

Long-term selective degradation of organic-walled dinoflagellate cysts in a Maderia Abyssal Plain turbidite

Daniel D. Gray (1), Gerard J.M. Versteegh (2), and Karin A.F. Zonneveld (1)

(1) MARUM - Center for Marine Environmental Sciences / Fachbereich 5 Geowissenschaften, Universität Bremen, Bremen, Germany, (2) Alfred-Wegener Institute Helmholtz-Zentrum für Polar und Meeresforschung, Bremerhaven, Germany

Post-depositional sedimentary dinoflagellate cyst degradation is well documented under oxic conditions, a process characterised by the preferential loss of “S-cysts” at elevated ambient oxygen concentrations. Establishing a quantitative relationship between degradation rates and aerobic exposure would allow paleo-bottom oxygen water profiles to be reconstructed. Here we trace the long-term (centennial-millennial scale) degradation pattern of a dinocyst assemblage from the F-turbidite of core GeoB20305-7 retrieved at Maderia Abyssal Plain (MAP), with reference to a suite of inorganic and organic geochemical profiles. A downward-migrating oxidation front advances through the the upper part of the depositional unit, resulting in a near-total loss of the Peridinales cyst fraction dominated by *Brigantedinium* spp. and *Echinidinium* spp. specimens. In contrast, *Gonyaulacales* species have subdued degradation responses resulting in the progressive reconstitution of the cyst assemblage away from its source signal. Assuming a diffusion-dominated migration of the oxidation front and a basic parameterisation of boundary conditions we estimate the oxygen exposure time (OET) of the oxidised section to be ~5000 years. The resulting degradation profile is well-fitted by an exponential decay curve. Implications of these observations are discussed with regard to existing schemes for dinoflagellate based proxy interpretation in oxic environments.