Preprocessing of spatial data on lakes within the PEP preprocessor

G. Smiatek
IMK-IFU, Garmisch-Partenkirchen, Germany

gerhard.smiatek@imk.fzk.de

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Introduction
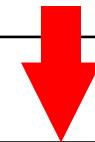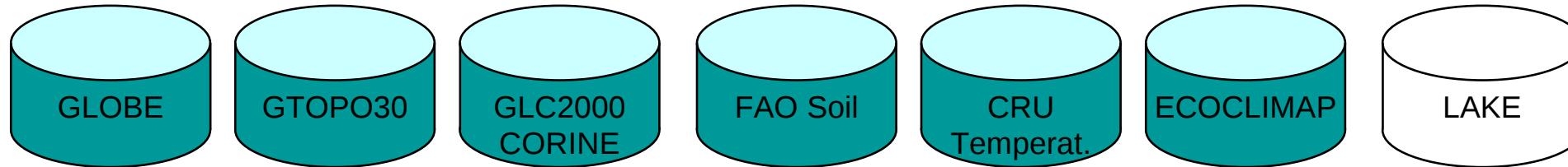
PEP (Preprocessor of time invariant input
data for the COSMO-CLM model)

Questions in context of the FLake model

1. What data is required ?

2. How the data should be processed ?

PEP Structure
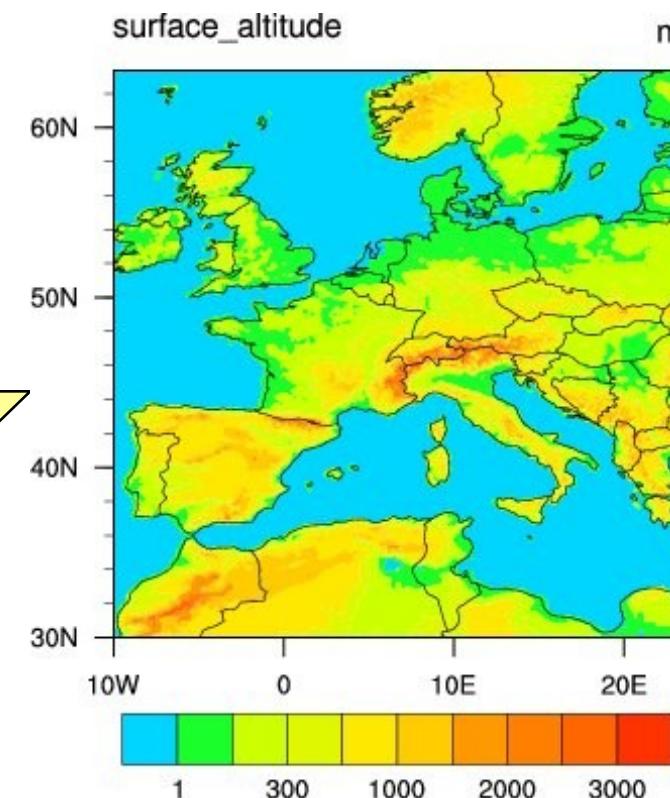
INPUT (Geographical projection, NetCDF format)

| GLOBE | GTOPO30 | GLC2000 CORINE | FAO Soil | CRU Temperat. | ECOCLIMAP | LAKE |

