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GloFAS flood thresholds

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GloFAS v4.0 thresholds are on the GloFAS wiki

GloFAS Auxiliary Data

The auxiliary data for GloFAS are provided as NetCDF files in WGS 84 (EPSG:4326), and are **available to download below**.

Four datasets are available to download:

- Upstream area
- Elevation
- The Local Drain Direction (LDD)
- Flood thresholds ← **New**

<https://confluence.ecmwf.int/display/CEMS/Auxiliary+Data>

GloFAS Flood Thresholds

GloFAS river discharge floods thresholds for selected return periods (or recurrence intervals) of 1.5, 2, 5, 10, 20, 50, 100, 200, and 500 years. These return levels were computed with the Gumbel extreme value distribution using L-moments. The two parameters of the distribution (mu and sigma) are also provided.

Download the GloFAS v4.0 flood thresholds files here:

- [flood_threshold_glofas_v4_rl_1.5.nc](#)
- [flood_threshold_glofas_v4_rl_2.0.nc](#)
- [flood_threshold_glofas_v4_rl_5.0.nc](#)
- [flood_threshold_glofas_v4_rl_10.0.nc](#)
- [flood_threshold_glofas_v4_rl_20.0.nc](#)
- [flood_threshold_glofas_v4_rl_50.0.nc](#)
- [flood_threshold_glofas_v4_rl_100.0.nc](#)
- [flood_threshold_glofas_v4_rl_200.0.nc](#)
- [flood_threshold_glofas_v4_rl_500.0.nc](#)
- [flood_threshold_glofas_v4_mu.nc](#)
- [flood_threshold_glofas_v4_sigma.nc](#)

