

## Cenozoic Nd isotopic variation of Asian dust in the northern Tibetan Plateau and the North Pacific Ocean

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### Background: Cenozoic Asian dust provenance change



#### Our new compilation of Nd isotopes of surface sediments in northern China



Map (a) showing Asian dust source areas and the GPC3 borehole in the North Pacific Ocean. Map (b) corresponds to the dashed black rectangle in (a) Note that the dots with black outlines are from this study.



Simplified map of central and eastern Asia (a), showing the modern, simplified dust-storm tracks and near-surface wind patterns (red arrows) and the hypothetical "glacial" dust-storm track (blue arrows) to the Chinese Loess Plateau (redrawn from Licht et al., 2016). Geological map of the Xining Basin (b) and Linxia Basin (c) Yang YB & Fang XM, in preparation

# **Results: Linxia Basin**





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## Nd isotopic correlation between bulk and <2 $\mu$ m data

Clay-sized fraction display generally higher values than the bulk samples (mostly within 1  $\epsilon_{Nd}$  unit)







Age (Ma)



CC

#### The reconstructed Cenozoic eolian dust Nd isotopic variation in the NTP and its comparison with other records.

1) At least from ~42 Ma to ~16 Ma, the frontal region of the NTP exhibited nearly the same Nd isotopic variations with regard to provenance change. The variation in the bulk  $\varepsilon_{Nd}(0)$  values indicates a persistent rise since ~42 Ma and a significant decrease since ~25 Ma.

2) Given the Nd isotopic distribution in the modern TP region, the simplest explanation for this twostage evolution is the stepwise northward outgrowth of the NTP.



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in

120° E

z 45°

z 40°

z

35°

z

30°

z

37°

z

36°

105° E

the



Summer Monsoon

The late Oligocene increase in the CAO contribution to Asian dust is consistent with the establishment of eolian systems in Central Asia (Junggar and Tarim Basins, Sun et al., 2010; Zheng et al., 2015) and the East Asia (the Chinese Loess Plateau, Guo et al., 2002; Qiang et al., 2011), suggesting that a modern-like tectono-climate regime that favors the formation and transport of Asian dust in the NTP and CAO regions initiated in the late Oligocene.

Welcom more comments for polishing our study :>



Indian Monsoor