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Constructing an accessible sediment core database format for rapid visual comparison of North Atlantic palaeoclimate data

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Many decades of research in palaeoceanography produced a wealth of late-Pleistocene stable isotope data from marine sediment cores. Much of these data, however, have been published in fragmented digital archives as supplementary data, if at all. An important aspect in the next years of palaeoceanography research involves, therefore, using a collaborative standard digital framework with which to place all of these records in a common format and on a common timescale, whereby geochronological uncertainties can be correctly quantified, evaluated and updated. Such an approach would allow for rapid comparison of datasets from multiple sediment locations, significantly reducing researcher workload and simultaneously improving understanding of palaeoclimate processes.

We use a common framework to store and view palaeoclimate data from North Atlantic sediment cores, using data from the ongoing ACCLIMATE project as an example. In order to simplify the data preparation and uploading processes as much as possible, we developed a system whereby data is stored in text file formats similar to those already used by much of the palaeoceanography community. In other words, no familiarity with database systems is required to contribute data, thus greatly reducing barriers towards the development of a shared digital framework.

We demonstrate the powerful ability of our simplified, common data sharing format for enabling rapid searching and data visualisation. We developed a Matlab based graphical user interface that allows the user to select and display stable isotope data form cores based on specific characteristics (water depth, latitude, longitude, foraminifera species, etc). Additionally, we also use inline 14C calibration and age-depth model tools, allowing for the rapid evaluation of geochronological uncertainty.