

Land-sea mask in ERA5 and ERA-Interim

Question

I retrieved the [land-sea mask](#) from [ERA5](#) or [ERA-Interim](#) on its archived grid (grid=av), or on a reduced Gaussian grid. The data has fractional values in the range 0 (sea) to 1 (land).

I also retrieved the same land-sea mask on a regular lat/lon grid (e.g. grid=2.0/2.0). This data is binary, with values 0 and 1.

Why is this?

The short answer

When you retrieve data in any other than the archived grid, the data is on the fly interpolated to your chosen grid, using ECMWF's interpolation tool [EMOSLIB](#). EMOSLIB by design interpolates a land sea-mask to a reduced Gaussian grid as fractional values, but to regular lat/lon as binary values.

From early 2019 the new interpolation tool [MIR](#) will be used by default, which by default interpolates the land-sea mask to fractional values, including for regular lat/lon grids.

The long answer

In the data archive at ECMWF, the land-sea mask is stored on a reduced Gaussian grid (N320 for ERA5 and N128 for ERA-Interim). For both datasets (ERA5 and ERA-Interim) the data values of the land-sea mask are fractional values in the range 0 (sea) to 1 (land).

When you retrieve land-sea mask data from the ECMWF data archive:

your grid specification	result
regular lat/lon grid (e.g. grid=2.0/2.0):	the land-sea mask is interpolated by EMOSLIB on the fly from the original Gaussian grid to regular lat/lon, and the output values are rounded to 0 or 1
Gaussian grid (e.g. grid=N256)	the land-sea mask is interpolated by EMOSLIB on the fly from the original Gaussian grid to the specified one, without rounding.
archive (original) grid (grid=av)	no interpolation takes place

Notes

1. For NetCDF output on ECMWF's [Web API](#), or if you intend to convert to NetCDF with [ecCodes](#), you have to retrieve data on a regular lat/lon grid.
2. The behaviour described above applies to data retrievals through ECMWF's [Web API](#) or [MARS client](#). Data retrievals from the [Climate Data Store \(CDS\)](#) use ECMWF's interpolation tool [MIR](#), which by default interpolates the land-sea mask to fractional values, including for regular lat/lon grids.

Related articles

- [Model grid box and time step](#)
- [ERA5 terminology: analysis and forecast; time and steps; instantaneous and accumulated and mean rates and min/max parameters](#)
- [ERA5 data documentation](#)
- [How to download ERA-Interim data from the ECMWF data archive](#)
- [About pressure level data in high altitudes](#)