



The geochemical records of *Porites* corals from Con Dao island, Southern Viet Nam as an indicator of Mekong river discharge and East Asian monsoon

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The Mekong river plays an important role in the Vietnamese economy, particularly in agriculture and fishery. And it is strongly dominated by the East Asian Monsoon. In this research, we presented 26-year geochemical coral records from Con Dao island and established the relationship between sea surface temperature (SST) and Sr/Ca ratios, demonstrated the potential of Ba/Ca and $\delta^{18}\text{O}_{sw}$ in capturing Mekong river discharge and flood events. A *Porites sp.* coral was collected on the southwest side of Con Dao island, about 90km distance from Mekong river mouth, at ~20m water depth. We measured Sr/Ca and Ba/Ca ratios using inductively coupled plasma atomic emission spectrometry (ICP-AES) and oxygen stable isotope ratios using an automated Kiel carbonate preparation device (Kiel IV) coupled to Finnigan MAT 253 at Hokkaido University. All geochemical proxies were measured in monthly resolution during the period 1980 – 2005. We have compared the coral Sr/Ca and observed SST in Con Dao island using only annual extreme values to obtain linear regression equation of Sr/Ca (mmol/mol) = $(-0.0504 \pm 0.004) \times \text{SST } (^{\circ}\text{C}) + (10.305 \pm 0.17)$. Our result is similar to some other previous studies in the same or neighbor region. We used the coral Sr/Ca ratios to create an age model for all proxies. The seasonal variation of coral Ba/Ca ratio show two peaks with a lower peak of $3.73 \mu\text{mol/mol}$ (± 1.42) in August and a higher peak of $4.35 \mu\text{mol/mol}$ (± 2.77) in March corresponding to warm/wet season and cool/dry season, respectively. Both of peaks reflected the Mekong river sediment discharge but amount of sediment discharge in summer is lower than in winter. Our result is consistent with the reversal of the Mekong river discharge, which is northward in summer and southward in winter. Using the pair of Sr/Ca ratio and $\delta^{18}\text{O}_c$, we reconstructed the oxygen isotopic composition of seawater ($\delta^{18}\text{O}_{sw}$) with a maximum in May and high decreasing in warm/wet season. Following the document about flood history in Mekong Delta, flood occurred 7 times from 1980 to 2005. We divided coral Ba/Ca ratios and $\delta^{18}\text{O}_{sw}$ to flood years and no flood years and calculated seasonal variation of each types. Comparing between them, we realized a significant increasing of Ba/Ca and $\delta^{18}\text{O}_{sw}$ in warm/wet season in flood years corresponding the increasing of discharge from Mekong river. This proves that our Ba/Ca and $\delta^{18}\text{O}_{sw}$ can capture flood events from Mekong river. We will apply this approaches in full length of cores to reconstruct the past histories of Mekong river discharge during last 80 years.