Flood Thresholds NetCDF metadata

▼ Collapse source

```

Dimensions: (lat: 3000, lon: 7200)
Coordinates:
* lat      (lat) float64 89.97 89.92 89.88 89.82 ... -59.88 -59.92 -59.97
* lon      (lon) float64 -180.0 -179.9 -179.9 -179.8 ... 179.9 179.9 180.0
Data variables:
  rl_1.5   (lat, lon) float64 ...
  rl_2.0   (lat, lon) float64 ...
  rl_5.0   (lat, lon) float64 ...
  rl_10.0  (lat, lon) float64 ...
  rl_20.0  (lat, lon) float64 ...
  rl_50.0  (lat, lon) float64 ...
  rl_100.0 (lat, lon) float64 ...
  rl_200.0 (lat, lon) float64 ...
  rl_500.0 (lat, lon) float64 ...
  sigma    (lat, lon) float64 ...
  mu       (lat, lon) float64 ...

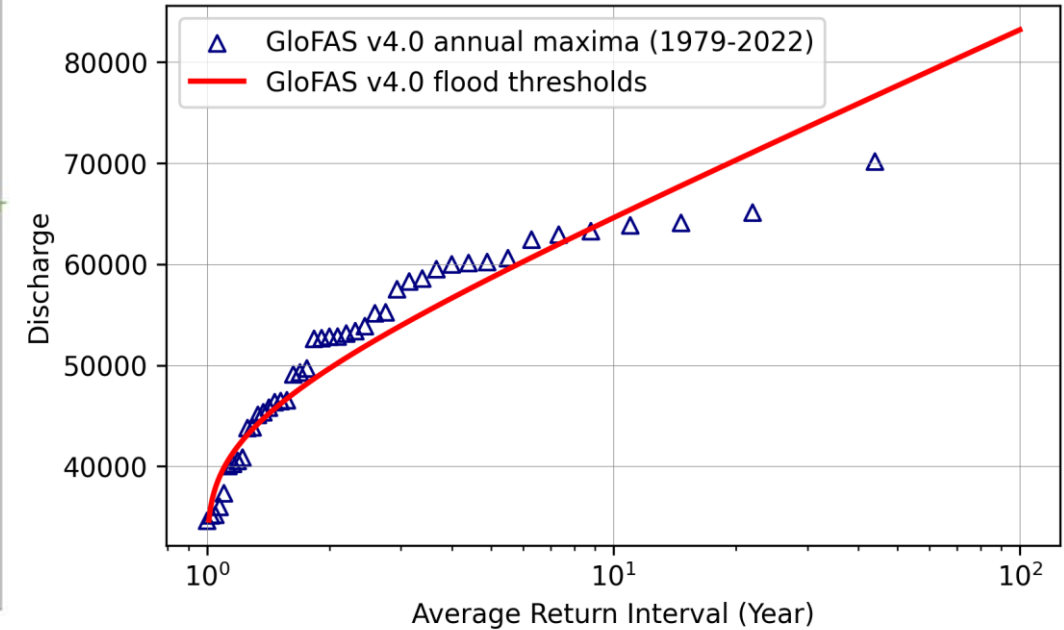
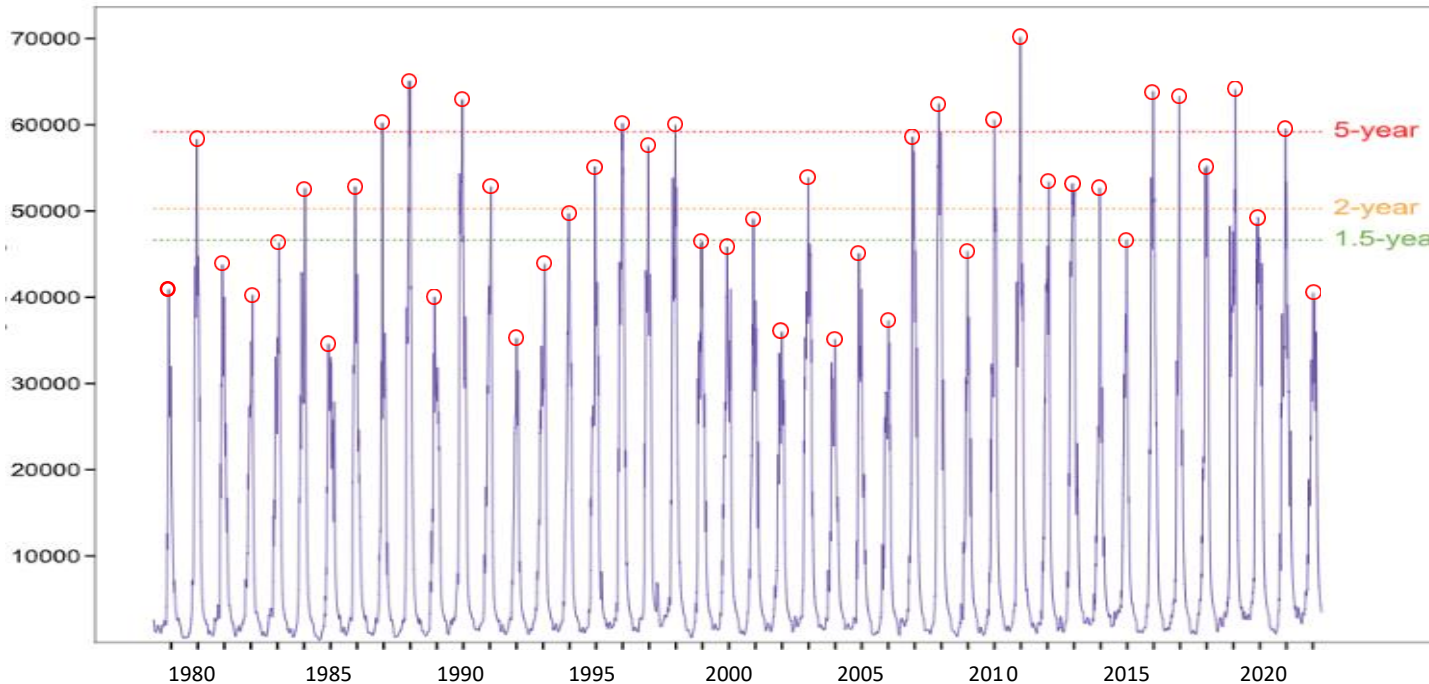
```



GloFAS v4.0 threshold generation

- Extract the annual maxima time series (1979-2022)
- Fit a Gumber distribution using the first two L-moments (λ_1, λ_2)

