

ECMWF's ancillary fields

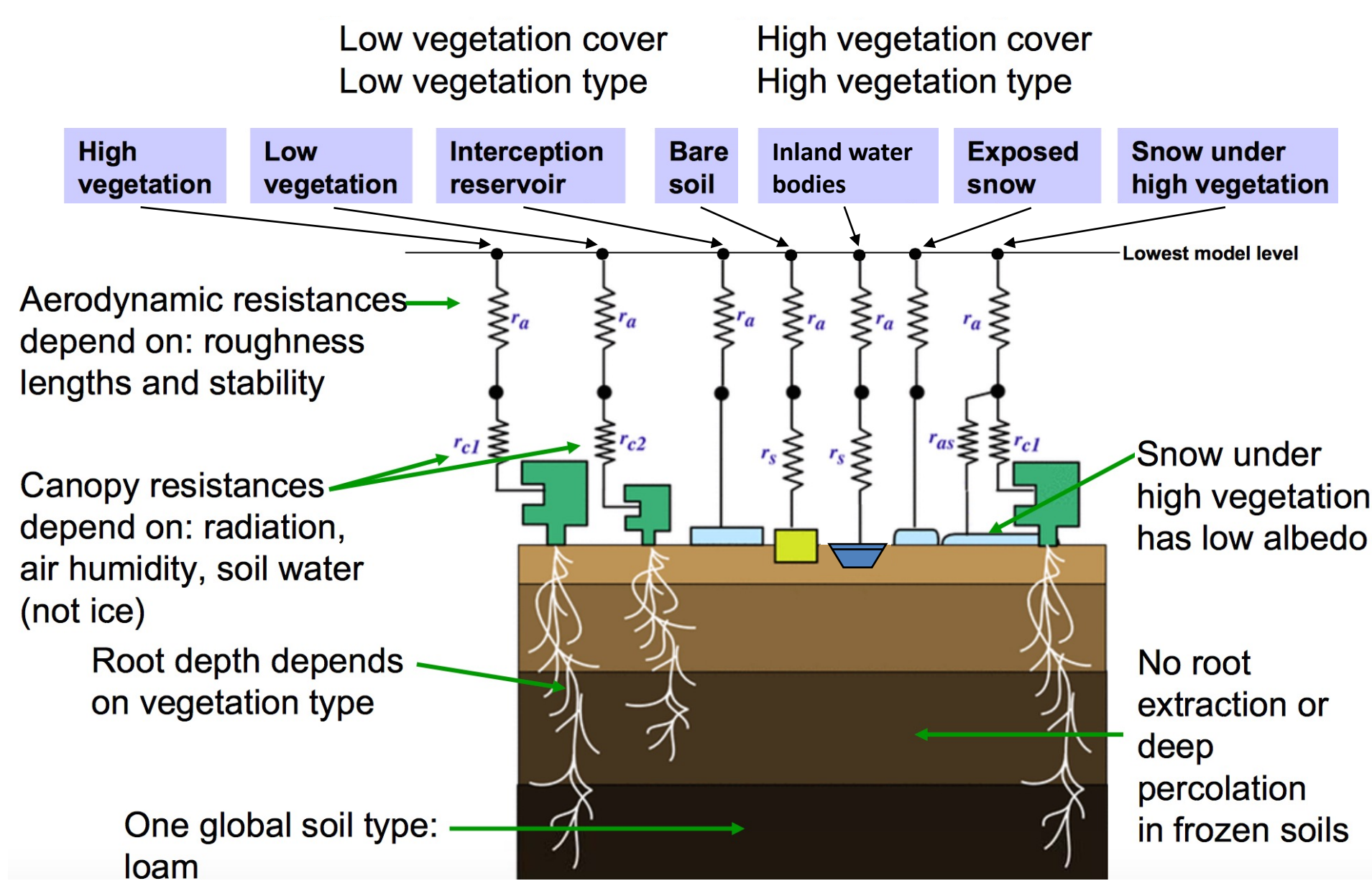


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Tiled surface scheme land and hydrology

