



## **The bioavailable iron in NEEM ice core related to Asian dust records over the past 110 kyr**

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The mineral dust can indirectly affect climate by supplying iron and other essential bioavailable elements into ocean. In this study, we present dissolved iron (DFe) and total dissolved iron (TDFe) concentrations in NEEM ice core over the past 110 kyr B.P. The concentrations of bioavailable reactive element Fe have good positive correlation with the concentrations of dust and Ca<sup>2+</sup> in NEEM ice core, while show significantly negative relationship with  $\delta^{18}\text{O}$  and CO<sub>2</sub> concentration. The ratios of DFe/TDFe are higher in warm periods (Holocene and last interglacial) than in cold period (LGM), indicating the iron-biological pump effect is more significant in warm periods than that in cold periods, this result may provide a new insight for reevaluating the iron hypothesis over glacial/interglacial periods. Our study also shows that the iron flux changes between NEEM ice core and Asian loess records are good consistent with the northern Hemisphere summer insolation. These results emphasize that the variability of Fe flux is most likely driven by solar radiation and dust in northern hemisphere.