^{232}Th-derived dust fluxes as a marker of deglacial changes in ITCZ position and intensity in the Eastern Equatorial Pacific

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Changes in the average position of the Intertropical Convergence Zone (ITCZ) today are strongly correlated with trade wind and upwelling intensity, ENSO variability and precipitation patterns throughout the tropics. Additionally, it has been suggested that changes in ITCZ position and intensity may drive millennial global climate variability. Several studies have provided proxy evidence consistent with a southward displacement of the ITCZ in the Atlantic and eastern Pacific during the Last Glacial Maximum (LGM), but to our knowledge none has constrained the magnitude and rate of its motion. As the ITCZ has been shown to be an effective barrier to dust transport from the dustier Northern Hemisphere to the Southern Hemisphere, we sought to track ITCZ movement during the last deglaciation through a spatial and temporal survey of dust flux and clay mineralogy under the eastern Pacific ITCZ. LGM and Holocene fluxes of ^{232}Th, a proxy for continental material, were calculated by normalization to ^{230}Th from a north-south transect of cores along 110˚W between 3˚S and 7˚N (ODP sites 848-853). Fluxes in all cores were 50-100% higher during the LGM, consistent with increased dustiness in both hemispheres during the glacial period. In both time periods, dust fluxes decrease towards the south, reflecting scavenging of Northern Hemisphere dust by precipitation at the ITCZ. Clay mineralogy and flux data indicate that cores between the equator and 4˚N received greater proportions of northern hemisphere dust during the LGM, suggesting a 2-3˚ southward displacement of the ITCZ at this time. The proposed glacial ITCZ location is roughly the same as its modern winter position in the region. The deglacial shift in the ITCZ's position appears to have occurred between 15 and 10 kyrs ago. Our data also suggest that the ITCZ was a less effective barrier to interhemispheric dust transport during the LGM, perhaps due to reduced intensity of convection.