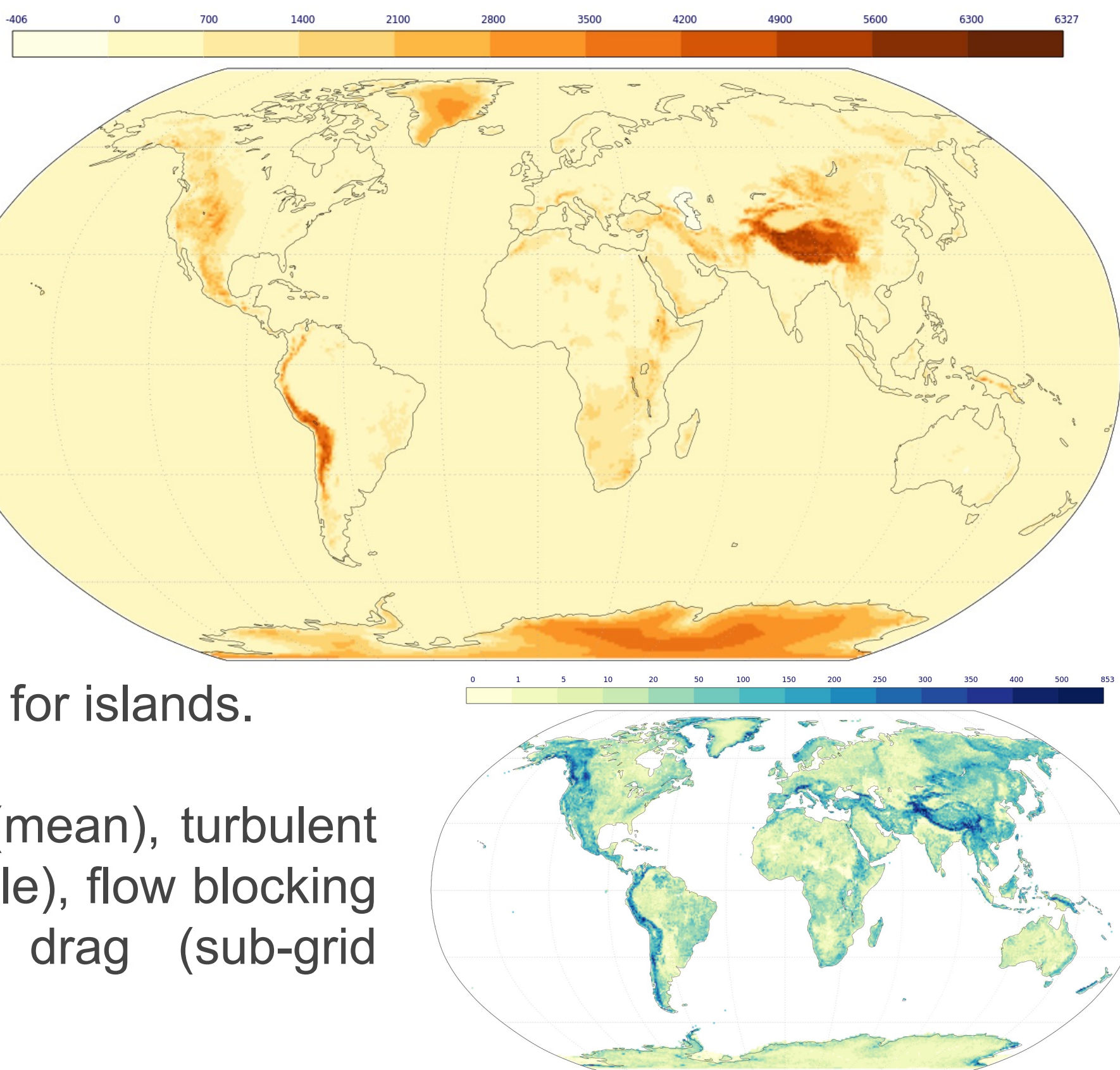
The scheme for surface-atmosphere exchange over land and surface hydrology **ecLand** computes turbulent surface fluxes of heat, moisture and momentum and skin temperature for different surface types. Area-weighted averages of **surface-atmosphere exchange fluxes** and **skin temperature** are computed according to the tiling of the grid boxes by surface type.



