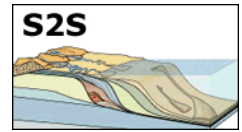


Source to sink evolution of organic carbon across the Waipaoa margin, NZ



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E. Leithold¹, N. Blair²

¹North Carolina State University; ²Northwestern University

The composition of particulate organic carbon in sedimentary systems provides information concerning sources of materials and their history. The NSF-MARGINS Source to Sink study of the Waipaoa system in New Zealand provides a platform to calibrate the particulate organic carbon (POC) sedimentary record by linking chemical characteristics to terrestrial and marine sedimentary processes. We have studied the POC composition in rocks, soils, and floodplain, riverine and marine sediments. Approximately one third of the current riverine particulate organic carbon is derived from the erosion of sedimentary rocks and can be tracked in surface sediments out to the continental slope (see figure). The balance of the C, possessing a mean nominal ¹⁴C-age of 1,000 years, is primarily from modern C₃ vegetation and aged soil POC. At minimum, the aged soil C represents 15% of the non-rock C pool. Relict alluvial terraces may be important sources of the aged material as the landscape adjusts to climate and anthropogenic forcings. The POC is transformed as it transits the shelf to the slope. In the energetic nearshore, the non-rock C is lost. We hypothesize this occurs via oxidation. Most POC bypasses this zone however and accumulates in the mid-shelf depocenter where modern marine OC is incorporated. Aged OC appears to accumulate on the outer shelf and upper slope, possibly signaling along-shelf/slope transport of particulates. By carefully considering the relationship between POC chemistry and sediment history in the contemporaneous sedimentary system, we can better interpret the longer-term organic geochemical stratigraphic record of the Waipaoa margin.

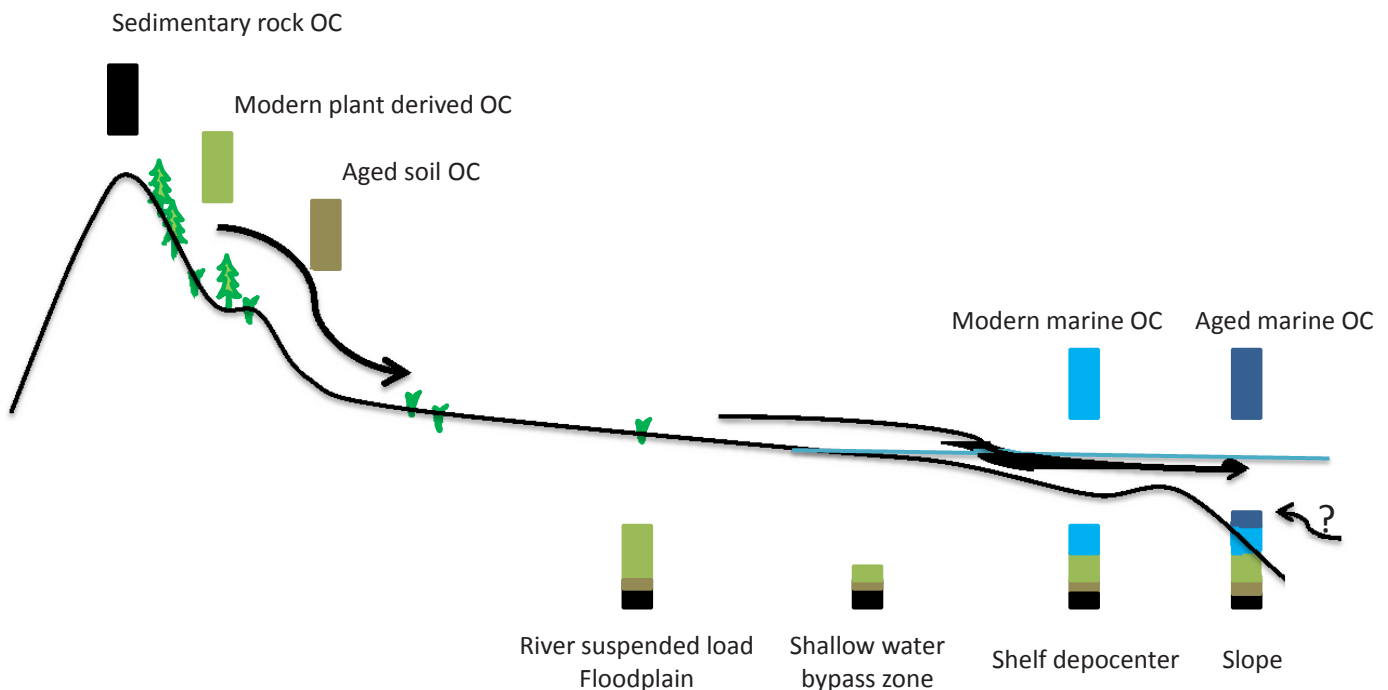


Figure: Schematic illustration of how the various sources of particulate organic carbon combine as sediment moves from source to sink in the Waipaoa system. The relative contributions, as depicted by the height of the bars, are approximate.

Terrestrial Sources and Export of Particulate Organic Carbon in the Waipaoa Sedimentary System: Problems, Progress and Processes (N.E. Blair, E.L. Leithold, H. Brackley, N. Trustrum, M. Page, L. Childress). Submitted to special Waipaoa volume, S. Kuehl and L. Carter, editors.

Dispersal and transformation of organic carbon across an episodic, high sediment discharge continental margin, Waipaoa sedimentary system, New Zealand (H.L. Brackley, N.E. Blair, N.A. Trustrum, L. Carter, E.L. Leithold, E.A. Canuel, J. Johnston, K.R. Tate). Submitted to special Waipaoa volume, S. Kuehl and L. Carter, editors.

