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Regional estimates of water scarcity and river habitat s for southern Europe

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With only sparse long-term river records for semi-arid areas, we have made use of the much better records for climate to provide estimates of monthly flow from source areas across Europe. These have been expressed in the form of flow duration curves, and the monthly frequencies of relevant flow stages. For semi-arid areas, the most critical river habitat is the occurrence of very low flow and dry conditions, which limit the activity of water breathing and water breeding creatures in the remaining pools.
The procedure we have adopted is to use interpolated climate data to define distributions of precipitation, temperature and potential evapotranspiration. These distributions are then used to generate a 50-year synthetic monthly climate time series. A simple generic hydrological model has then been used to estimate a corresponding series for discharge and this has been summarised as a flow exceedance curve, using parameters calibrated against flow data. Bankfull flow has been estimated for a return period of 1.5 years, and pool conditions are then defined, on the basis of cross-sectional geometry as 0.1% of bankfull flow. The corresponding annual duration of pool conditions is then taken from the exceedance curve. The frequency of pool conditions can then also be estimated for each month of the year. This method has been applied across Europe, showing regional contrasts of critical habitat conditions across the Mediterranean.