Geophysical Research Abstracts, Vol. 8, 07972, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07972

Charcoal (Inertinite) in Late Devonian Marine Black Shales: Implications for Terrestrial and Marine Systems and for Paleo-atmospheric Composition

S. M. Rimmer (1), A. C. Scott (2)

(1) Department of Earth and Environmental Sciences, University of Kentucky, Lexington, KY 40506, USA. (2) Department of Geology, Royal Holloway University of London, Egham, TW20 0EX, UK

(srimmer@uky.edu / Fax: 859-323-1938 / Phone: 859-257-4607)

Fossil charcoal in the geologic record provides evidence for fire events that, in turn, may have implications relative to terrestrial ecosystems and atmospheric evolution. Much of the fossil charcoal record involves known terrestrial or near-shore environments and shows earliest occurrences of fire in the Pridolian (Late Silurian), with fire events increasing throughout the Late Devonian and into the Carboniferous. We suggest that inertinite (fossil charcoal) occurrences in marine shales, particularly marine black shales of Devonian and Mississippian age, can further constrain paleo-atmospheric oxygen levels and provide an important linkage between terrestrial and marine ecosystems. In particular, frequent fire events would have had a significant impact on soils both in providing a release of mineral nutrients and in being subjected to post-fire erosion. Incomplete residues of this early biomass burning also would have been the source of inert carbon in soils and sediments and helped in the long-term extraction of carbon from the atmosphere-biosphere system. In addition, elements such as phosphorous and iron, which may have been mobilized during post-fire erosion, may have had an impact on the growth of marine planktonic algae which may have reinforced marine anoxic events at this time in Earth history. Evidence for fossil charcoal in organic-rich Devonian-Mississippian marine black shales from the Appalachian and Illinois Basins (USA) will be evaluated as will fossil charcoal occurrences from the Late Devonian terrestrial sediments of the Hampshire and Catskill Formations.