An Integrated Study of the Calcareous Nannofossil Response to Short-Term Paleoceanographic Changes Recorded in the Upper Jurassic Haynesville Formation of East Texas and North Louisiana, USA

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The stratigraphic distributions of Upper Jurassic calcareous nannofossils are being investigated in 76 core samples raised from three wells drilled into the Haynesville Formation in North Texas and East Louisiana, USA. The formation consists predominantly of dark shales and mudstones deposited in a shallow low-energy restricted basin. Deposition of these sediments was influenced by relatively gentle tectonic subsidence of an extensional nature punctuated by sea-level variations as continental plates separated during the Jurassic. Nannofossils are calcium carbonate remains of all unicellular photosynthesizing nannoplankton smaller than 30 microns. Nannoplankton are almost exclusively marine and live in the photic zone of the ocean because of their need for sunlight and nutrient. Hence, they are sensitive to and record photic zone conditions such as temperature, salinity, sea-water pH, water-mass distribution and productivity, and nutrient concentration. This unique characteristic, their extremely small size and the broad distribution of many of their taxa, have made them very important index fossils for solving a wide range of stratigraphic problems (For example; sediment dating and correlation, paleoceanographic and paleoclimate studies).

Changes in relative abundance among Upper Jurassic nannofossil assemblage species reflect different climatic, ecological and oceanographic conditions. The goals of this study are to provide a detailed nannofossil biostratigraphy for the sections, understand the nature of variability among species of the Mesozoic coccolith Family Ellipsagelosphaeraceae, determine if this variability is controlled by palaeoecologic factors, and along with lithofacies and bulk carbonate oxygen and carbon isotope data, attempt a palaeoceanographic reconstruction for the Haynesville deposition.