

Postglacial Paleoclimate Preserved in Pan-Pacific Peatlands

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Peatlands are wealthy archives of paleoclimate information and occur abundantly throughout the terrestrial landscapes adjacent to the Pacific Ocean. Such environments have been accumulating partially decayed plant material on the land surface since the end of the last glaciation and beyond. Peatlands play two important roles in the carbon-climate system. First they are huge sinks of carbon from the atmosphere. Northern peatlands alone account for 1,080 Gt of carbon—twice the amount in the preindustrial atmosphere. Second, through various geochemical and paleontological means, they record changes in atmosphere-ocean circulation related to the flux of carbon into terrestrial systems, and also the flux of carbon to and from the deep ocean. Here we present many records of climate and hydrological change from peatlands throughout the Pacific sector, including locations in Alaska, Kamchatka, Hawaii, Borneo, Chile, and New Zealand. We use many different paleoclimate proxies in each of these environments, but in each, we reconstruct the hydrogen isotopes of precipitation using compound-specific stable isotope analysis of leaf wax biomarkers. By using at least one common proxy and common sedimentary environments, we are able to easily compare data from multiple sites to create a unified interpretation of changing postglacial climate, including changes in the major zonal wind belts as well as teleconnected ocean-atmosphere systems such as ENSO.