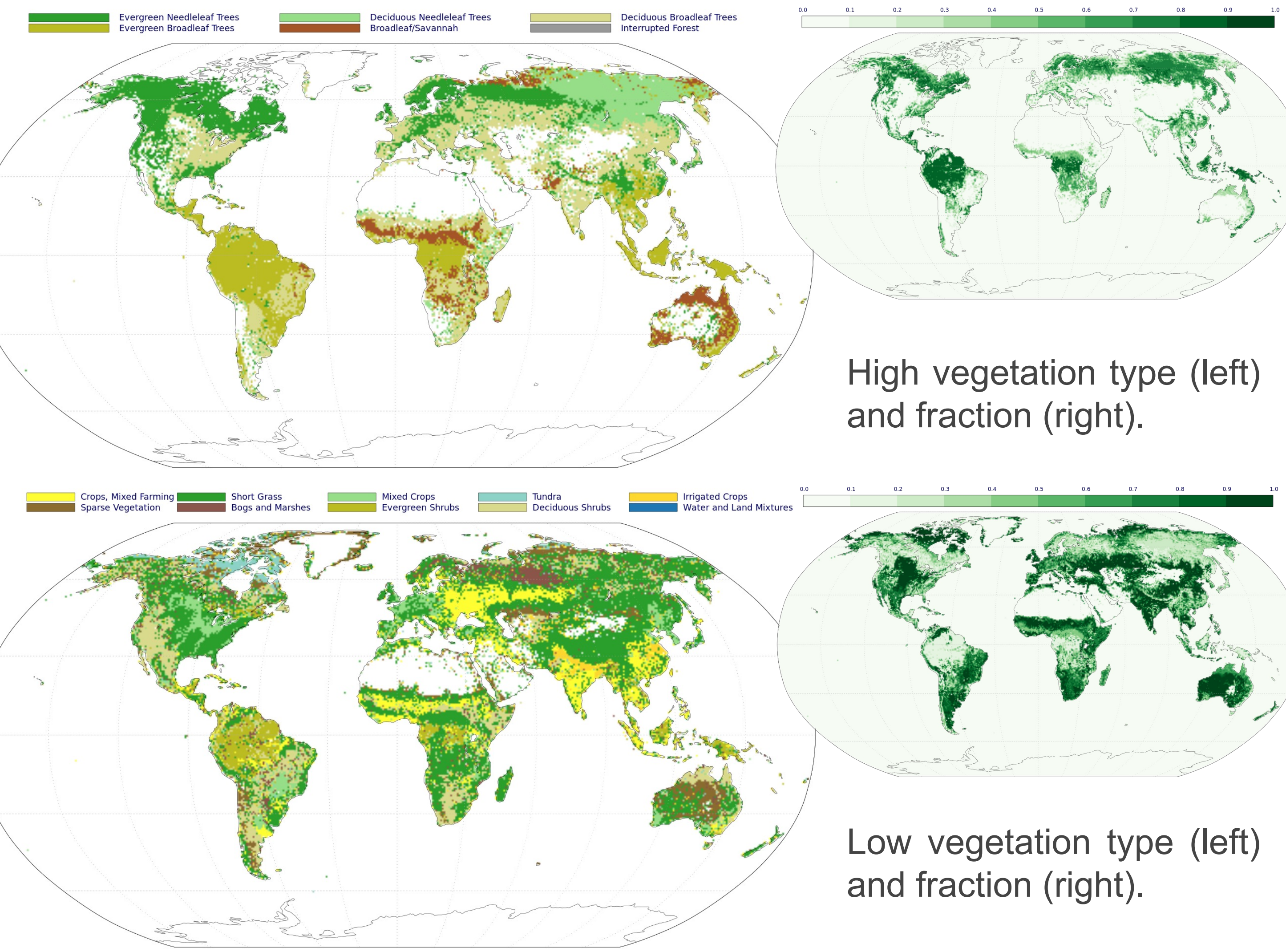
Orography

Consists of mean orography (top), small-scale (bottom), and sub-grid scale orography (4 fields; not shown).
Source: Copernicus Global 30m Digital Elevation Model (GLO-30); 2015, 30 m; Multi-Error-Removed Improved-Terrain (MERIT) DEM for islands.

Usage: atmospheric boundary (mean), turbulent orographic form drag (small-scale), flow blocking and orographic gravity-wave drag (sub-grid scale).