Interpolation

Rotated coordinates
NetCDF data format

surface_altitude   m

Example: dx : 1667° x 0.1667°

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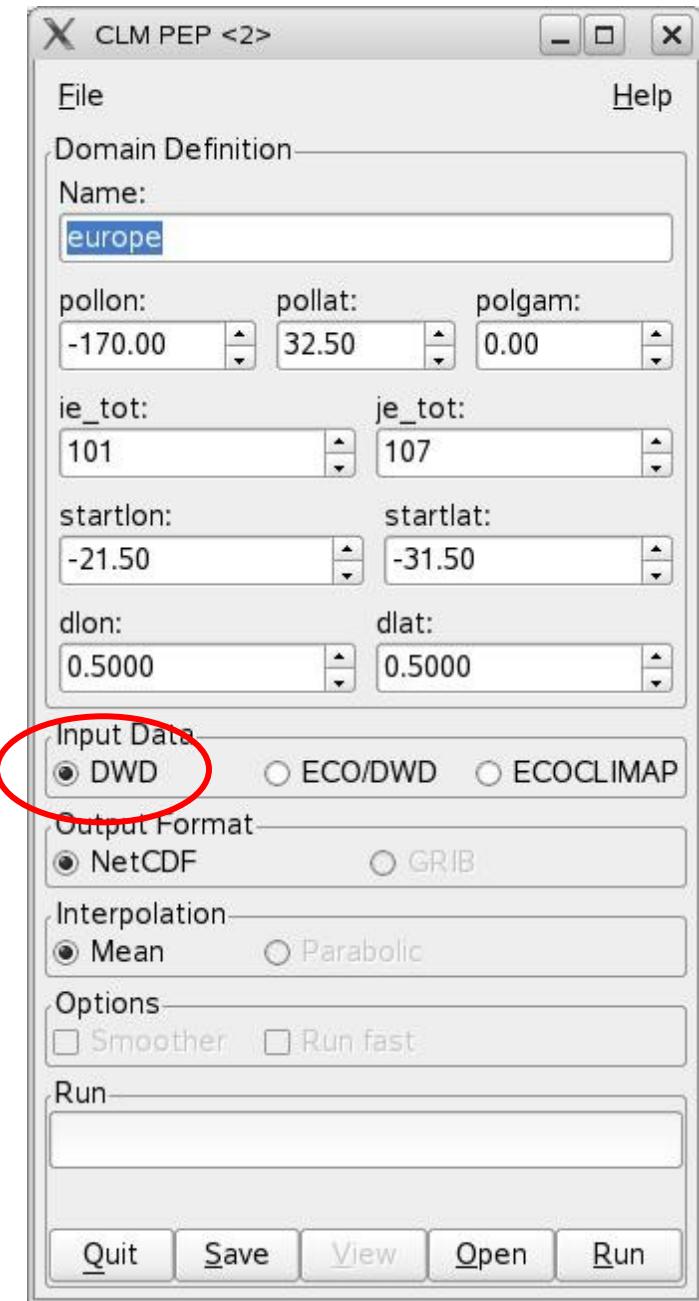
Preprocessor PEP Version 0.5
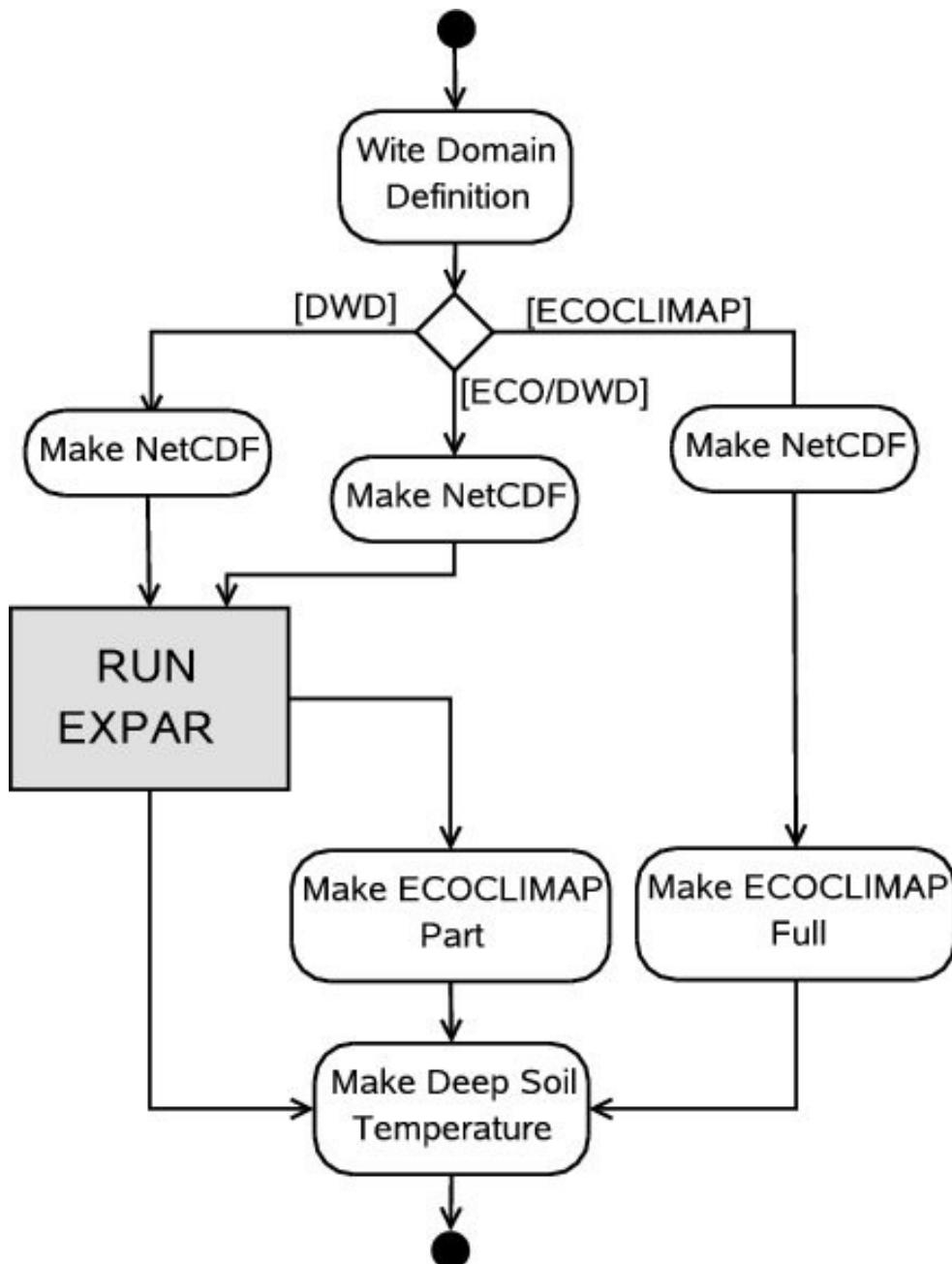
Provision of time invariant boundary data:
Topography, vegetation, soils and others

