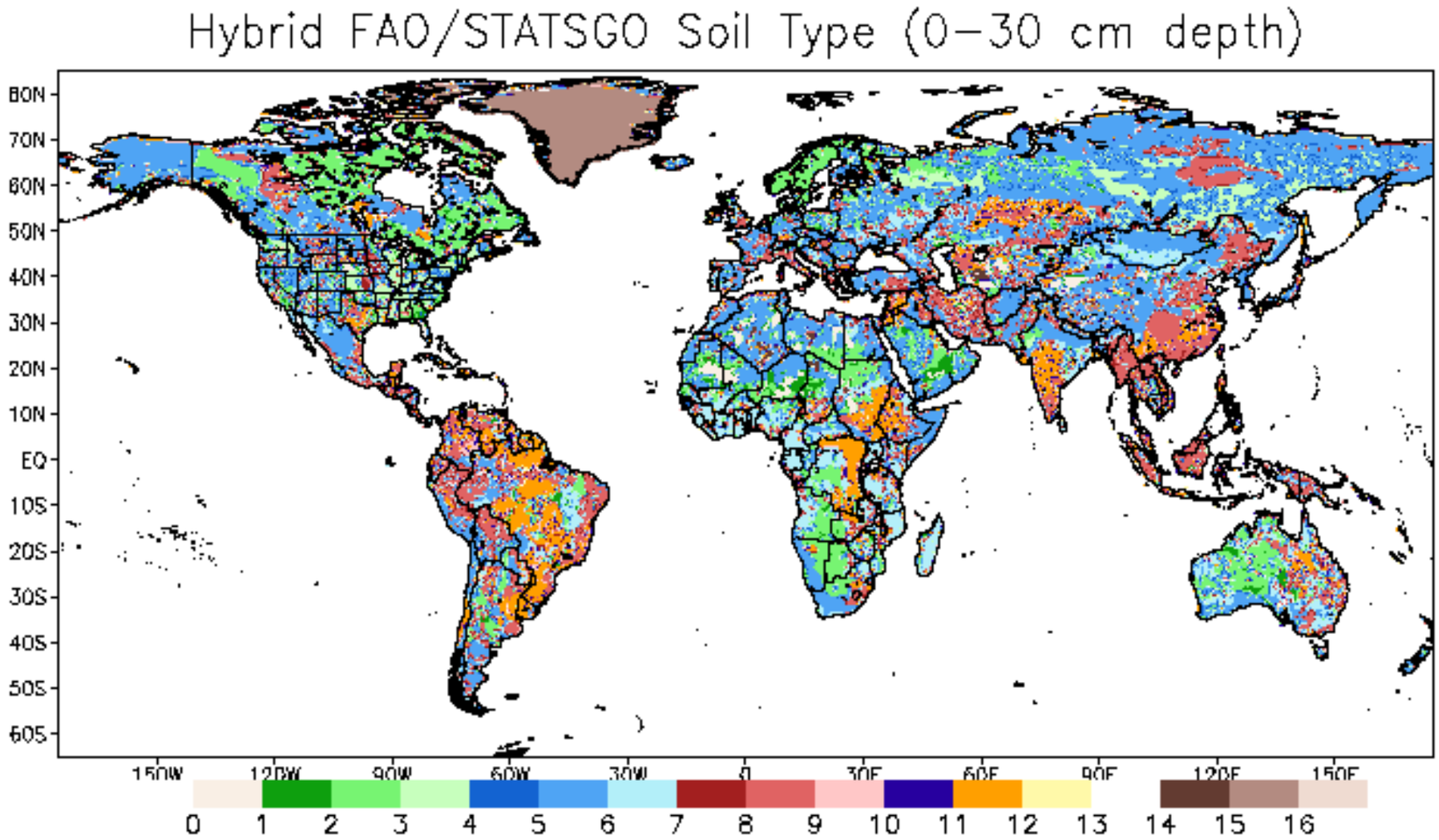


Example: dx : 1667° x 0.1667°

Vegetation parameter: LAI
(Fraction of deciduous forest > 0.5)