Vegetation

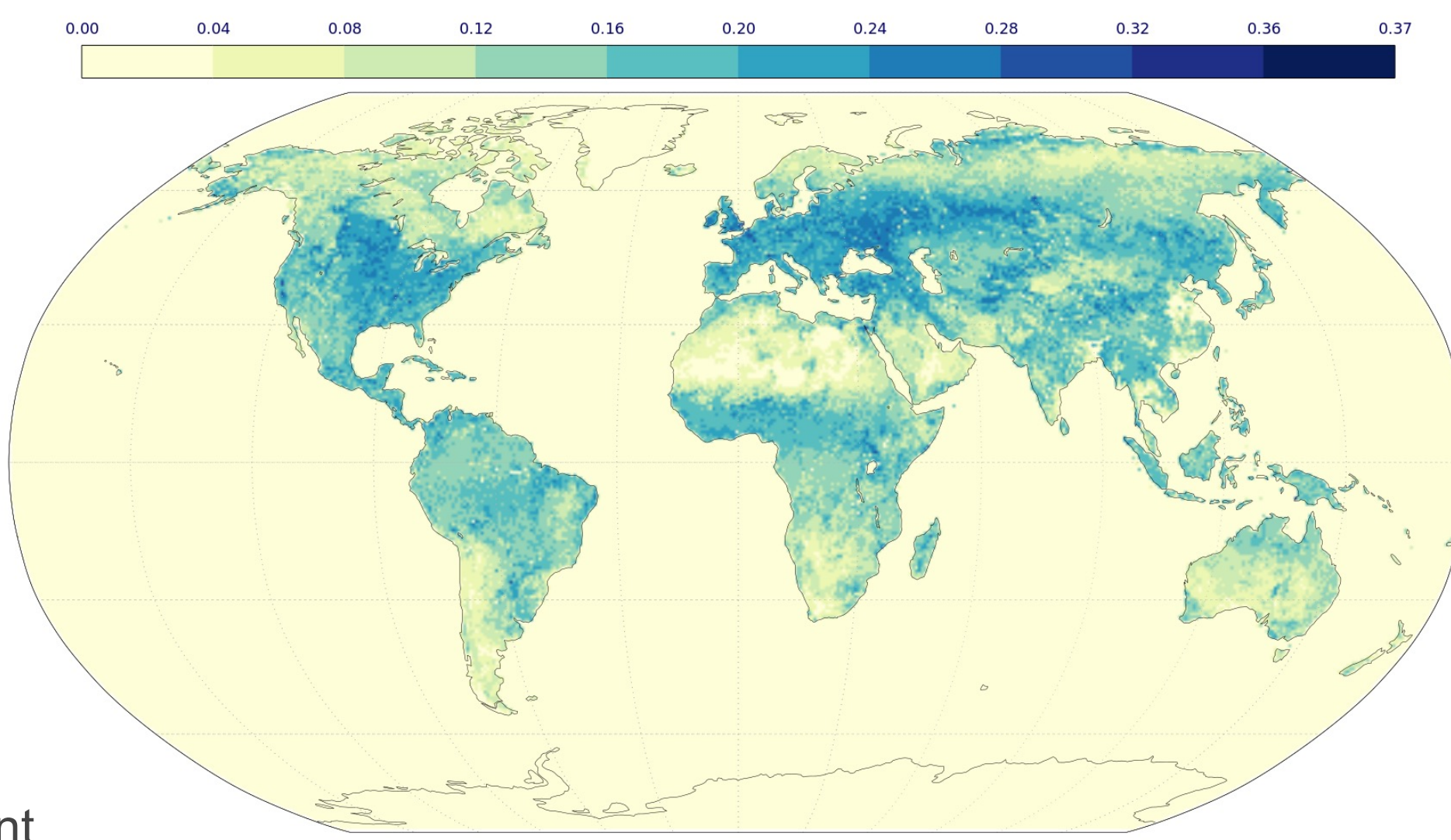


Fields consist of dominant vegetation types and vegetation cover fraction for high and low vegetation.
Source: ESA-CCI land use/land cover; 2019, 300 m resolution.
Usage: grid-box fractions and vegetation processes modelling in ecLand.

Albedo

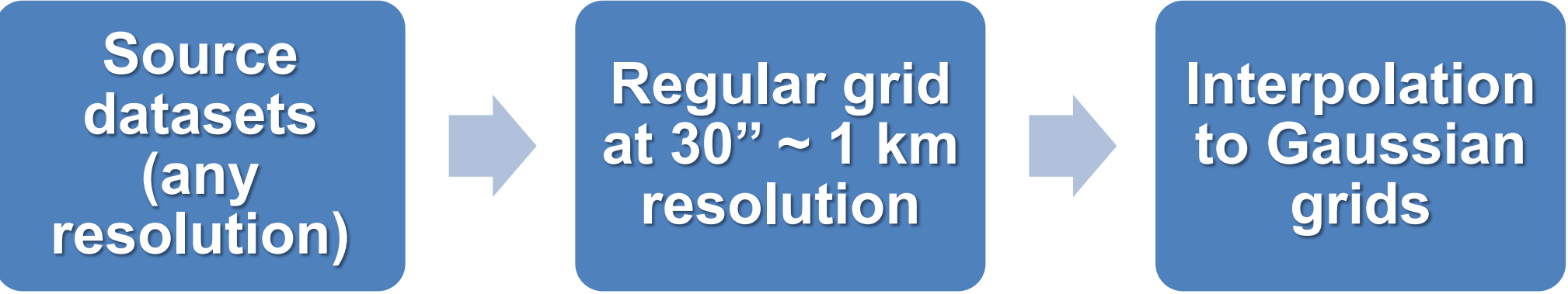
Consists of monthly fields split into 6 components.
Source: MODIS BRDF; 2001, 1 km. Fixed values for ocean and ice.
Usage: radiation and energy budget

