O_2/N_2 ratios in 1.5-million-year-old ice cores from Allan Hills Blue Ice Areas: implications for the long-term atmospheric O_2 concentrations

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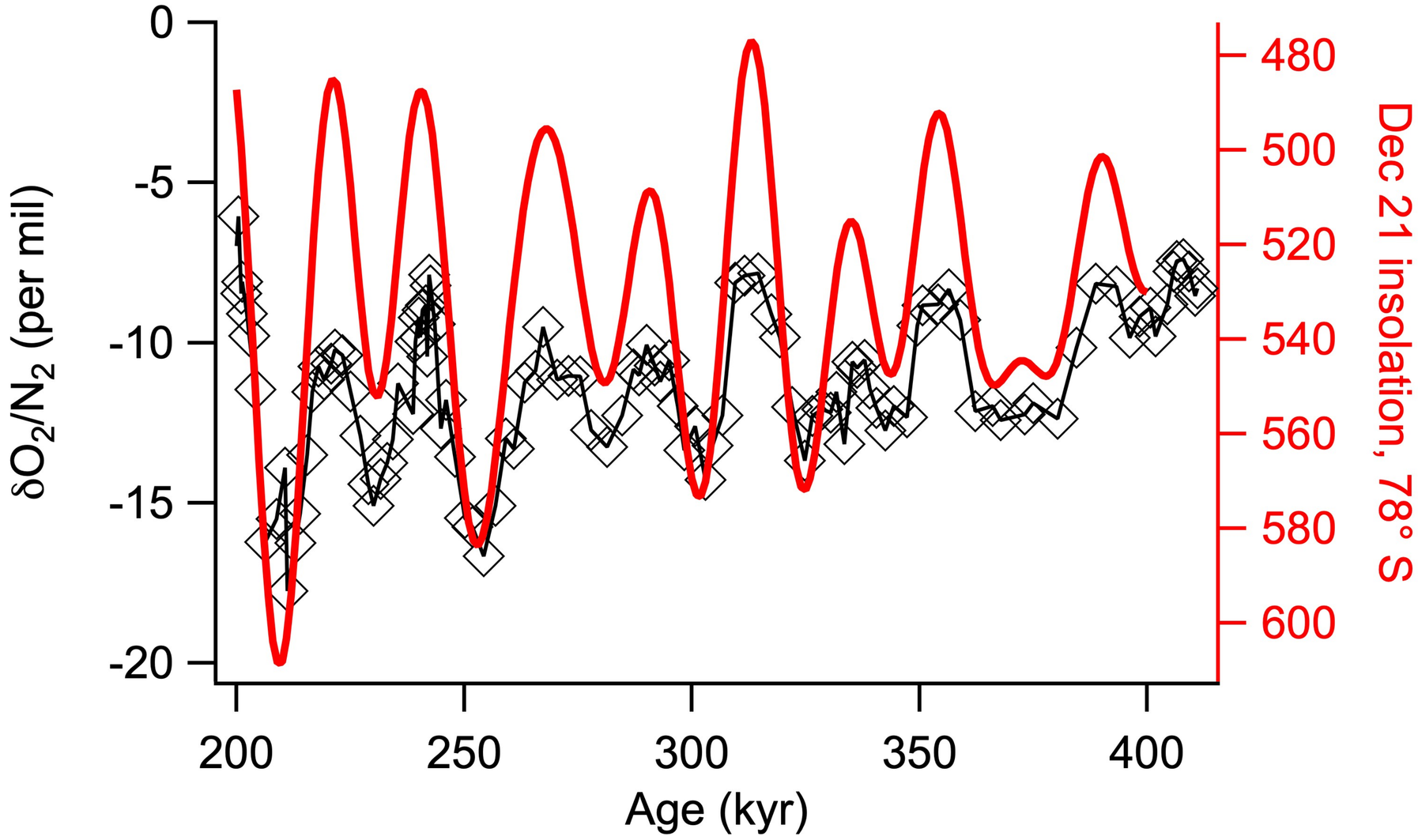
