Geochemical Data as a Proxy to Sea Level Variations and Palaeoenvironmental Changes

GREGORY D. PRICE Department of Geological Sciences, The University of Plymouth, Drake Circus, Plymouth, PL4 8AA,UK

Studies regarding the geochemistry of fine-grained sediments and fossils have been increasingly used to both interpret depositional and diagenetic environments. Variation in elemental and isotopic compositions of sediments and fossils may be attributed to a number of environmental factors including marine productivity, water temperature and salinity, redox conditions, water depths and sedimentation rates. Two examples are examined, the Cenomanian-Turonian boundary from Southern England and the Lower Toarcian of Yorkshire, England. Both the early Jurassic and the Cenomanian to Turonian are characterised by a rise of sea level and are associated with extensive anoxic bottom waters. The Lower Toarcian sediments consist frequently of highly organic-rich shales where the sequence stratigraphic significance is somewhat obscure. In contrast the Cenomanian-Turonian consists of chalks and calcareous claystones. A suite of trace elements (including Mn, Ca, Fe, and Al) have been analysed following nitric and hydrofluoric acid digestion. The degree to which geochemical variation can effectively be used as a proxy to reconstruct sea level histories and palaeoenvironmental change in mudrock dominated successions is examined.