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The new Open Cosmogenic Isotope and Luminescence Database (OCTOPUS)

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To date, globally more than 4000 in situ detrital catchment-averaged 10Be data are available, forming a highly variable, statistically resilient dataset that represents substantial effort of both capital and labour. However, published data are often inaccessible to researchers, are frequently subject to lacking crucial information, and commonly differ in underlying calculation and standardisation algorithms. Resulting data disharmony has confounded the purposeful (re)use of published 10Be-derived data, for instance for inter-study comparison, for looking at the greater picture of Earth surface's downwearing or for innovative data revaluation.

The new OCTOPUS database, initially consisting of one global and two Australian sub-collections, does away with these problems on global level by providing and maintaining a freely available, fully harmonized, and easy to use compilation of catchment-averaged 10Be data (and their 26Al complements, if available). The Australian National Data Service- (ANDS) funded project is maintained and hosted at the University of Wollongong (UOW) and is made available to the research community via an OGC compliant Web Map Service.

The global 10Be compilation (version 1 'Dooku's dilemma') provides published 10Be studies with all their samples, published and recalculated (i.e. harmonized) rates, featuring vector data (point and polygon geometry files incl. attribute table) and a variety of SRTM-derived raster data (HydroDEM, Flow Directions, Flow Accumulations, Slope Gradient, Atmospheric Pressure, Production Scaling, Topographic Shielding) at the same time. Sample metadata are comprehensive including information regarding data source and version information, sample location, and sampled material. 10Be and if applicable 26Al denudation rates are recalculated using the CAIRN open source code (Mudd et al., 2016), with all input files provided for transparency and reproducibility.

Additionally, on continental sub-level, OCTOPUS hosts comprehensive sub-collections of (A) both published and so far unpublished Australian 10Be–26Al in situ catchment-averaged data, and (B) available fluvial, aeolian, and lacustrine Thermoluminescence / Optically Stimulated Luminescence (TL/OSL) data.

Reference: Mudd, S.M., Harel, M.-A., Hurst, M.D., Grieve, S.W.D, Marrero, S.M., 2016. The CAIRN method: automated, reproducible calculation of catchment-averaged denudation rates from cosmogenic nuclide concentrations. Earth Surf. Dynam., 4, 655–674.