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Paleogene climate variations on the East African margin.

A. O'Halloran, C.J. Nicholas and R. Goodhue
University of Dublin, Trinity College, Dublin 2, Ireland (ohalloao@tcd.ie)

The Paleogene (65-24Ma) contains two of the most significant global climate change events. The global warming event; the Palaeocene-Eocene Thermal Maximum (PETM); and the global cooling event; the Early Oligocene Climate Event (EOCE). Between the towns of Kilwa and Lindi, on the southern coastal margin of Tanzania, a complete $\sim$2km Paleogene succession has been continuously cored by the Tanzanian Drilling Project (TDP). The succession is a mid- to outer-shelf passive margin sequence dominated by clays and claystones with occasional ribbon limestones and more carbonate-rich intervals.

Distribution of clays in modern oceans appears to be controlled by contemporary climate and so detrital clays of past marine basins provide information on the palaeoclimate of the source region(s). However, there are many processes involved in transporting continental sediments to marine basins and so a degree of care must be taken when analysing clay mineralogy for climatic signals. Paleogene organic-rich clays from Tanzania have multi-disciplinary potential, allowing full elucidation of the past climate in this region. An overview of the clay mineralogy through the Paleogene has produced results indicating a largely stable depositional system, with fluctuations of key clay minerals throughout. In this study fluctuating abundances of kaolinite, montmorillonite, calcite and quartz have been used in conjunction to attempt paleoenvironmental and paleoclimatic reconstruction of low latitude East Africa through the Paleogene. Semi-quantitative x-ray diffraction across the PETM has shown a rise in kaolinite production, apparently contrary to hypotheses that low latitude coastal areas would experience more arid conditions. Montmorillonite also increases, while quartz and calcite show decreasing abundances into the early Eocene. In combination with other techniques this data will provide a comprehensive overview of climate and climate-induced processes on the East African coast.