- ## 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

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Preprocessor PEP Version 0.5

In DWD Option Makefiles for

- PGF90

- GNU Fortran (Intel, AMD)

- GNU Fortran /Mac

Smiatek, Rockel and Schättler: Meteorologische Zeitschrift, 2008 (in Englisch)
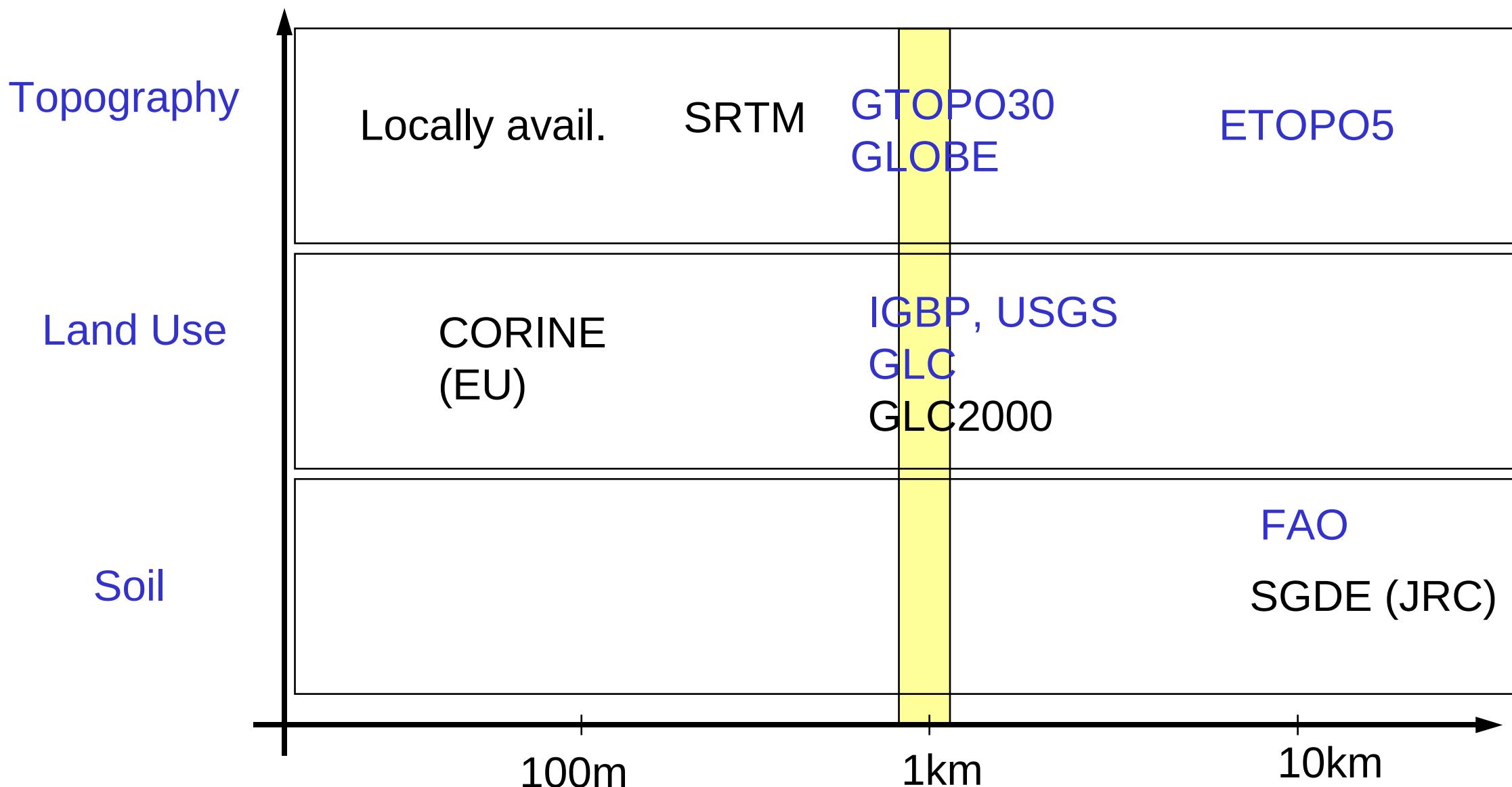
Variable	Description	Unit	DWD	Option DWD/ ECOCLIMAP	ECO- CLIMAP
HSURF	Surface height	m	●	●	●
Z0	Surface roughness length	m	●		
Z0_VEG	Surface roughness length due to vegetation	m	○		
Z012	Monthly Surface roughness length	m		●	●
Z012_VEG	Monthly surface roughness length due to vegetation	m		●	●
LAI_MX	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	○	○	○