Right: July near-infrared albedo for direct radiation, volumetric component



Ancillary field generation

ECMWF has around 30 operational ancillary fields describing static or climatological surface data. The processing of the data has recently been updated and will be done in two steps:
a) processing from source datasets to regular latitude/longitude grid at ~ 1 km in Google Earth Engine,
b) processing from ~ 1 km to IFS Gaussian grids at target resolutions using the internal Meteorological Interpolation and Regridding (MIR) software tool.



Fields are interpolated by **conservative interpolation** (grid-box average), **mode** (dominant grid-box type), or **nearest land-grid-box neighbour** methods.

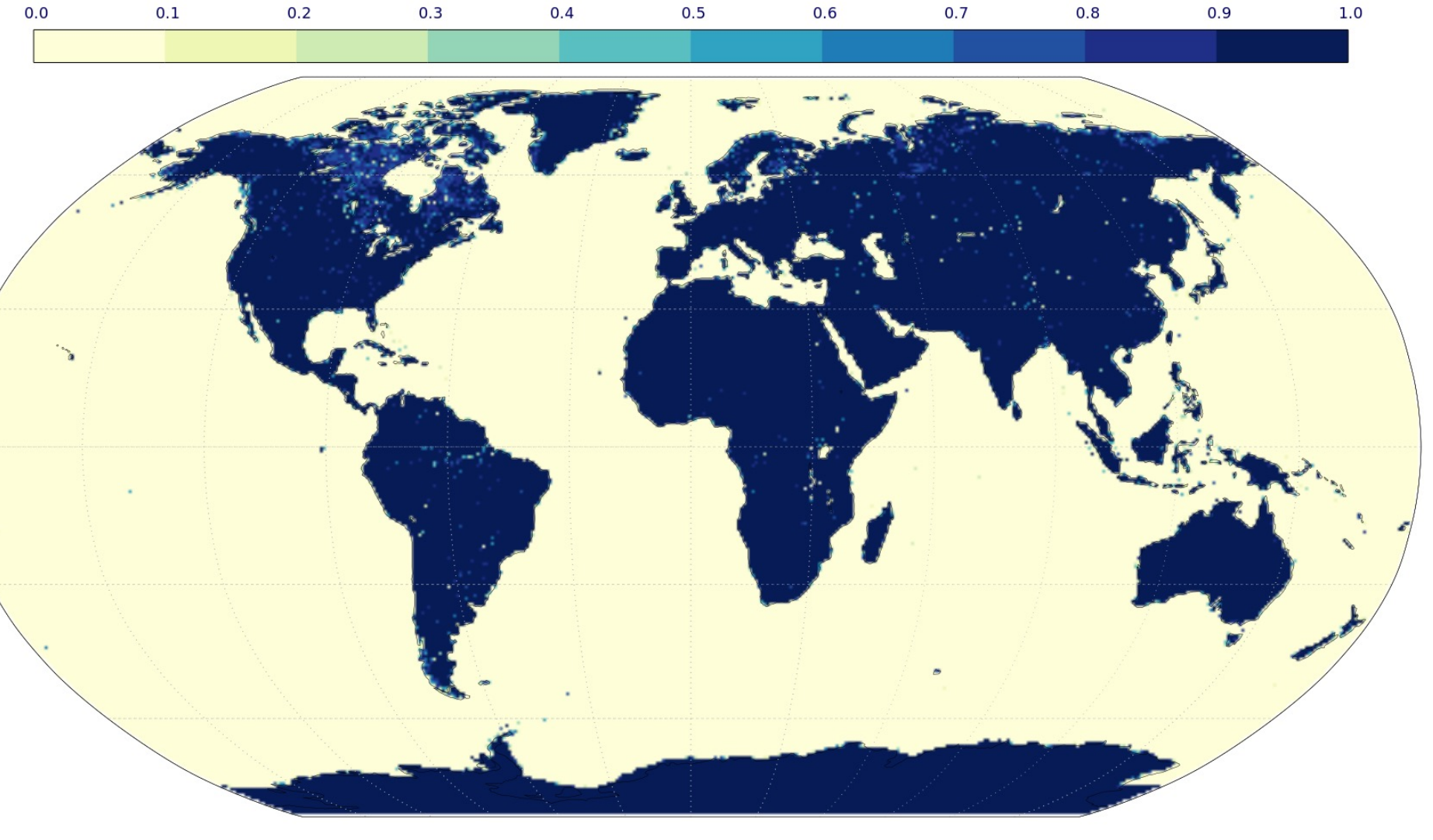


ecFlow suite for ancillary processing

Land and inland water cover

Source: Joint Research Centre Global Surface Water permanent water; 1984-2018, 30 m.

