Modern spatial rainfall rate is well correlated with coretop $\delta D_{dinosterol}$ in the South Pacific Convergence Zone

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The South Pacific Convergence Zone (SPCZ) is the Southern Hemisphere's most prominent precipitation feature extending southeastward 3000 km from Papua New Guinea to French Polynesia. Determining how the SPCZ responded to climate variations before the instrumental record requires the use of indirect indicators of rainfall. The link between the hydrogen isotopic composition of fluxes of water though the hydrologic cycle, lake water, and molecular fossil D/H ratios make hydrogen isotopes a promising tool for improving our understanding of this important climate feature. A preliminary analysis of coretop sediment from freshwater lakes in the SPCZ region indicates that there is a strong spatial relationship between $\delta D_{dinosterol}$ and mean annual precipitation rate, whereas the relationship is weak for $\delta D_{nC16:0fattyacid}$ and mean annual precipitation rate. The objectives of this research are to use D/H ratios of the biomarker dinosterol to develop an empirical relationship between $\delta D_{dinosterol}$ and modern environmental rainfall rates so that we may quantitatively reconstruct several aspects of the SPCZ's hydrological system during the late Holocene. The analysis includes 31 coretops from 6 Solomon Islands lakes, 2 Wallis Island lakes, 3 Vanuatu lakes, and 1 lake each from Tahiti, Samoa, New Caledonia, and the Cook Islands. These islands span range of average modern precipitation rates from 3 to 7 mm/day and the coretop sediment $\delta D_{dinosterol}$ values range from -240‰ to -320‰.