Organic carbon burial over the last 10 kyr by the Waipaoa River, NZ

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Small mountainous rivers (SMRs), most of which are located along active margins, play a unique role in marine and global carbon cycles. SMRs drain only ~20% of land, but deliver approximately 40% of the fluvial sediment to the global ocean, which is roughly equivalent to the fraction delivered to all passive margins. In addition to high sediment yields, SMRs are unique in the ability to sequester large quantities of organic carbon (OC), due to composition and delivery method. Primary factors contributing to the efficient sequestration of OC are hypothesized to be dependent on 1) the recalcitrant nature of the OC and 2) episodic delivery to the seabed in rapid burial events. Particulate organic carbon exported from SMRs is 7 – 75% fossil carbon (kerogen), which is inherently recalcitrant. Efficient burial of particulate organic carbon (POC) contributed from these systems likely plays an important role in long-term atmospheric O_2 and CO_2 buffering, as well as preserve a thorough record of paleo-environments.

Most of our knowledge of SMR sedimentary systems is from contemporary environments, however sediment accumulation in SMR shelves has varied over time in response to anthropogenic impacts, climate change and sea level. These forcing functions have influenced long-term sediment and OC accumulation rates. Changes in OC accumulation rate are therefore expected to influence the quantity and/or composition of OC on SMR margins.

To investigate the effect of long-term, spatially extensive forcings on the geochemical record of SMRs we use the Waipaoa River, New Zealand. The Waipaoa River represents a system of interest due to its large sediment yield (6750 tons/km^2/yr), despite draining only 2205km^2. Continental shelf cores collected by the MATACORE group aboard the *R/V Marion Dufresne* in 2006 extend to 10 ka. Correlations between sediment accumulation rates, OC burial flux, and eustatic sea-level rise suggest a system responsive to climate forcings. However, organic geochemical proxies, including $\delta^{13}C$, $\delta^{15}N$, and lignin phenols do not correlate strongly with mean millenial-scale burial fluxes but instead exhibit notable variability in response to shorter-termed events and processes.