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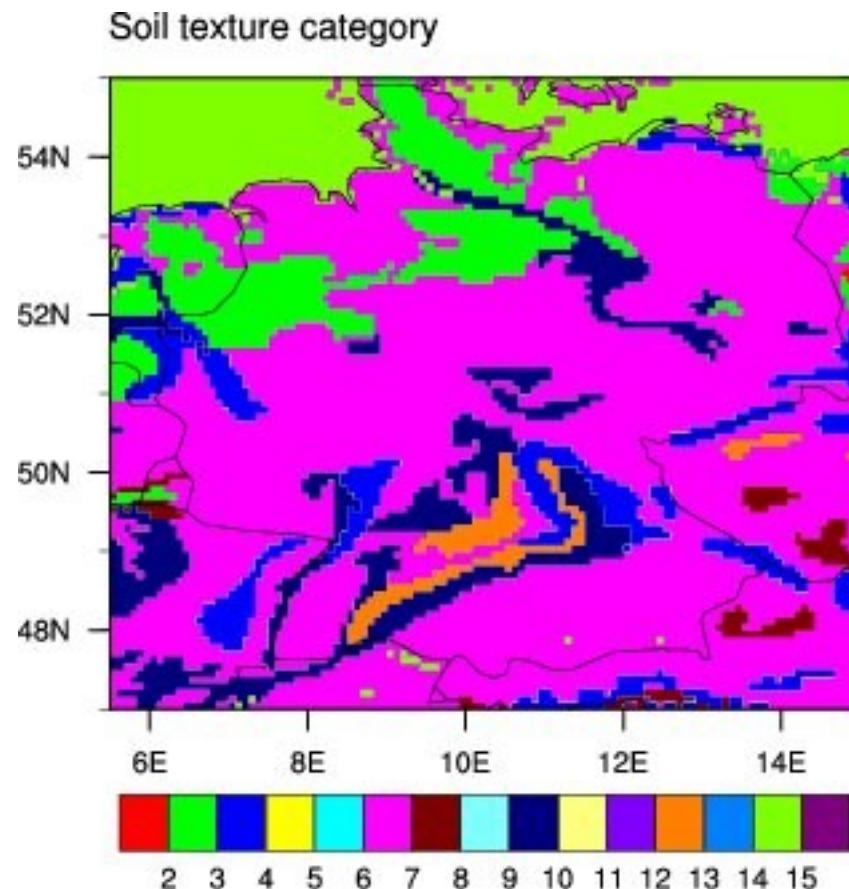
System parameter data in COSMO-CLM

Parameter	Source	Status
Topography	GTOPO30 GLOBE	Very good
Land use	GLC2000 ECOCLIMAP CORINE	good
Soil Texture	FAO, STATSGO/FAO	poor
Lake-location	From land use	?
Lake-Parameter	Lake data set	?

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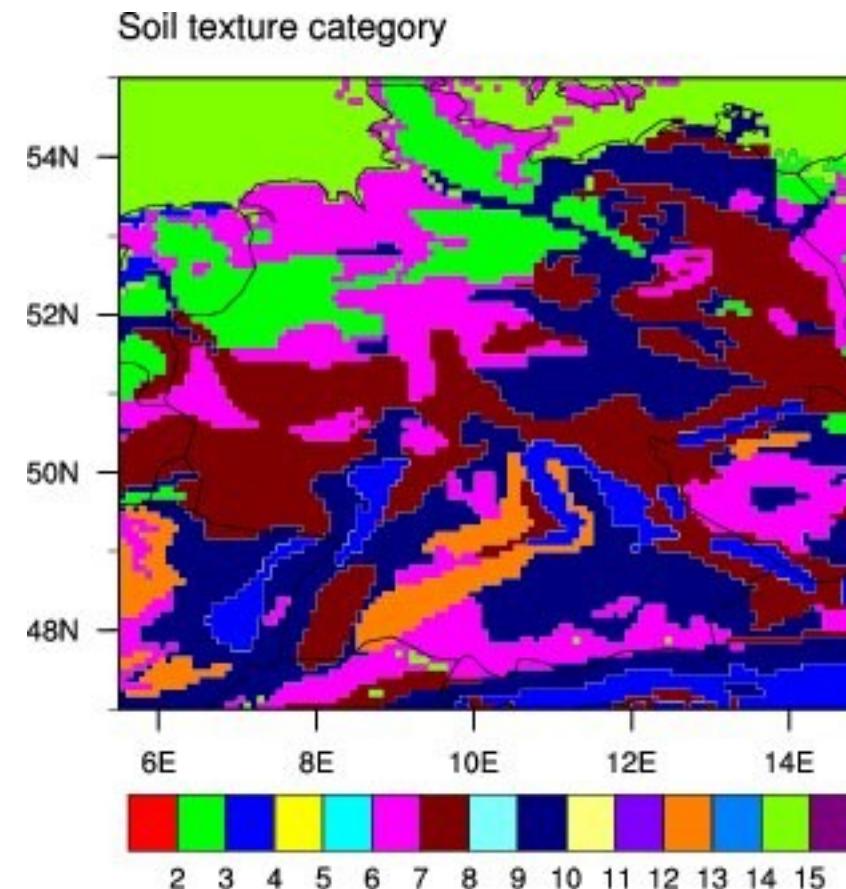
Spatial resolution of the input data

