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Gridding down the fossil record: an experiment

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'How will big pictures emerge from a sea of biological data' was one of the 25 questions the journal Science listed as major challenges for the future of Science. The question certainly applies for palaeobiology, and more in particular to the fossil record. Tools have been developed to deal with the vast amount of data ($e.g.$, NOW (http://www.helsinki.fi/science/now), the Paleobiology Database (www.paleodb.org) and MioMap (http://www.ucmp.berkely.edu.miomap)). The increased stratigraphical control, the continuous development of climatic proxies, and better understanding of the palaeogeography ensure that, now more than ever, we have an opportunity to use these data to come to a better understanding of ecological processes on a geological timescale (Eronen, 2007).

The traditional and, arguably, the best way of dealing with palaeoecology is the point-based approach: localities are used as the basic entity for studies. The alternative, a grid-based approach in which the fossil record for a particular area is lumped, has many drawbacks. It mixes data along unnatural boundaries, obscuring patchiness in ecosystems, combining data from different sedimentological settings, and thus generally produces artificial groupings. The method, however, has one advantage. Single localities often produce only one type of fossil (seeds, leaves or just large mammals or small mammals, respectively). In a grid-based approach different types of localities are joined, allowing a more complete overview of the fossil record.

As an experiment, to see how viable a grid-based approach can be, an experiment is conducted using the NOW-database (version July 2003; Fortelius, 2003). Diversity, expressed as the number of mammal genera in grids of two by two degrees, is plotted across Europe per MN zone. Some of these charts will be presented at the EGU.

Eronen, 2007. Locality coverage, metacommunities and chronofauna: concepts that connect paleobiology to modern population biology.

Fortelius, M. (coordinator) [2003]. Neogene of the Old World Database of Fossil Mammals (NOW). University of Helsinki. http://www.helsinki.fi/science/now/.