

Post middle Miocene dust accumulation in the North Pacific: A record of central Asian climate change

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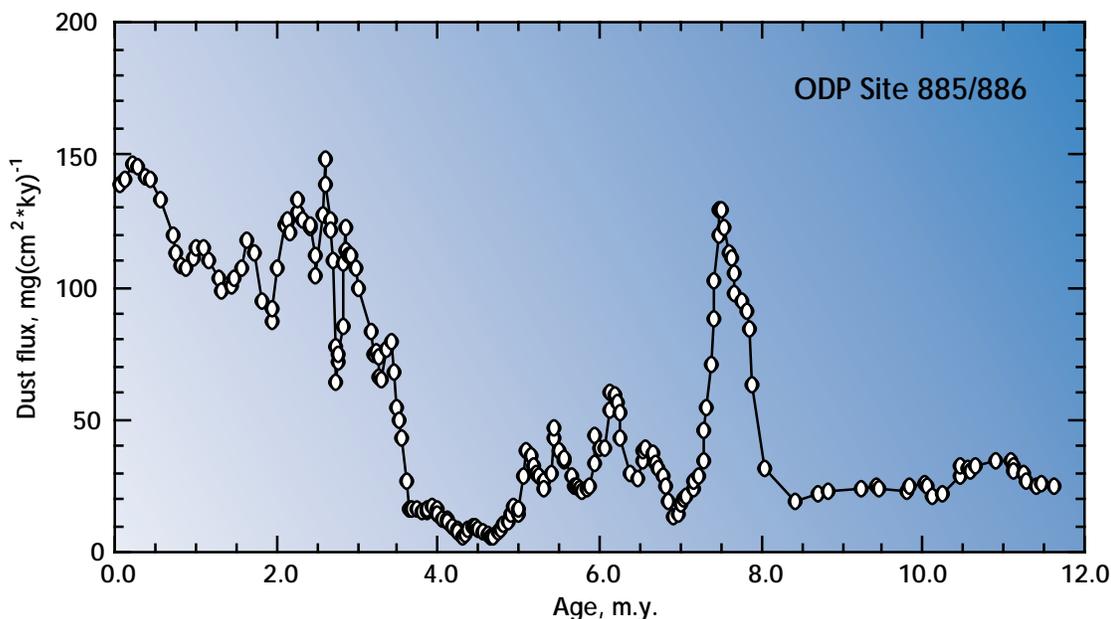
The history of dust accumulation in the North Pacific provides a direct record of Asian aridity in the region north of the Tibetan Plateau [Rea, 1994]. ODP Leg 145 recovered the first continuous cores with a well-constrained chronostratigraphy, cores that can be used to decipher the past 12 m.y. of this record. The combined data from holes drilled at nearby Sites 885 and 886, show periods of low eolian mass accumulation rate prior to 3.6 Ma followed by high dust input since [Snoeckx *et al.*, 1995]. Leg 145 information confirms previous indications that dust input from China to the ocean increased markedly at about 3.6 Ma, 1 m.y. before the onset of major Northern Hemisphere glaciation (and 1 m.y. before the loess-soil sequences of China began to form). These data and other tectonic-related information from the region north and east of the Tibetan uplift suggest that the Tibetan Plateau became high enough to cut off the southern moisture source to central Asia at 3.6 Ma, allowing the drying seen in the Leg 145 record.

The period of very low dust fluxes between 5 and 3.6 Ma suggests that the eolian source region was, during the early Pliocene, characterized by much less arid conditions, presumably large lakes in the basins of central China. The dust flux maxima seen at 7.5 Ma is well constrained by data but poorly understood as to cause. Possible causes are tectonic, changes in mountain-basin configuration, or biotic, changes in vegetative cover. In addition to this enigmatic late Miocene eolian deposition episode, firm evidence that central Asia was dry for a million years before the loess soil sequences began to form provides new constraints in understanding the late Cenozoic climatic transition to the ice ages.

References:

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North Pacific Eolian Fluxes



Mass accumulation rate of eolian dust in the central North Pacific in $\text{mg}(\text{cm}^2 \cdot \text{ky})^{-1}$. Dust flux is a record of the relative aridity of the eolian source region, more dust is generated during drier climatic conditions. The graph shown is a 3-point smoothing of the combined data from Holes 885A and 886B [Snoeckx *et al.*, 1995].