Topography | Locally avail. | SRTM | GTOPO30 GLOBE | ETOPO5

Land Use | CORINE (EU) | IGBP, USGS GLC GLC2000

Soil | FAO SGDE (JRC)

100m — 1km — 10km

FAO/STATGO soil data
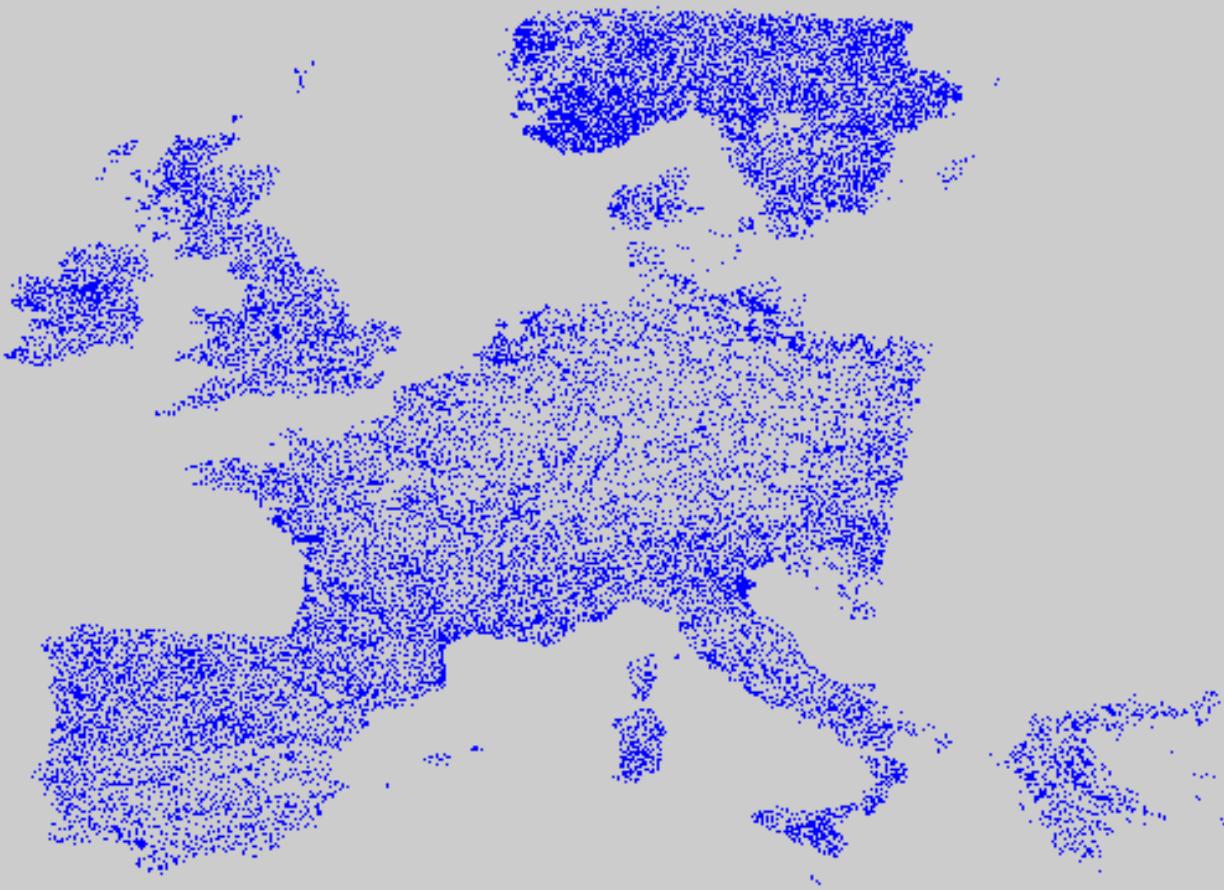
0 - 30cm depth

30 -100 cm depth

Lake data

Water Patterns and Lake Boundaries of the European Community