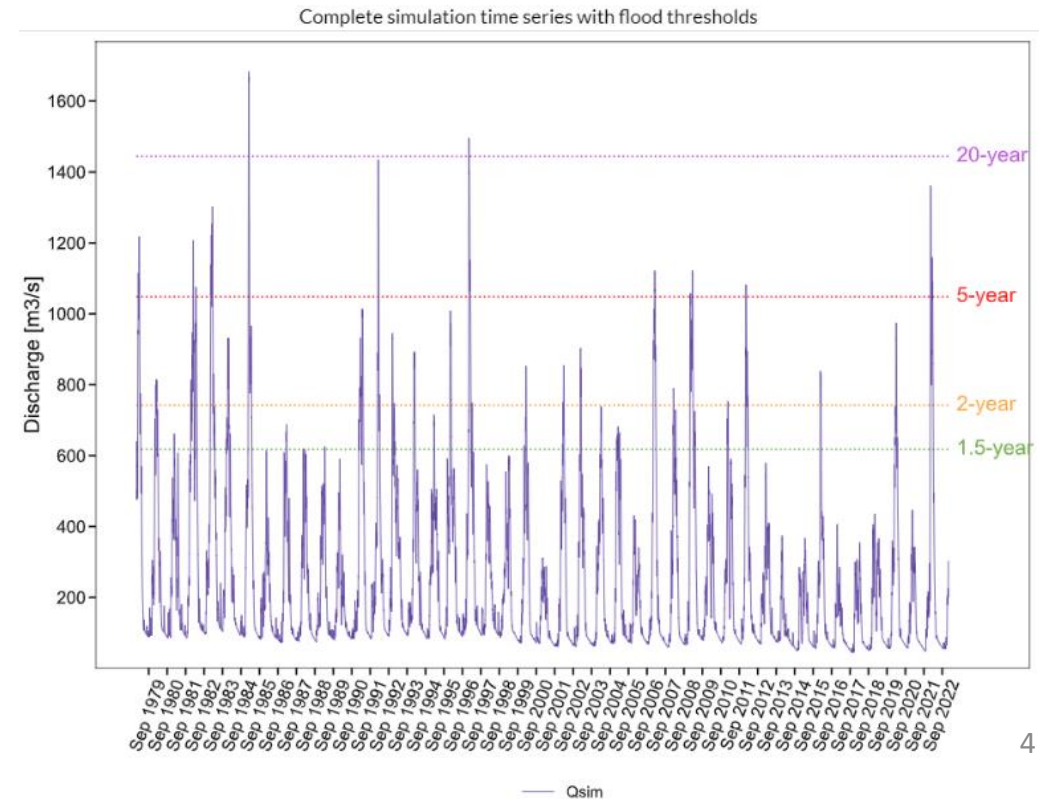
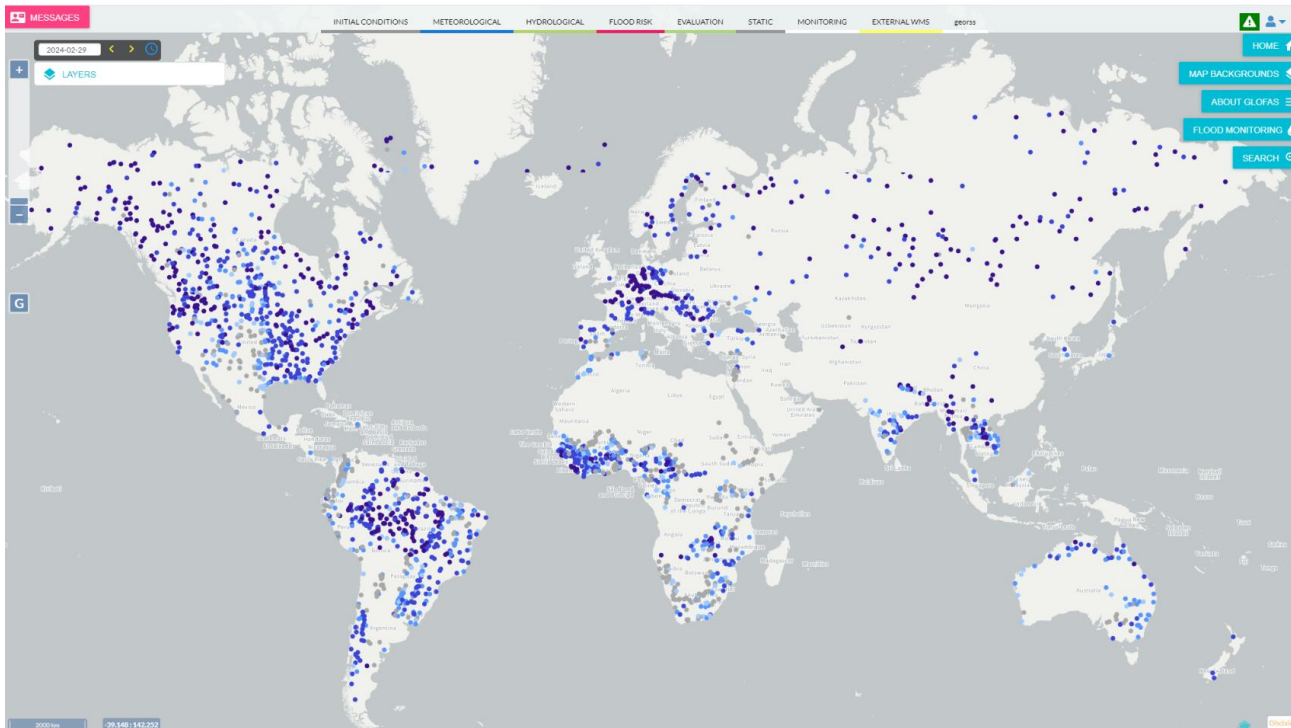
$$X = \mu - \sigma * \ln \left(\ln \frac{T}{T - 1} \right) \quad \mu = \lambda_1 - 0.5772 * \sigma \quad \sigma = \lambda_2 * \frac{1}{\ln 2} \quad (T = \text{return period})$$





