Volcanic activity of the Kerguelen Plateau and an associated climate change as triggering factors of the Kilian Event (OAE 1b; Late Aptian): New evidences from DSDP Site 545, offshore Morocco

Elodie Bracquart [1], Guillaume Charbonnier *[1], Sylvain Garel [2, 3], Julien Danzelle [1], Thomas Munier [1]

[1] Institut des Sciences de la Terre de Paris (ISTeP) – CNRS : UMR7193, Sorbonne Université, Paris – France
[2] Energy & Geoscience Institute, The University of Utah, Salt Lake City, UT 84108, USA
[3] CVA engineering, Immeuble Toki Lana 7, chemin de la Marouette, Bayonne, France

The Aptian-Albian boundary is marked by perturbations of the carbon cycle and of the oxygenation conditions in the Western Tethys and in the Central Atlantic, corresponding to the Oceanic Anoxic Event 1b (OAE 1b). It is characterised by the presence, in the sedimentary record, of four dark organic-carbon-rich layers, including the Niveau Kilian at the latest Aptian. Even though this event is commonly attributed to the activity of the Kerguelen Igneous Province, the triggering mechanisms of the Kilian event and the conditions of deposition of the organic rich shales are still uncertain.

To answer these questions, a multi-proxy study (Clay mineral, mercury analysis, Rock-Eval) was carried out on core samples from DSDP Site 545, located in the deep domain of the Atlantic margin of Morocco. Rock-Eval pyrolysis analysis coupled with published trace-element data indicate that the increased organic matter burial at that site was both influenced by a boosted surface primary productivity and by an higher supply of terrestrial organic matter.

The good correlation between Hg concentrations and the Hg over total organic carbon (Hg/TOC) ratio indicates that the mercury sequestration in sediment was not controlled by the organic matter alone. We suggest that the subaerial volcanic activity of the southern Kerguelen plateau contributes to increase aerial flux of Hg into the stratosphere allowing its global distribution.

The clay mineral assemblages indicate an enhancement of the continental weathering before the Kilian Event synchronous with the appearance of volcanic pulses. We suggest that a global CO_2 increase generated a rapid warming and an accelerated hydrological cycle inducing the formation of a sapropel event. Finally, an aridification observed right after the Kilian Event, also identified in South-European and North-American locations suggests that this event had a major impact on the migration of the climate belts.

Keywords: Kilian event, OAE 1b, Mercury, Clay mineralogy, Volcanism, Cretaceous

Merci de ne rien inscrire dans cette zone et ne pas modifier les marges des pieds de page et entêtes.