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# Integrating palaeoenvironmental and climate cyclicities – Optimizing the stratigraphic framework in the non-marine Lower Cretaceous

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Studies on changing paleoenvironments and climate cycles in non-marine archives of the Cretaceous greenhouse earth are hitherto rare, primarily a result of the lack of high-resolution stratigraphy and correlations to the marine record. On the other hand, recent refinements of the geological time scale have made major advances for the Cretaceous to yield a resolution comparable to that of younger Earth history. In the Cretaceous marine record is now possible to correlate and date short-term sea-level records and their possible relation to climate and/or tectonic events with appropriate resolution. Correlation in the non-marine realm ('continental' aquatic) has long been fraught with considerable problems and limitations, especially on supraregional (i.e. inter-basinal) to global scales, thus often hampering serious attempts at dating and chronological linking of events documented by the respective deposits – let alone appropriate correlation to marine successions.
A new interdisciplinary project and multi-proxy study funded by the Austrian Science Fund (FWF) uses the Lower Cretaceous European record (English Wealden) as a test site for the integration of ostracod biostratigraphy and assemblage changes, and cyclostratigraphy (orbitally/climate driven cycles). Ostracods (microcrustaceans with a calcified shell) are the most useful biostratigraphical and palaeoenvironmental tool in Lower Cretaceous non-marine sequences. During the past two decades, research progress in late Mesozoic non-marine ostracods led to their extended applicability, whereas their wide dispersal ability has become a key conside-ration in their supraregional (inter-basinal to global) biostratigraphical utility. The integrative methodology applied in this project, targets the correlation of the ostracod faunal composition change with the variation of geochemical and sedimentological parameters through time and inferences on controlling (palaeoenvironmental) factors and their regulating mechanisms ('climate changes', orbital cycles?). The approach is multiple: 1) Biostratigraphy in the supraregional to global context, 2) cyclostratigraphy using ostracods, lithologic parameters and sediment geochemistry, 3) stable isotope geochemistry, and 4) magnetostratigraphy for chronological control. The methods used, evaluated and optimized within the scope of this project can then be efficiently applied on larger scopes and to larger datasets towards a better linking of marine and non-marine Cretaceous successions, enhancement of resolution in the considerable (particularly Lower) Cretaceous non-marine record, and integration of these data into the Cretaceous timescale.