



Sedimentary organic matter geochemistry of Clayoquot Sound, Vancouver Island, British Columbia

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ABSTRACT: Surface sediment samples from three interconnected fjords of Clayoquot Sound, British Columbia, were density fractionated (1.6 g cm^{-3}) to isolate discrete organic debris (OD) from mineral-associated organic matter (MOM). Total organic carbon (OC) values varied greatly, ranging from <0.1% to 8.8% by weight, with a general decreasing trend from fjord head to the continental shelf. Within the sediment, terrestrial OM was present either as vascular plant debris or soil MOM. Down-fjord, the woody vascular plant material in the OD fraction acquires nitrogen, which is hypothesized to be due to the bacterial incorporation of nitrogen from the water. Terrestrial OC in the MOM is incompletely replaced by marine OC within the fjords, resulting in a 65% net loss of MOM. Sediments deposited under oxic and intermittently anoxic water column conditions have organic carbon to surface area ratios (OC: SA) ranging from 0.4 to 1.2 mg C m^{-2} , similar to that of typical continental margin sediments. Given that temperate fjords contain an estimated 12% of the continental margin sediment deposited during the last 100,000 yr, and that they bury at least a margin-equivalent amount of OC (either weight or surface area normalized), we hypothesize that temperate fjords may contain 12% or more of the sedimentary OC buried during this time.

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