Geophysical Research Abstracts
Vol. 18, EGU2016-12910, 2016
EGU General Assembly 2016

Mesozoic black shales, source mixing and carbon isotopes

Guillaume Suan
Université Lyon 1 - CNRS, UMR 5276 LGLTPE, Earth Science, France (guillaume.suan@univ-lyon1.fr)

Over the last decades, considerable attention has been devoted to the paleoenvironmental and biogeochemical significance of Mesozoic black shales. Black shale-bearing successions indeed often display marked changes in the organic carbon isotope composition (δ^{13}Corg), which have been commonly interpreted as evidence for dramatic perturbations of global carbon budgets and CO_2 levels. Arguably the majority of these studies have discarded some more "local" explanations when interpreting δ^{13}Corg profiles, most often because comparable profiles occur on geographically large and distant areas. Based on newly acquired data and selected examples from the literature, I will show that the changing contribution of organic components with distinct δ^{13}C signatures exerts a major but overlooked influence of Mesozoic δ^{13}Corg profiles. Such a bias occurs across a wide spectrum of sedimentological settings and ages, as shown by the good correlation between δ^{13}Corg values and proxies of kerogen proportions (such as rock-eval, biomarker, palynofacies and palynological data) recorded in Mesozoic marginal to deep marine successions of Triassic, Jurassic and Cretaceous age. In most of these successions, labile, ^{12}C-enriched amorphous organic matter of marine origin dominates strata deposited under anoxic conditions, while oxidation-resistant, ^{13}C-rich terrestrial particles dominate strata deposited under well-oxygenated conditions. This influence is further illustrated by weathering profiles of Toarcian (Lower Jurassic) black shales from France, where weathered areas dominated by refractory organic matter show dramatic ^{13}C-enrichment (and decreased total organic carbon and pyrite contents) compared to non-weathered portions of the same horizon. The implications of these results for chemostratigraphic correlations and pCO_2 reconstructions of Mesozoic will be discussed, as well as strategies to overcome this major bias.