

## Dust-climate couplings over the past 800-kyr

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Secular dust fluctuations have been hardly paid attention from the viewpoint of Milankovitch theory. In the present study, we address dust records from Antarctica ice core.

Dust may have passive and active effects on climate. As dust depends on the climate, dust values gradually increase or decrease under the surrounding environments such as dust origin. On the other hand, dust can force on the climate through its albedo effects. We have considered these two effects from the feature of past 800-kyr dust fluctuations.

We have analyzed each climatic cycles for small dust values (dust tend to be subject to climate) and large values (dust tend to affect climate) using spectral analysis. To examine what phenomena relates the two effects, dust fluctuations are compared with other records such as insolation, ice volume and atmospheric CO<sub>2</sub> records. Moreover, we researched the duration for each passive and active period of dust and the relation with temperature from the accumulation curve of dust masses.

When dust is in the subsidiary state for climate, it behaves locally on polar region, and seems to relate ice volume fluctuations, whereas as dust has predominant effects on climate, its fluctuations are global, which may relate to CO<sub>2</sub> fluctuations such as carbon cycle. The accumulation curve of dust masses suggests relatively long passive stage for about 60~70-kyr, and restrained active stage for about 10~20-kyr.

We discuss the linkages between these features of dust fluctuations and climate shift on glacial-interglacial timescales.

Keywords: Milankovitch theory, glacial-interglacial cycle, eolian dust