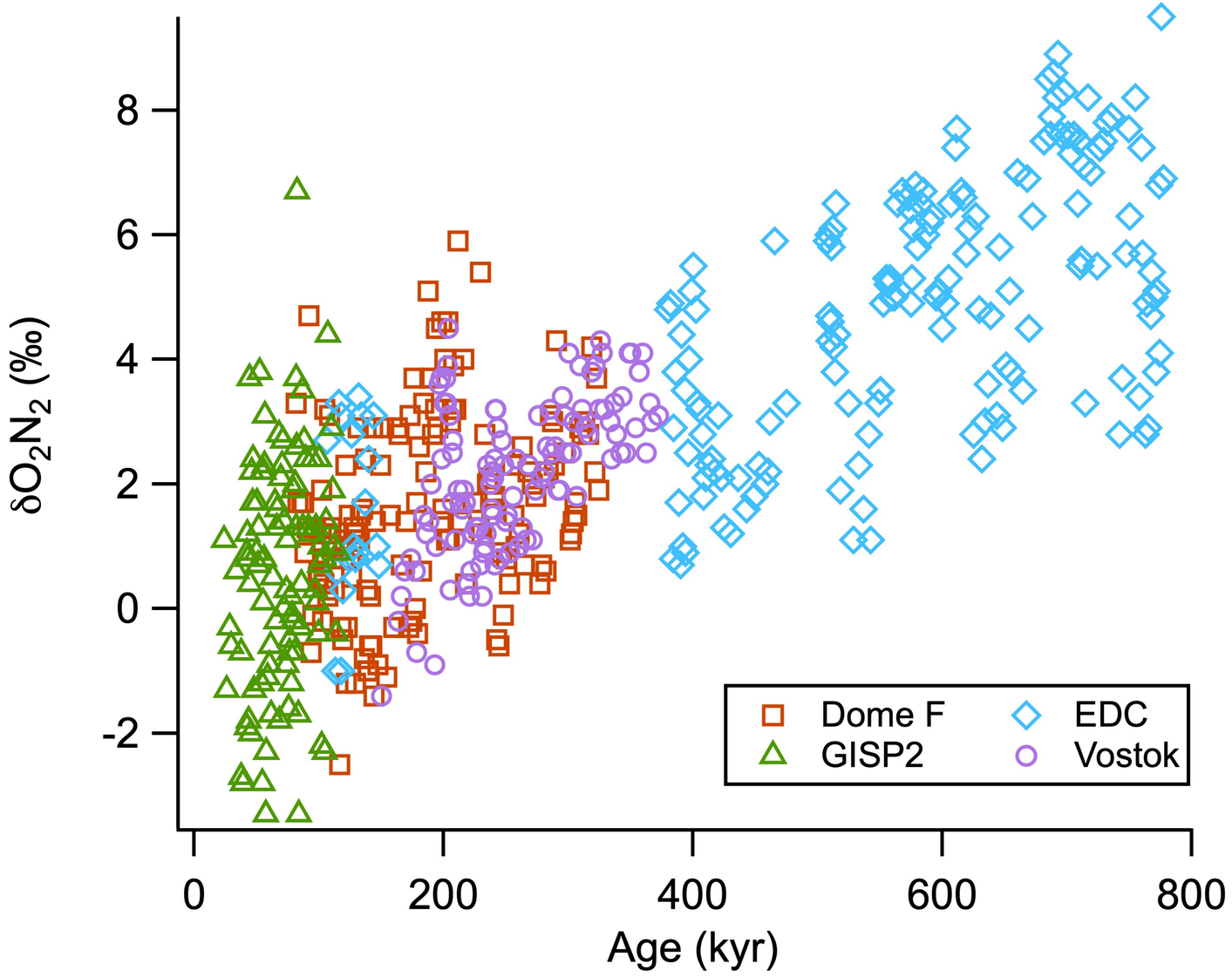
Despite being a potential direct archive of atmospheric O_2, ice core $\delta O_2/N_2$ is modified by a number of processes and carries strong insolation signals



