

OCTOPUS Id: Record ID from the OCTOPUS v2 Database, for basins used in this study

OCTOPUS reference ID: Reference information provided from the OCTOPUS v2 Database.

Centroid LON: Centroid WGS84 coordinate of given OCTOPUS v2 basin geometry

Centroid LAT: Centroid WGS84 coordinate of given OCTOPUS v2 basin geometry

Area: Area (in WGS84 degrees) of given OCTOPUS v2 basin geometry

MAP (mm/yr): Mean annual precipitation (mm/yr) extracted from the CHELSA model.

GLiM class: Modal basin lithology from the GLiM database (Hartmann and Moosdorf, 2012)

OCTOPUS gradient: Mean basin gradient provided from the OCTOPUS v2 database, which uses the surface fitting method described here: (<https://pro.arcgis.com/en/pro-app/2.8/tool-reference/spatial-analyst/how-slope-works.htm>)

90m DEM avg. gradient: Average gradient calculated from the Hydrosheds SRTM (Lehner et al., 2008), created by averaging D8 slopes within the basin.

30m DEM avg. gradient: Average gradient calculated from the 30m global Copernicus DEM, created by averaging D8 slopes within the basin. Due to computational limitations these were only calculated on basins <1 sq. degree in area.

OCTOPUS 10BE Erates (mm/yr) (nearby basins averaged): Basin averaged 10Be erosion rates provided by the OCTOPUS v2 database. In some cases, the average of nearby basins used, and thus the rate will differ from the official OCTOPUS database rates.

Rates averaged?: Were the rates re-calculated by averaging nearby basins within 10 km, and differing by less than 5% in drainage area (see main text for details).

90m Erates, bestfit advection: Erosion rates (mm/yr) calculated from the best-fit advection-only modelled run on the 90m DEMs.

90m Erates, bestfit diffusion: Erosion rates (mm/yr) calculated from the best-fit advection-only model run on the 90m DEMs.

90m Erates, bestfit adv+diff: Erosion rates (mm/yr) calculated from the best-fit advection-diffusion model run on the 90m DEMs.