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The Paleogene Intertropical Convergence

Zone

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Latitudinal transects of eolian deposition can help define patterns of equatorial zonal winds during Paleogene warm periods and their movement in response to global climatic transitions of the Cenozoic. We examined geochemical and mineralogical data from a number of piston cores and ODP drill sites in the tropical and subtropical Pacific Ocean. In the modern Pacific, dust deposited beneath the northeast trade winds reflects Asian provenance and is likely transported back west through the trade wind system via input from the mid-latitude westerly winds. The amount of dust supplied from American source regions is an order of magnitude lower and has limited influence on the dust record in the offshore pelagic realm of the Pacific. The inter-tropical convergence zone (ITCZ) forms an effective barrier to inter-hemispheric dust transport and marks the southern boundary of the Asian dust component. Just south of the ITCZ, dust is transported by southern trade winds predominantly from andesitic source regions of Central and South America. During warm periods of the early Paleogene, andesitic sources appear to dominate eolian deposition throughout the central and equatorial Pacific. Two hypotheses are offered to explain this observation. First, increased andesitic input is associated with trade wind transport from a North American provenance because Asian dust flux, which overwhelms this component in the modern Pacific, was significantly reduced at this time. Mineralogical data collected by light-absorption spectroscopy techniques on bulk sediments recovered during ODP Leg 199 supports this scenario showing increased illite/smectite ratios during the late Cenozoic near the time when Asian dust flux increased. Alternatively, the increased andesitic component during the Paleogene may reflect eolian deposition beneath the southern trade winds with the position of the ITCZ at a latitude as far north as perhaps 25°\$N. Data from clay mineralogy (from XRD), elemental geochemistry and Nd isotopic ratios from piston cores EW9709-01 and LL44-GPC3 support this hypothesis and show a transition to Asian-like dust provenance occurring by the early Miocene.

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