GloFAS v4.0 reanalysis with flood thresholds

- The full reanalysis time series (1979-2022) is displayed in the Hydrological Model Performance layer on <https://www.globalfloods.eu/>
- For all the fixed reporting points, including also the flood thresholds (1.5-, 2-, 5- and 20-year)
- Helps with how well the thresholds represent the extreme event behaviour (in reanalysis alone and forecast vs reanalysis)

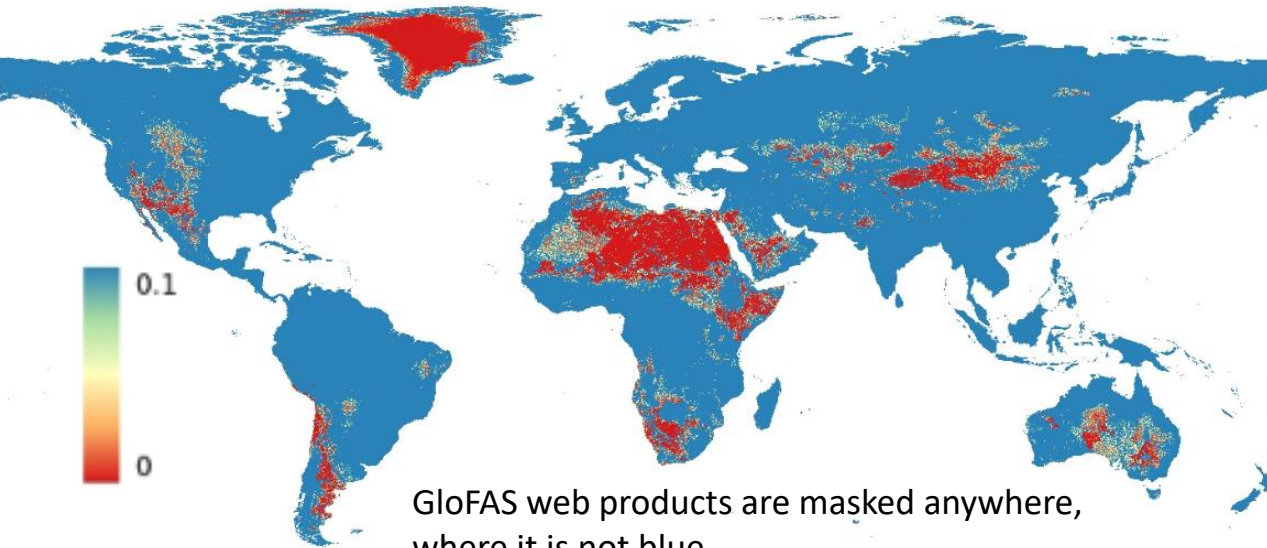




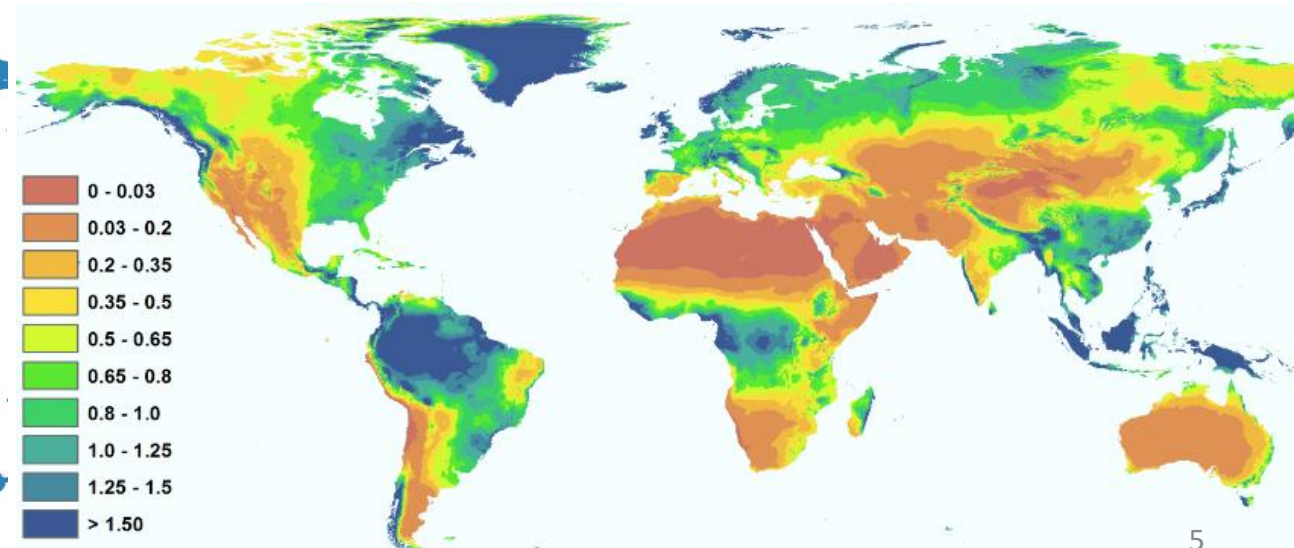
GloFAS v4.0 river discharge masking

- Small (below 250 km²) and extremely dry (below 0.1 m³/s 2-year flood threshold values) catchments are masked in GloFAS web products
- No coloured river pixels (in flood summary layers and 5-, 20-year probability maps) and no dynamic reporting point in those areas
- Important to be aware of this when the no-flood-signal is interpreted
- Dry areas are in good agreement with the aridity index (mean precip / mean evapotranspiration)

