

Compositions of dust and sea salts in the Dome C and Dome Fuji ice cores from Last Glacial Maximum to early Holocene based on ice-sublimation and single-particle measurements

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We analyzed the chemical compositions of dust and sea-salt particles in the EPICA Dome C (EDC) ice core during 26–7 kyr BP using an ice-sublimation technique, and compared the results with existing data of the Dome Fuji (DF) ice core. Combined with ion concentration data, our data suggested similar sea-salt fluxes in both cores and significantly lower dust flux in the EDC core. The differences in modal size and aspect ratio of dust particles between the two cores support the dominance of Patagonian source suggested by earlier works. The compositions of calcic dust showed major change at ~17 kyr BP, possibly reflecting a relative increase in dust transported via the upper troposphere. The calcium sulfate fraction was higher in the DF core than in the EDC core after ~17 kyr BP, suggesting that higher Patagonian dust contribution to the DF region. Abundant NaCl particles were found in the DF core in comparison with the EDC core from the LGM to early Holocene, possibly because of the high concentration of terrestrial dust in the DF core that reduced acid availability for sea-salt modification. During the Holocene, the lower NaCl fraction and Cl^-/Na^+ ratio in the EDC cores suggested that most Cl^- was lost to the atmosphere from snow at Dome C, while it was preserved at Dome Fuji as NaCl and solid solution.

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