

Changes in clay and iron hydroxides compositions when terrigenous sediments enter a marine environment – an experimental study

BEAVIS, F R^{1*} AND ELLIS, D J²

¹Research School of Earth Sciences, Australian National University, Canberra Australia; GHD, 239 Adelaide Tce, Perth, WA 6004,

(*correspondence fern.beavis@gmail.com)

²Research School of Earth Sciences, Australian National University, Canberra, ACT 0200, Australia (david.ellis@anu.edu.au)

Terrestrial clays and iron hydroxides undergo geochemical changes when transported from freshwater to saltwater environments. We have studied changes in major and trace element compositions of a range of samples that were suspended in the water column and aliquots analysed over five months. This gave an understanding of the changes occurring to clays due to contact with the seawater *prior* to settling and burial, and thus independent of subsequent biogenic and authigenic processes at the estuary sediment-water interface and within the sediment column. This research defines the initial pre-depositional alterations occurring to the sediment chemistry and concentration of elements upon entering the saltwater environment.

Clay pipe experiments involved suspending PVC pipes in estuarine waters with samples enclosed within layers of sand. The geochemical changes to each of the clay types, and goethite, demonstrate significant changes to terrigenous fine grained sediments (both major and trace elements) upon entering the marine environment. Besides natural changes, a temporary spike in Cu and Zn, that correlated with flooding, indicated successful detection of anthropogenic pollutants.