Holocene mismatch of the East Asian and Indian summer monsoons

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Oxygen isotope records from stalagmites in caves in southern China, interpreted as proxy rainfall records reflecting the intensity of the East Asian summer monsoon, indicate gradual monsoon weakening for the last ~9,000 years, as also documented for the Indian monsoon [1, 2]. Coupled with high-precision dating, the speleothem proxy records have been used to test monsoon links with orbital forcing, solar changes, iceberg discharges in the North Atlantic, ocean currents, and atmospheric methane [1]. However, these 'benchmark' cave records do not match other published, dated East Asian proxy rainfall records (based independently on loess/palaeosol magnetic properties [3], and cave oxygen isotope inter-comparisons[4]), which show variable East Asian monsoon intensity through the entire Holocene. Here is presented an explanation for the strong correlation of the cave records with the extra-regional Indian monsoon record yet their mismatch with other dated Chinese rainfall records. The implications of this for the Holocene evolution of the East Asian summer monsoon are also discussed.

[1] Wang *et al*. (2005) *Science* **308**, 854-857. [2] Dykoski *et al*. (2005) *Earth Planet. Sci. Letts* **233**, 71-86. [3] Maher & Hu (2006) *The Holocene* **16**, 309-319. [4] Hu *et al*. (2008) *Earth Planet. Sci. Letts*.

The effect of tidal movements on Sulfur cycling in mangrove sediments using stable isotopes

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The management and remediation of acid sulfate soils relies on an understanding of the processes that underlie their formation and biogeochemical behaviour. To help identify and understand these complex processes, stable isotopes of sulfur and oxygen can be used. Mangrove sediments represent currently forming acid sulfate soils, so understanding the processes operating as these sediments are laid down may provide some insight into the characteristics observed in much older materials. The aim of this study is to examine the influence of tidal movements on sulfur cycling in mangrove sediments using stable isotopes.

Mangrove sediment samples were collected from an estuary in Ballina, eastern Australia every 1.5 hours over a 12 hour period. Samples were collected to a depth of 40 cm and frozen with liquid nitrogen. Stable sulfur isotopes ratios were determined on the sulfate and sulfide fraction of the sediment and accompanying pore waters.

The sulfur isotope signature of the sulfide fraction remained relatively consistent throughout the profiles and during tidal changes. The signature of the sulfate fraction however recorded a significant decrease from seawater sulfate values during low tide. When the sediments are exposed to air, sulfides which have a light isotope signature are oxidised to produce isotopically light sulfate. This light sulfate is retained in the sediment pore water during low tide until it is either washed from the profile or diluted by the isotopically heavier seawater sulfate during high tide.