PROJECTION: Geographic
SOURCE: STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
(EUROSTAT; LUX.)
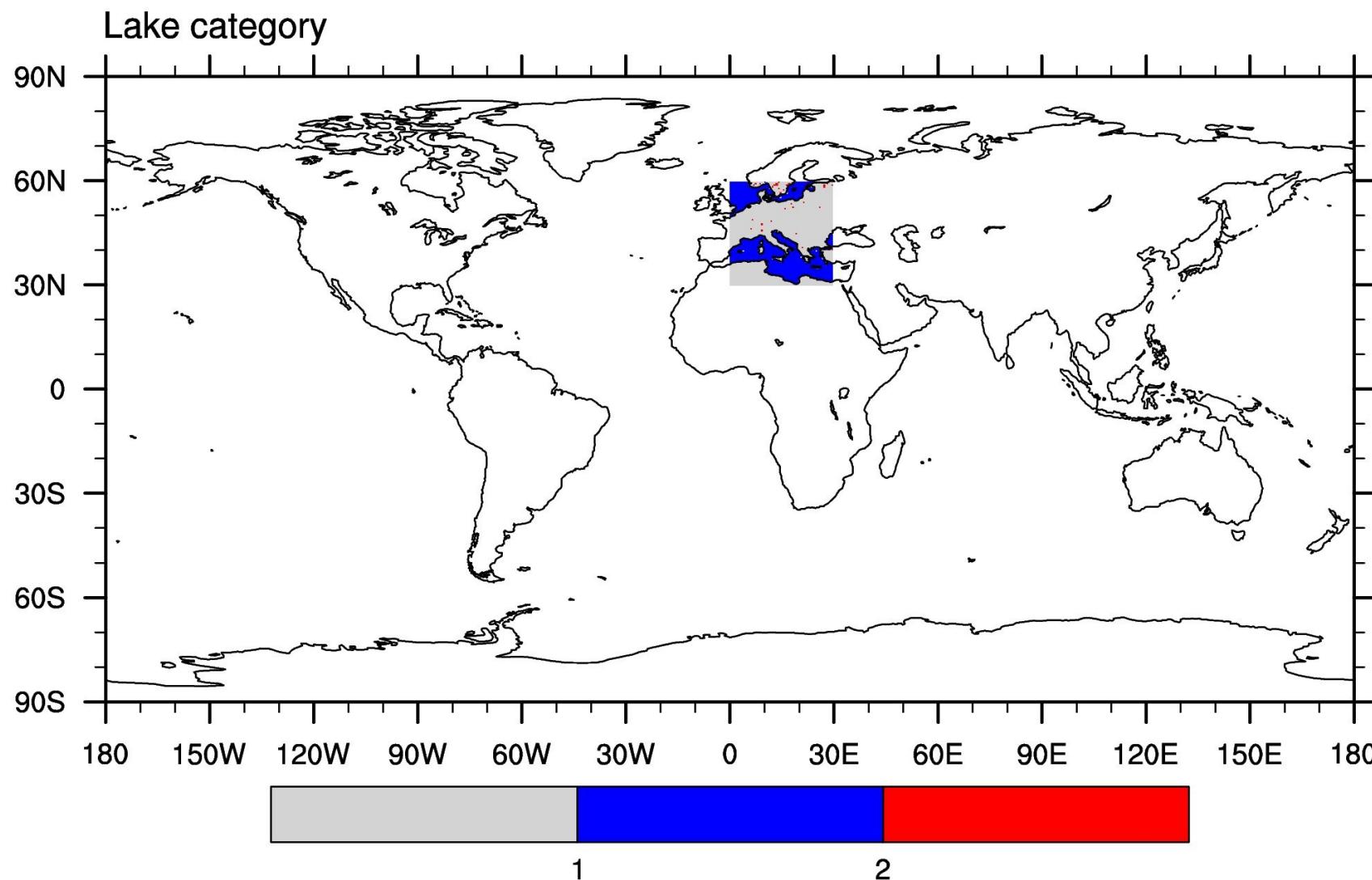
- 500 000 natural Lakes
- 16 000 Area > 1 km^2
- 24 Area > 400km^2
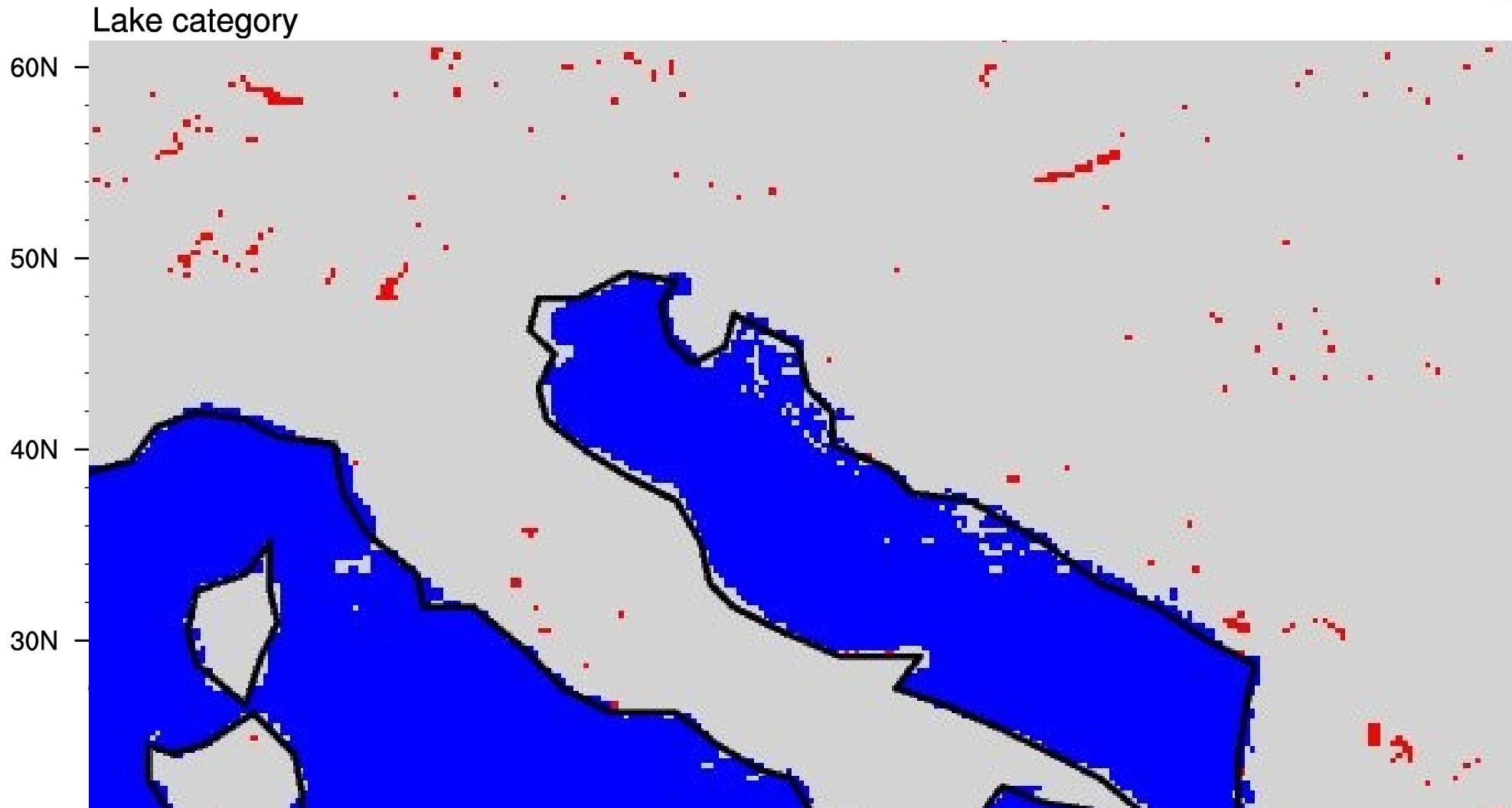
EEA Waterbase - Lakes