Modified from Suwa and Bender 2008

Recently, a persistent decline in ice core $\delta O_2/N_2$ is interpreted to reflect decreasing O_2 concentrations over the late Pleistocene



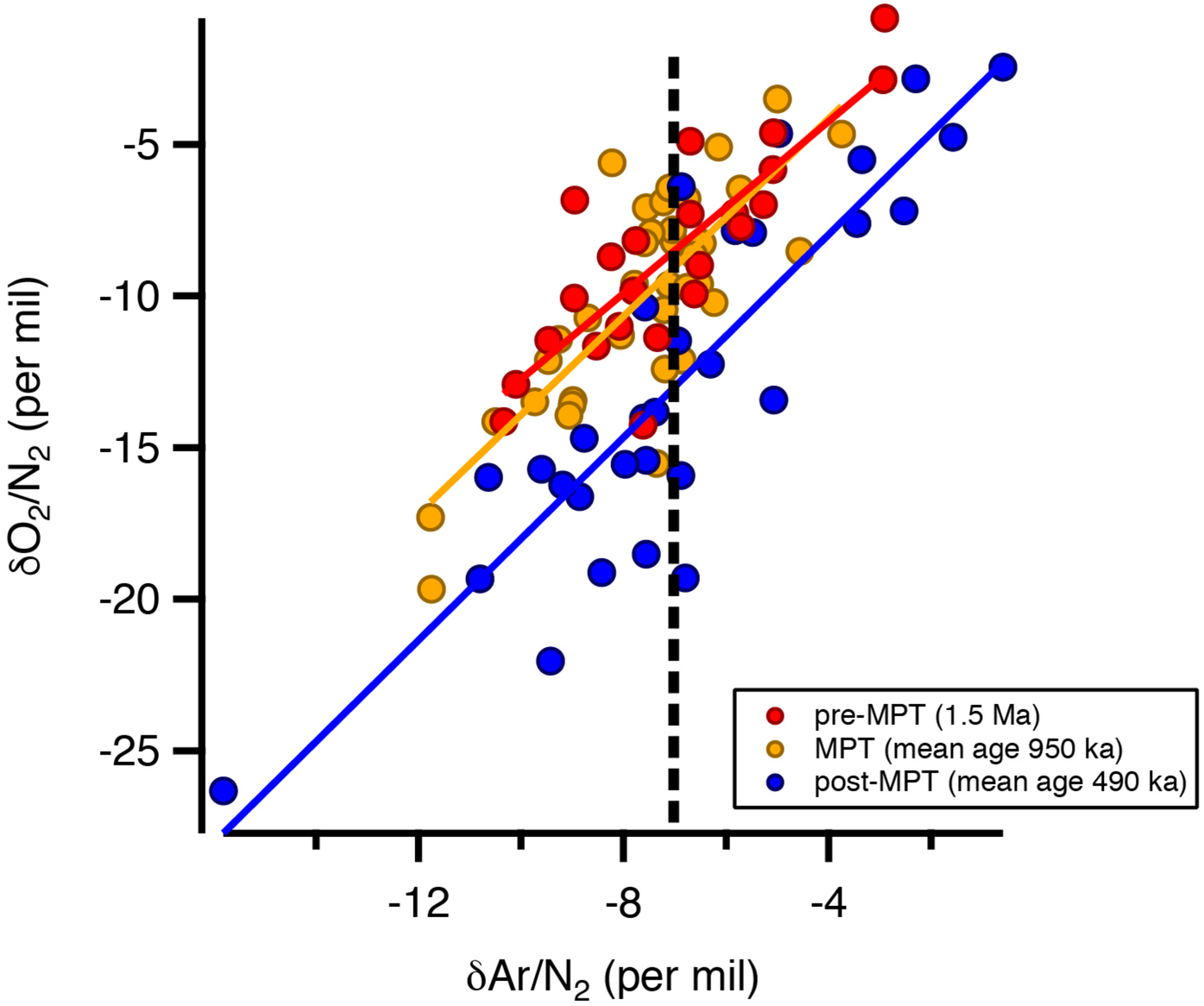
Rate of change:

-8.4±0.2 ‰/Myr (1σ; Stolper *et al* 2016)

-7.0±0.6 ‰/Myr (1σ; Extier *et al* 2018)

Modified from Stolper *et al* 2016

In our work, $\delta Ar/N_2$ is used to correct for the $\delta O_2/N_2$ fractionations during bubble close-off and gas losses



Key takeways:

The late-Pleistocene decline in $\delta O_2/N_2$ is observed in Allan Hills cores with a comparable rate of change.

Between 1.5 Ma and 950 ka, however, there is no statistically significant trend in blue ice $\delta O_2/N_2$.

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Field team
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