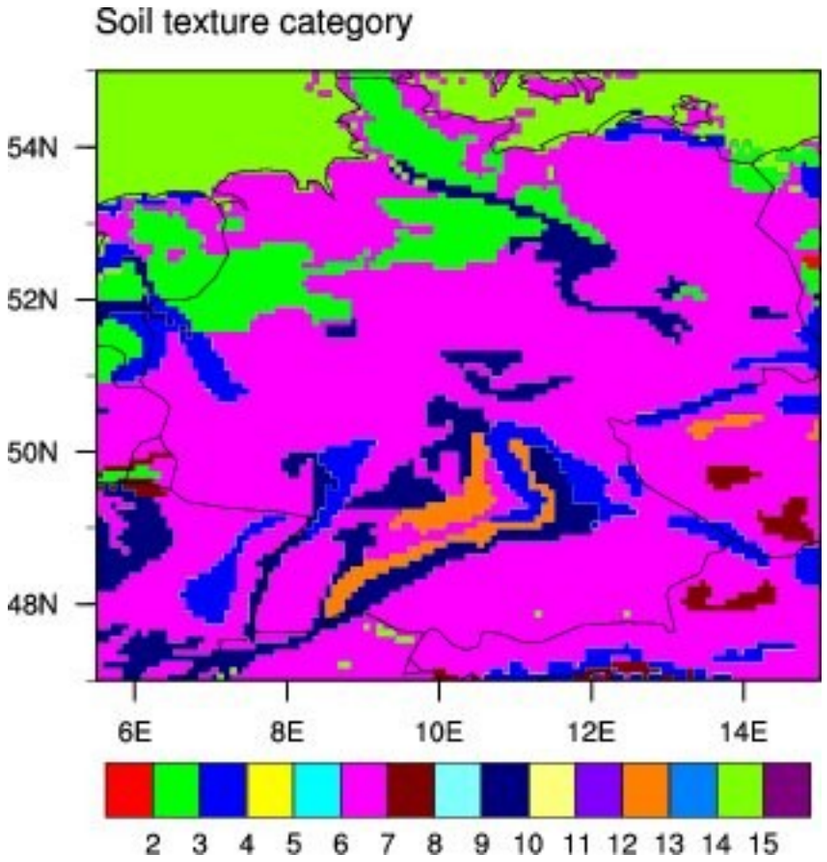


Two Layer Soil data

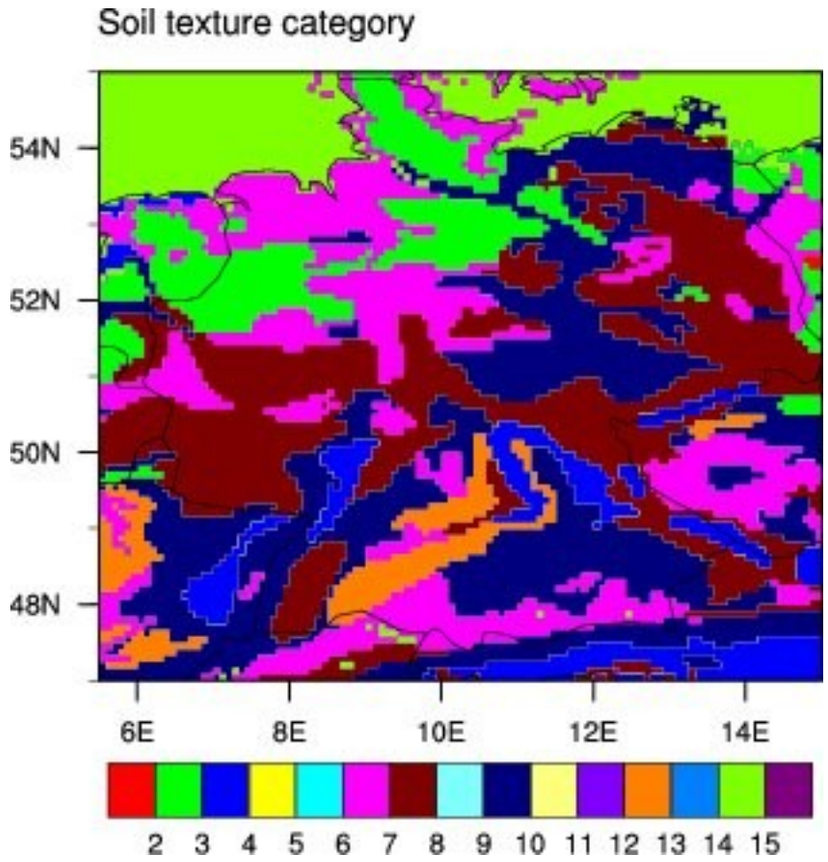


FAO/STATGO soil data

0 - 30cm depth



30 -100 cm depth



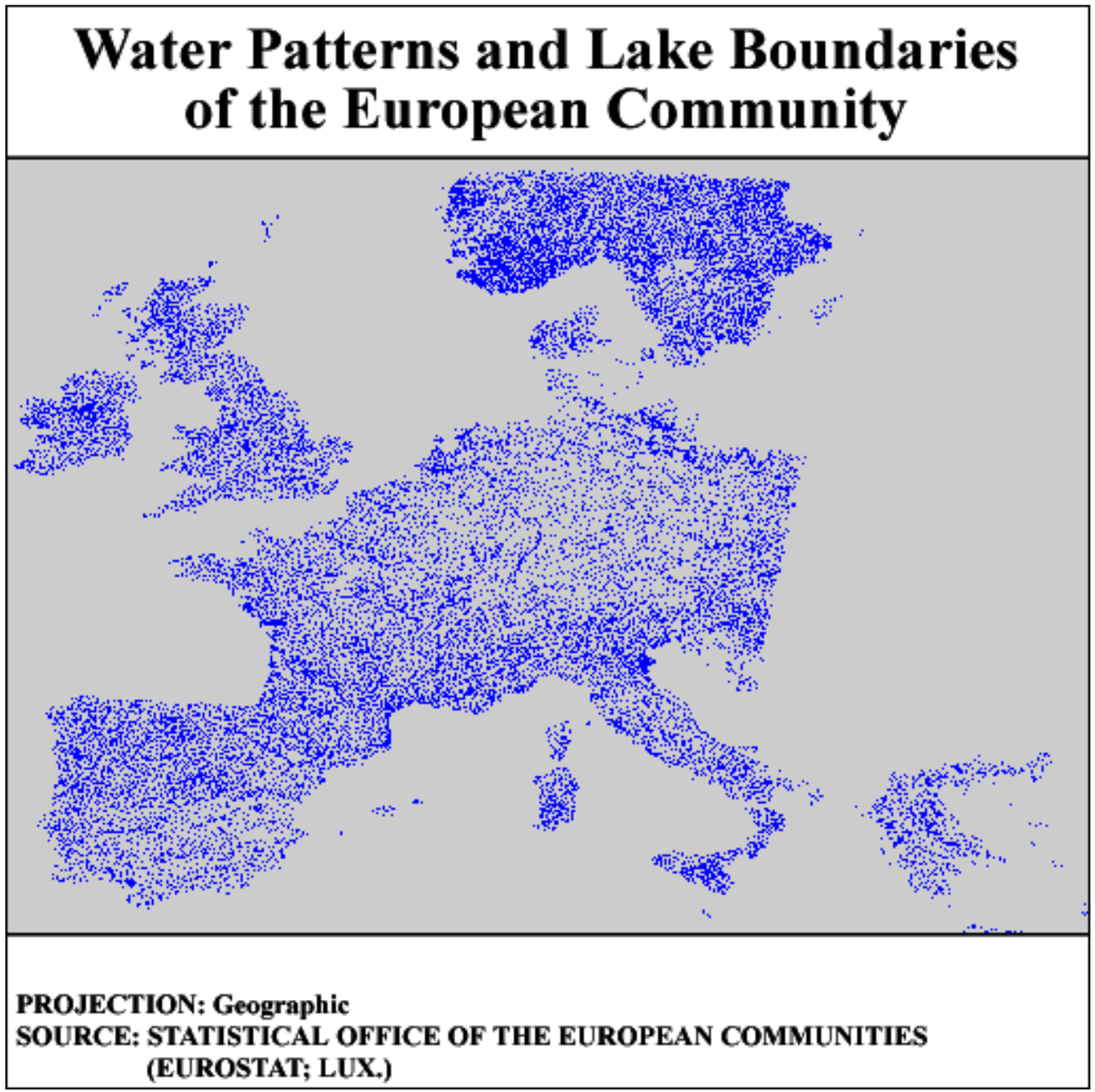
FAO/STATGO soil data

- Data in resolution of 30 x 30 arc seconds (resampled from 5 x 4 arc minutes
- Will be extended step by step as new data become available
- Possible data sources:
  - JRC soil (at the current stage only 10 km by 10 km data available)
  - Local authorities (in Germany already in contact)

Lake data

Model	Required data
Lake-Model	location Lake depth Typical winds Optical parameters Sediment temperature

Lake data



- 500 000 natural Lakes
- 16 000 Area > 1 km²
- 24 Area > 400km²

EEA Waterbase - Lakes

Conclusions

- Topography and vegetation data (Europe, USA) satisfactory
- More detailed data on soils required
- Testing and evaluation of vegetation/soil data required (here IMK-IFU will contribute)
- Review of all look-up tables (Soil and vegetation parameters could be useful)