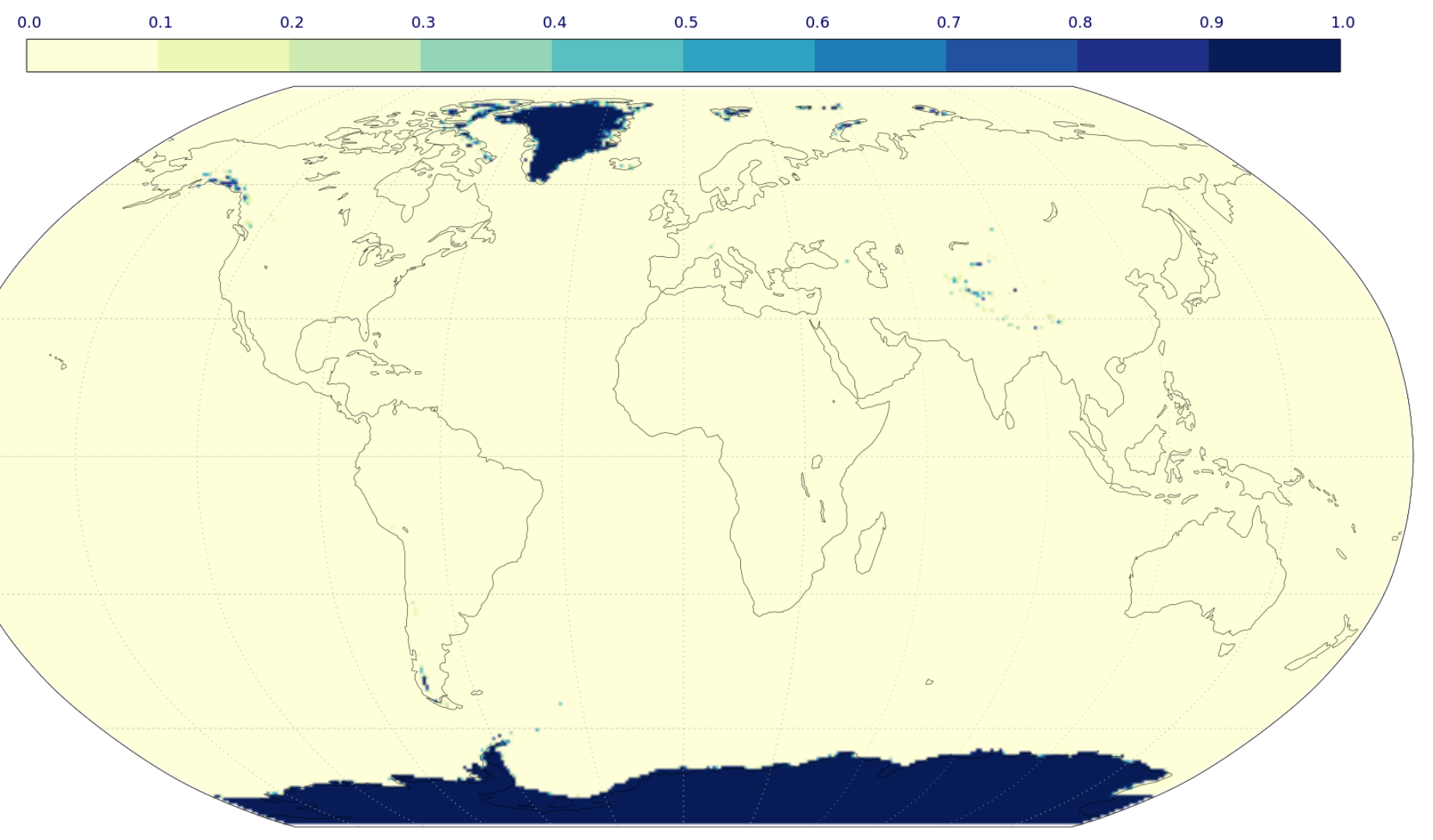
Usage: grid-box fractions; split between land / inland-water / ocean-wave models; regional masks for land data assimilation



Glacier cover

Source: Global Land Ice Measurements from Space (GLIMS), regional corrections for Greenland, Iceland, Svalbard, Antarctica; 2017.

