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An independent, annually dated ice core record of explosive volcanism from WAIS Divide synchronized to EPICA Dome C over the last 27,000 years

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We present a new, annually dated sulfur record from the WAIS Divide ice core in West Antarctica spanning the last 27000 years, analyzed using high resolution continuous flow analysis coupled to two mass spectrometers. We extract more than 600 volcanic deposition events, of which many can be linked to other Antarctic ice core records. Over the last 27 kyrs, 230 common volcanic events were identified in WAIS Divide and EPICA Dome C by the volcanic signatures in the sulfate and sulfur ice core records which allow a direct link to the new Antarctic deep core age scale AICC2012. We validate our synchronization with independent time series (e.g. of atmospheric mineral dust) measured conjointly at high resolution.
Volcanic synchronization allows to analyze the relative timing of climate events (e.g. abrupt climate changes), with age uncertainties being independent from the uncertainties of the gas age to ice age difference inherent in using palaeo gas records for synchronization.
We give a detailed insight into the timing of climate change during the last 27 kyrs as expressed in ice core records from West Antarctica versus East Antarctica with unprecedented relative age control.
Changes in past climate forcing, as indicated by ice core records of mineral dust, volcanic aerosols or sea ice proxies can thus be addressed on a continental scale and contrasted to temperature histories from Antarctica.