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Central project (coordination)

Anthropogenic global warming is regarded as a major threat to species and ecosystems worldwide. Predicting the biological impacts of future warming is thus of critical importance. The geological record provides several examples of mass extinctions and global ecosystem perturbations in which temperature-related stresses are thought to have played a substantial role. These catastrophic natural events are potential analogues for the consequences of anthropogenic warming but the Earth system processes during these times are still underexplored, especially in terms of their ultimate trigger and the extinction mechanisms. We propose a research unit, which aims at assessing the relative importance of warming-related stresses in ancient mass extinctions and at evaluating how these stresses emerged under non-anthropogenic conditions. An interdisciplinary set of projects will combine high-resolution geological field studies with meta-analyses and sophisticated analysis of fossil occurrence data on ancient (suspect) hyperthermal events to reveal the rate and magnitude of warming, their potential causes, their impact on marine life, and the mechanisms which led to ecologic change and extinction. Geochemistry, analytical paleobiology and physiology comprise our main toolkit, supplemented by biostratigraphy, sedimentology, and modeling.