Seasonal variations in silicon concentrations and $\delta^{30}Si$ signatures at a tropical estuary: Matang, Malaysia

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Rivers play a crucial role in the delivery of silicon (Si) from the continents to the ocean. However, a detiled understanding of the role that estuarine environments play in regulating this delivery of dissolved Si (DSi), remains poorly resolved. This is due to the complex mixing of riverine and marine waters, and biogeochemical processes that take place.

We present data from the tropical Matang Estuary, Malaysia. Field campaigns were carried out on three (dry, wet, dry season) occassions, over one year (August 2015, November 2015, April 2016 respectively). Each sampling (n=13) was conducted across a c. 12 km transect from brackish to saline waters.

Estuary waters are more saline and have lower DSi concentrations during the dry season (August 2015 and April 2016) than wet season months (November 2015), displaying both the reduced catchment/upstream delivery of riverine DSi and increased nutrient uptake by diatoms in these periods. This is supported by a significant, positive relationship between $\delta^{30}Si_{DSi}$ and Diatoxanthin/DSi (µg/Mol) (r=0.65, p<0.001). Overall, April 2016 data have most enriched $\delta^{30}Si_{DSi}$ (+0.91 to +1.36‰) signatures, coincident with a strong El Niño, dry season. While, $\delta^{30}Si_{DSi}$ signatures are highest in November 2015 (+0.62 to +1.11‰) and lowest in August 2015 (+0.57 to +0.90‰) at sites with greatest salinity. November 2015 data show a significant relationship between $\delta^{30}Si_{DSi}$ and 1/DSi (r=0.60, p<0.001) suggesting changes in source DSi and/or clay dissolution in the monsoonal period.