EGU21-6250
https://doi.org/10.5194/egusphere-egu21-6250
EGU General Assembly 2021

Geochemical evidence of tropical cyclone controls on shallow-marine sedimentation (Pliocene, Taiwan)

Shahin Dashtgard[1], Ludvig Löwemark[2], Pei-Ling Wang[3], Romy Setiaji[2], Yu-Yen Pan[1,2], and Romain Vaucher[1]

[1]Simon Fraser University, Earth Sciences, Canada (sdashtga@sfu.ca)
[2]National Taiwan University, Geosciences, Taiwan
[3]National Taiwan University, IOceanography, Taiwan

Shallow-marine sediment typically contains a mix of marine and terrestrial organic material (OM). Most terrestrial OM enters the ocean through rivers, and marine OM is incorporated into the sediment through both suspension settling of marine plankton and sediment reworking by tides and waves under fairweather conditions. River-derived terrestrial OM is delivered year-round, although sediment and OM delivery from rivers is typically highest during extreme weather events that impact river catchments. In Taiwan, tropical cyclones (TCs) are the dominant extreme weather event, and 75% of all sediment delivered to the surrounding ocean occurs during TCs.

Lower Pliocene shallow-marine sedimentary strata in the Western Foreland Basin of Taiwan comprises mainly completely bioturbated intervals that transition upward into strata dominated by tidally generated sedimentary structures, indicating extensive sediment reworking under fairweather conditions. Physical evidence of storm deposition is limited. However, lower Pliocene strata contain OM that is effectively 100% terrestrial OM in sediment that accumulated in estimated water depths <35 m. The overwhelming contribution of terrestrially sourced OM is attributed to the dominance of TCs on sedimentation, whereby □600,000 TCs are estimated to have impacted Taiwan during accumulation of a ~200 m long succession. In contrast, the virtual absence of marine OM indicates that organic contributions from suspension settling of marine OM is negligible regardless of the preserved evidence of extensive reworking via fairweather processes (i.e., waves and tides). These data suggest that (1) even in the absence of physical expressions of storm deposition, TCs still completely dominate sedimentation in shallow-marine environments, and (2) the organic geochemical signal of preserved shallow-marine strata is not reflective of day-to-day depositional conditions in the environment.