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MinSORTING: an Excel macro for modelling sediment composition and grain-size distribution

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Detrital mineral analyses are gaining increasing attention in the geosciences as new single-grain analytical techniques are constantly improving their resolution, and consequently widening their range of application, including sedimentary petrology, tectonic geomorphology and archaeology (Mange and Wright, 2007; von Eynatten and Dunkl, 2012).
We present here MinSORTING, a new tool to quickly predict the size distribution of various minerals and rock fragments in detrital sediments, based on the physical laws that control sedimentation by tractive wind or water currents (Garzanti et al., 2008).
The input values requested by the software are the sediment mean size, sorting, fluid type (seawater, freshwater, air) and standard sediment composition chosen from a given array including nine diverse tectonic settings. MinSORTING calculates the bulk sediment density and the settling velocity. The mean size of each single detrital component, assumed as lognormally-distributed, is calculated from its characteristic size-shift with respect to bulk sediment mean size, dependent in turn on its density and shape. The final output of MinSORTING is the distribution of each single detrital mineral in each size classes (at the chosen 0.25, 0.5 or 1 phi intervals). This allows geochronolgists to select the most suitable grain size of sediment to be sampled in the field, as well as the most representative size-window for analysis. Also, MinSORTING provides an estimate of the volume/weight of the fractions not considered in both sizes finer and coarser than the selected size-window. A beta version of the software is available upon request from: alberto.resentini@unimib.it

Mange, M., and Wright, D. (eds), 2007. Heavy minerals in use. Developments in Sedimentology Series, 58. Elsevier, Amsterdam.

Garzanti, E., Andò, S., Vezzoli, G., 2008. Settling-equivalence of detrital minerals and grain-size dependence of sediment composition. Earth and Planetary Science Letters 273, 138–151.

von Eynatten, H., and Dunkl, I., 2012. Assessing the sediment factory: The role of single grain analysis. Earth Sciences Reviews, 115, 97-120.