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Variations in trace elements and Platinum group elements compositions during the past 800,000 years at Dome C EPICA ice cores, Antarctica

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Trace elements and Platinum group elements (PGE) concentration were determined in sections from the EPICA (European Project for Ice Coring in Antarctica) Dome C ice core, covering a period from ~600 kyr BP to ~800 kyr BP, by inductively coupled plasma sector field mass spectrometry (ICP-SFMS) coupled with desolvation nebulization system and sub-boiling pre-concentration [1]. These data enable us to extend the previous EPICA Dome C (EDC) records of trace elements and PGEs covering the past 270 kyr [2, 3, 4], which corresponds to the last two climatic cycles. The records show well defined variations of trace element concentrations in relation to climate conditions with lower values during the interglacial periods and much higher values during the coldest periods of the last eight climatic cycles. Crustal enriched elements show well defined variations in concentrations in relation to climatic conditions with lower values during the interglacial periods and much increased values by about 10 times during the glacial periods. On the other hand, PGEs show a less differences between their concentrations for different climatic conditions. Mean concentrations of Ir and Pt for the glacial periods were approximately two times higher than their mean concentrations for the interglacial periods. Concentration ratios (Ir/Pt) and crustal enrichment factors (E_{FC}) of Ir and Pt indicate that atmospheric PGE in Antarctica may be originated dominantly from non-crustal sources, and the extent of their contributions were likely regulated by the climatic conditions during the investigated time period.

References:

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