



## **Extended atmospheric CH<sub>4</sub> record from the EPICA Dronning Maud Land ice core**

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Climate reconstructions from polar ice cores can contribute to improve the understanding of the dynamic processes taking place in Earth's climate system. To combine records from different ice cores it is crucial to put the climatic data on a common time scale. A very useful tool for this purpose is making use of atmospheric methane (CH<sub>4</sub>) measurements on air extracted from bubbles trapped in these ice cores. CH<sub>4</sub> is a well mixed greenhouse gas, which shows climatic variations on millennial scales. This allows a relatively precise synchronization of climate events along different cores.

Here we extend the EPICA Dronning Maud Land (EDML) atmospheric CH<sub>4</sub> record from 50 kyr back to ~200 kyr BP. The new data covers the marine isotope stages (MIS) 4, 5, 6 and 7. We match these data with atmospheric CH<sub>4</sub> records derived from EPICA Dome Concordia (EDC) and Greenland ice cores, establish a first gas age scale over this period relative to the EDC3 age and compare the records of the different sites.

Because of the higher snow accumulation rate at EDML compared to the accumulation rate at EDC, the air enclosed in bubbles along the EDML ice core has a narrower age distribution. Therefore the EDML CH<sub>4</sub> record shows more precisely fast variations and is generally better suited to be synchronized to Greenland records than the EDC CH<sub>4</sub> record.