Lake data

Model	Required data
FLake-Model	Location
	Lake depth
	Typical winds
	Optical parameters
	Sediment temperature
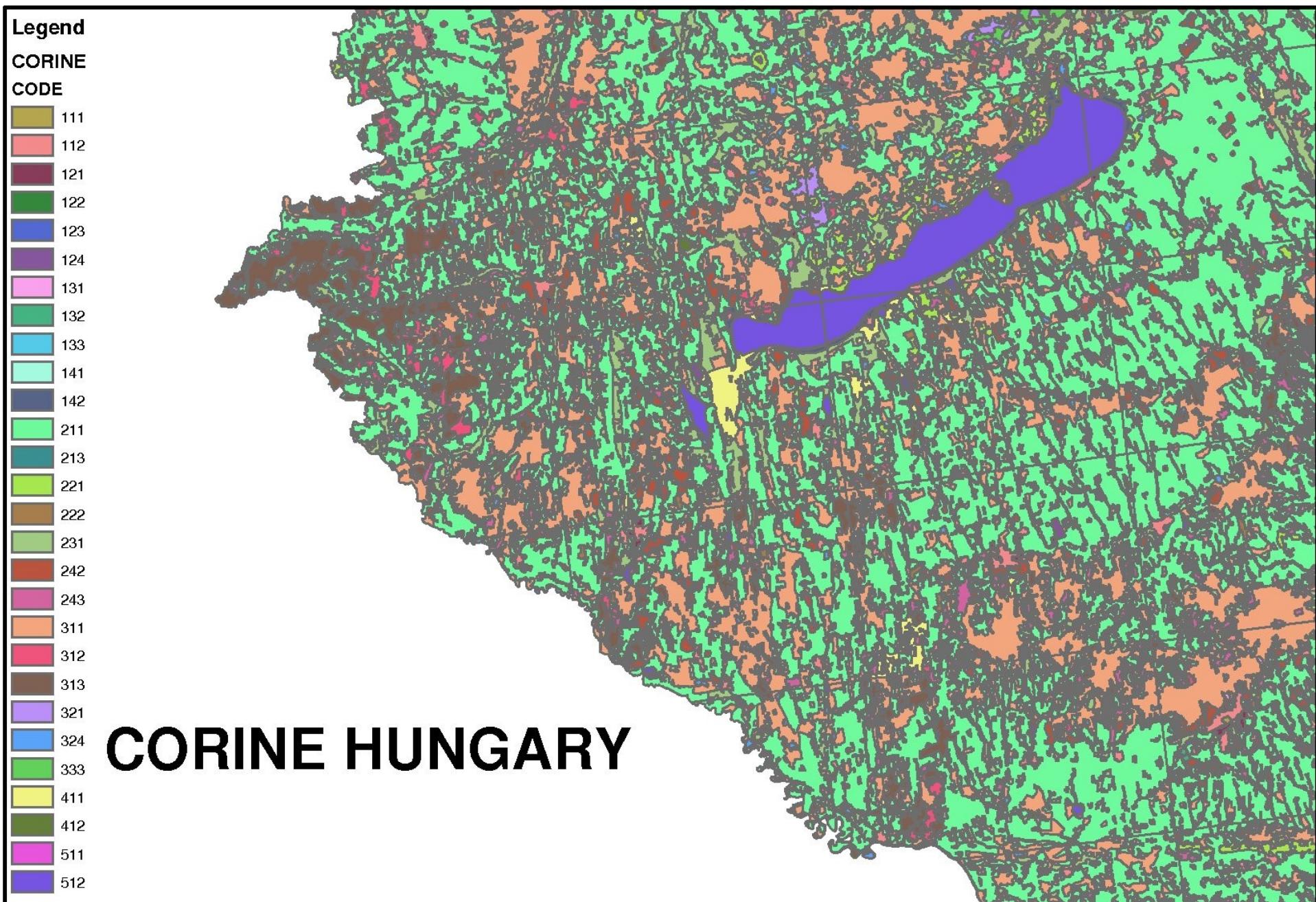
All PEP input in 30° by 30° tiles in NetCDF

