S9 - SEA-LEVEL CHANGES, KELLWASSER HORIZONS AND CORAL-BRACHIOPOD CRISES DURING THE LATE FRASNIAN IN THE NAMUR-DINANT BASIN (BELGIUM)

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In the Namur-Dinant Basin, the Lower (LKW) and the Upper Kellwasser Events (UKW) are marked by the development of argillaceous deposits with dysaerobic-anaerobic facies and correspond respectively to the maximum of relative sea level (maximum flooding surface) of the two late Frasnian - earliest Famennian third-order sequences. The initial decline of the rugose corals within the Namur-Dinant Basin is recognized in the Lower *rhenana* Zone, and is correlated with the beginning of the rise in sea level triggering the transgressive system tract of the first late Frasnian sequence and following the fall in sea level which marks the top of the middle Frasnian limestone formations and bioherms. This decline was not due to the LKW *sensu stricto*, which happened later and induced strictly no extinction in corals and brachiopods as those occurring below the LKW were still present above. Rugose corals disappeared progressively, along with the tabulates, in the Upper *rhenana* Zone, before the UKW. The brachiopod decline occurred in three steps within the interval spanning the Lower *rhenana* Zone to the *linguiformis* Zone. Most brachiopod orders suffered severely and the major losses occurred at the top of the Upper *rhenana* Zone. These extinction episodes were linked principally to diachronous regional facies changes related to transgressions. For example, atrypids disappeared at the top of the Lower *rhenana* Zone in the deeper part of the basin, just before the deposition of the dark shales of the Matagne Formation, but persisted within the Upper *rhenana* Zone in its shallow parts.

S3 - GLOBAL VEGETATION AND MODELLING NEOGENE CLIMATES

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Predicting the response of Earth's climate to anthropogenic greenhouse gas emissions using numerical climate models is a way of providing policy makers with the information they need to make society wide decisions about the future climate change and its impacts on civilization. To test the predictive ability of models the use of substantial databases of palaeoclimatic / environmental information from periods in Earth history significantly different from the modern is required. The Neogene (Miocene and Pliocene) provides such a time period. It is close enough to the recent for plate tectonic differences to be minimal, but distant enough to offer significantly different climates. Focusing on the mid-Piacenzian warm period a global palaeobotanical database has been constructed containing 202 marine and terrestrial sites. This database is consistent with the BIOME4 mechanistic vegetation model, which has allowed the merger of data and climate model output to create an advanced hybrid vegetation reconstruction. This reconstruction is now being used to facilitate new modelling studies and palaeoecological studies. The vegetation pattern shows a northward shift in evergreen taiga, temperate forests and temperate grasslands. Warm-temperate forests spread across mid and eastern Europe. In Africa and Australia desserts were reduced and replaced by tropical savannas and woodland. Current work is focused on producing another hybrid vegetation reconstruction for the late Miocene (Tortonian). We have constructed a database of 207 palaeobotanical data points. This new reconstruction shows a spread of forests northwards and an even greater spread of warm-temperate forests through modern temperate regions.