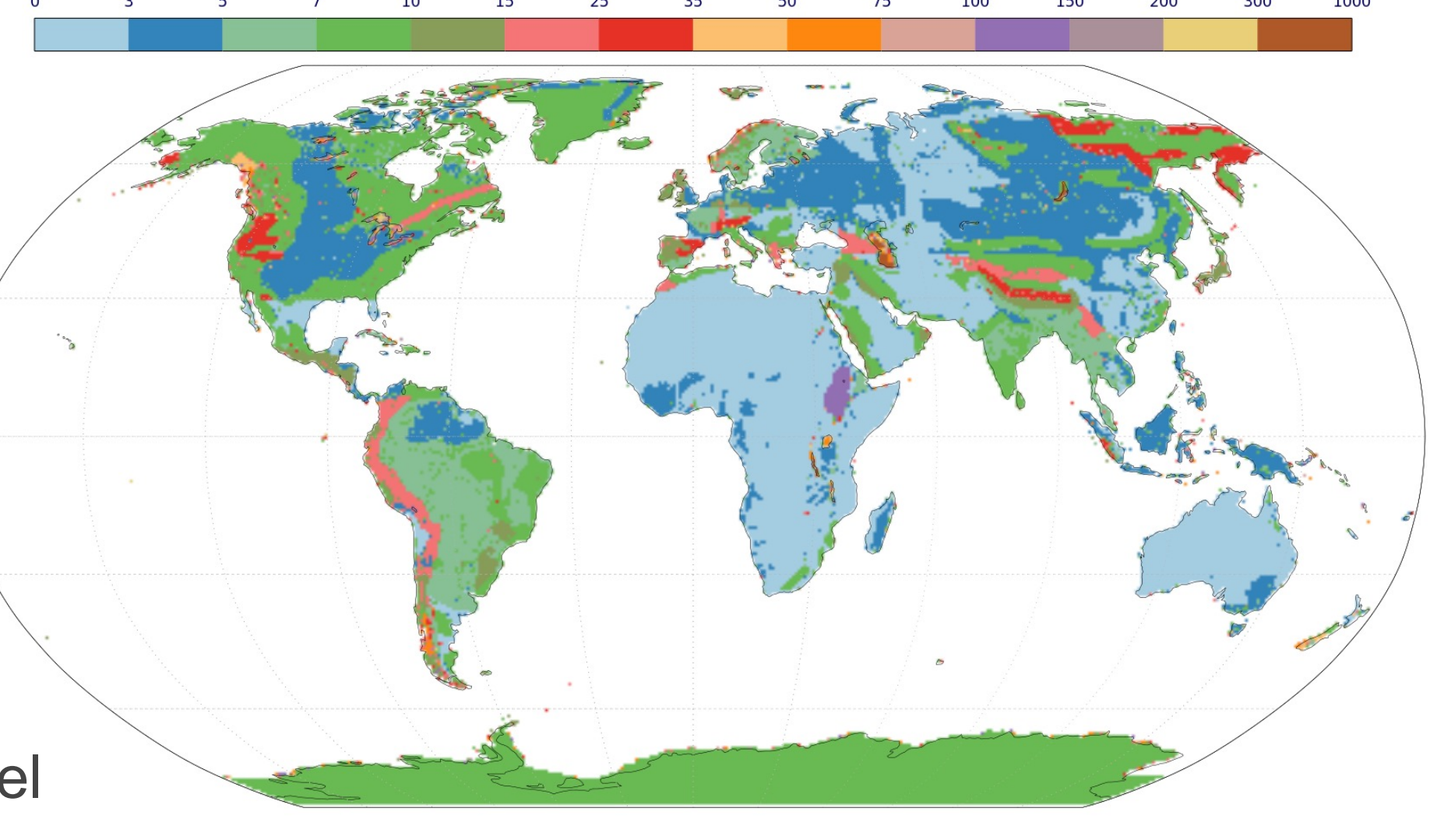
Usage: mask for land model; glacier fraction in new glacier scheme for Cycle 50R1.