Lake category
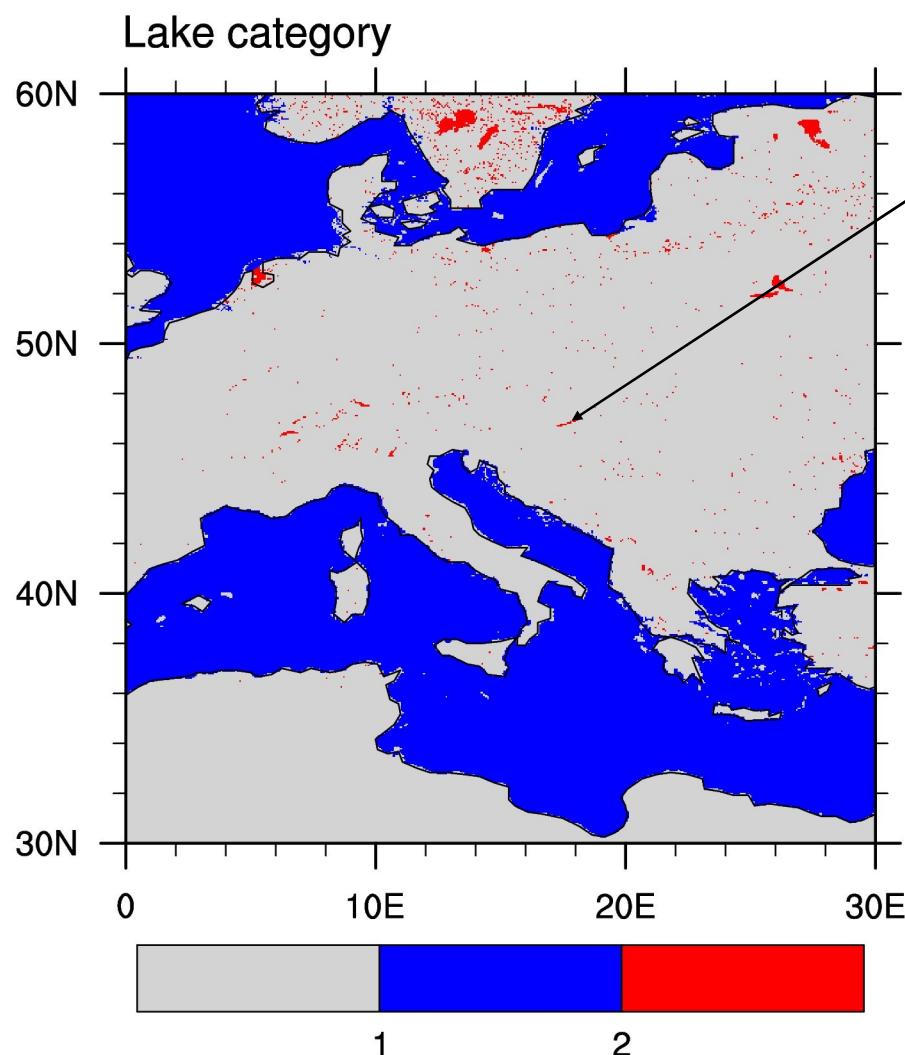
Inland waters tile: 030N000E (ECOCLIMAP)

Lake category

Data with 30m resolution available

CORINE HUNGARY

Inland waters tile: 030N000E

LakeDepthDataSet_v1p0

Lake category

ID

- Location
- Area
- Depth
- …
- …

Conclusions

- Topography and vegetation data (Europe, USA) satisfactory

- More detailed data on soils required

- In the lake data base an ID required to link the data with the land use

- Special attention to the land use data processing required

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