2-year flood threshold



Aridity index

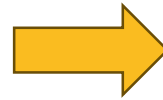
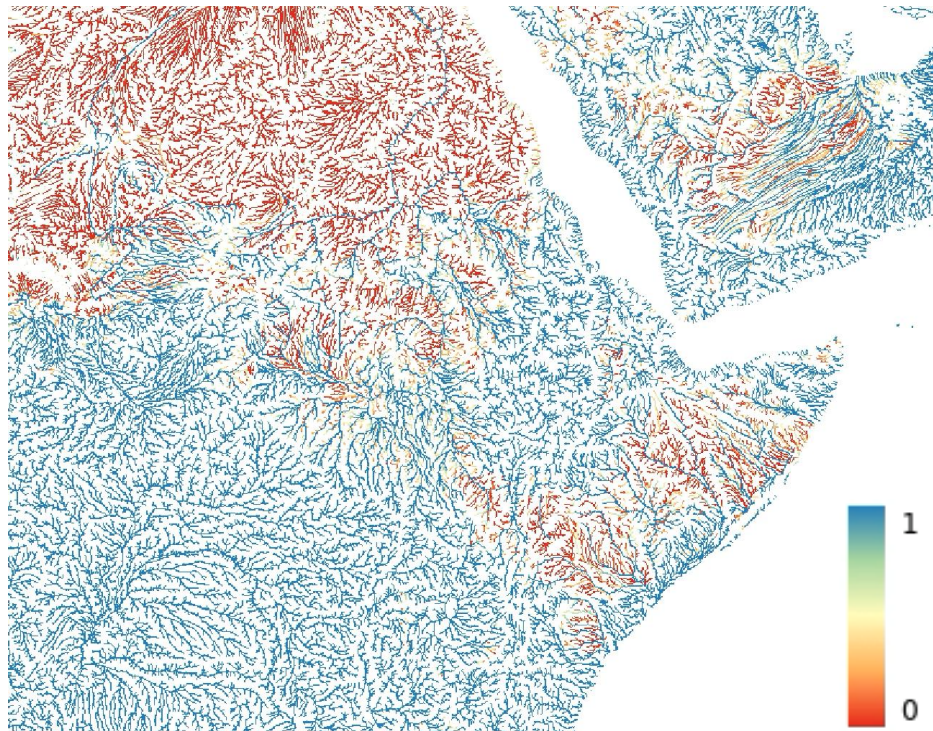




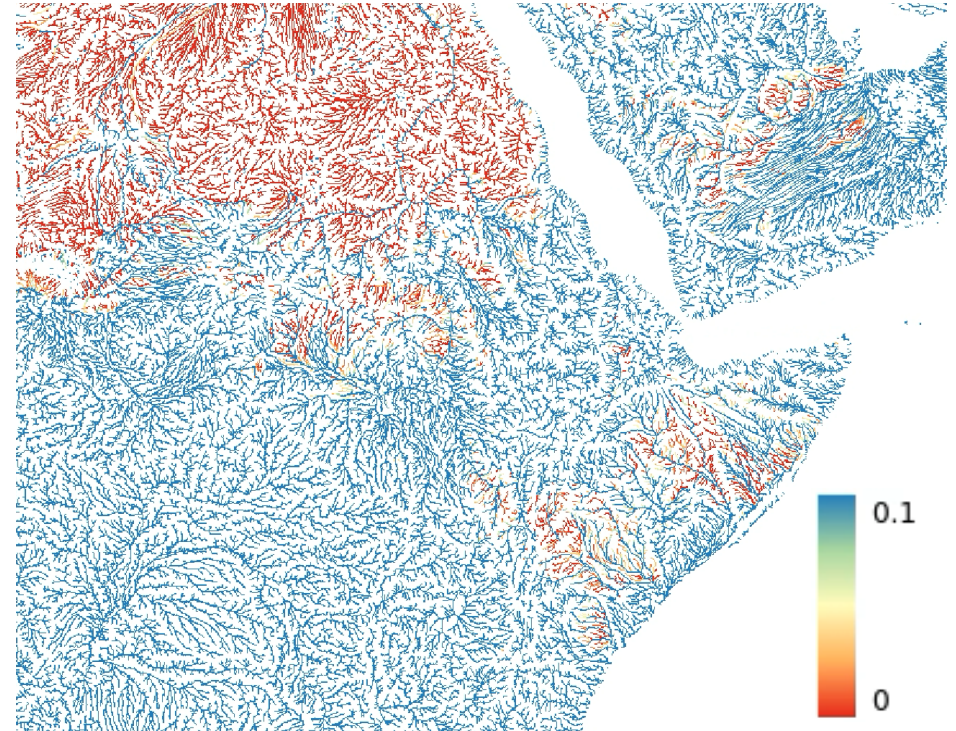
GloFAS v4.0 river discharge masking

- Small (below 250 km²) and extremely dry (below 0.1 m³/s 2-year flood threshold values) catchments are masked in GloFAS web products
- The minimum threshold was adjusted in GloFAS v4.1 from 1.0 to 0.1 m³/s (2-year threshold)

GloFAS v4.0



GloFAS v4.1





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Thank you



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