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Eolian transport to the SE Pacific inferred from siliciclastic grain size variability

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The reconstruction of low-latitude ocean-atmosphere interactions is one of the major issues of paleo-environmental studies. The trade winds, extending over 20˚ to 30˚ of latitude in both hemispheres, between the subtropical highs and the intertropical convergence zone (ITCZ), are dominant factors of atmospheric circulation and little is known about their long-term variability on geological time-scales, in particular in the Pacific sector of the southern hemisphere.

Our work focuses on Plio-Pleistocene variations in southeast trade wind strength and its dust transport in the Southeast Pacific as missing links for a comprehensive understanding of changes in regional oceanography, El Niño behavior and associated changes in upwelling. To assess trade wind intensities, we investigate changes in grain size distribution of the wind-blown sediment fraction over time. We here present the modern spatial pattern of siliciclastic grain size variability in eastern equatorial and subtropical Pacific surface sediments as a reference data set for currently performed downcore studies on ODP sites 1237 and 1239. The surface samples were analyzed for grain size (Beckmann-Coulter laser particle sizer) and clay mineral (XRD) distributions in order to identify sediment dispersal patterns of terrigenous input, i.e., eolian signals and possible fluvial overprints.

In general, the fine-silt fraction dominates the siliciclastic component of surface sediments west of the South American deep sea trench, with modes ranging from 4.5 to 8μm. First results confirm a decrease in grain-size in the prevalent wind direction away from the source regions in the Atacama Desert. Grain-size distributions in the

Panama Basin appear to reflect the pattern of prominent bottom water currents.