Inland water mean depth

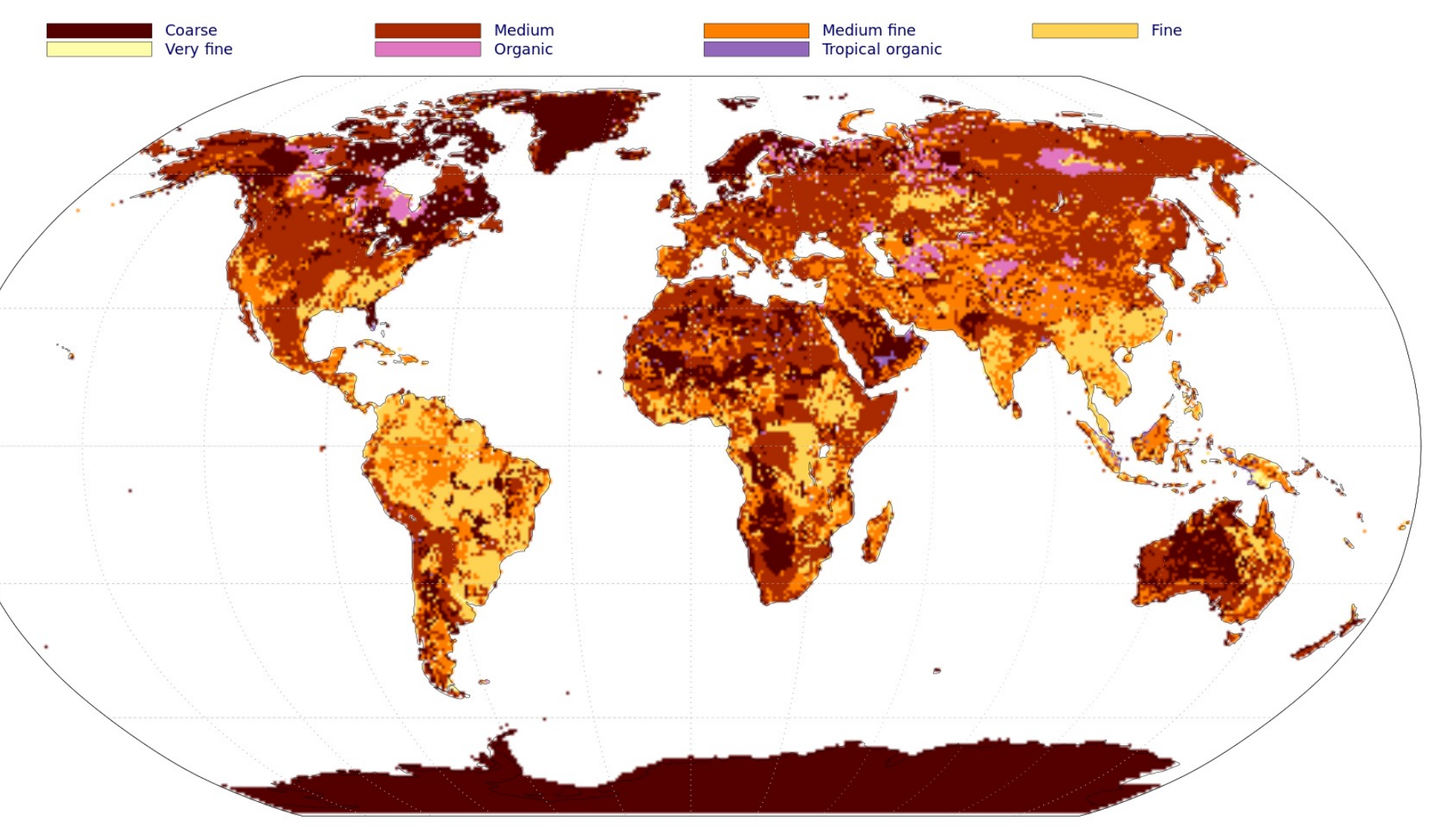
Source: Global Lake DataBase (GLDB) v3, 2014, 1 km — comprises information from Global Relief Model ETOPO1, in-situ lake bathymetry, indirect mean depth estimates; General Bathymetric Chart of the Oceans (GEBCO).

Usage: FLake inland water model



Soil texture

Source: FAO/UNESCO Digital Soil Map of the World (DSMW) 30-100 cm layer; 2003, 10 km. **Future:** ISRIC World Soil Information SoilGrids, 2020, 250 m.
Usage: soil water and energy budgets



More ancillary fields

Sub-grid scale orography, seasonal leaf area index for high/low vegetation, urban cover, wetland cover, plant photosynthesis types, ASCAT soil moisture CDF matching parameters, ozone, ocean bathymetry



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