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Volcanic event frequencies in the last 400 kyr and their correlation with climatic changes

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The possible link between volcanism and climate was the issue of several studies in the past years. The impact of volcanic emissions (mainly of SO_2 and ash) on climate at short-term temporal range is well documented by instrumental and proxy data. On the contrary, the possible positive feedback of multiple and intense mega-eruptions on climatic changes at global scale or, in opposite way, the possible impact of climatic changes on the volcanic activity via changes in the isostatic balance after melting of the ice sheets, are still not well understood. In this optic it is necessary to provide as much as possible high-resolution, long records of paleo-volcanism. For this purpose, high-resolution sulfate measurements (every 1.5-2 cm corresponding to about 1-25 year depending on the depth) were performed on the first 3190 m of the Dome C ice core (EDC - 75˚06'S, 123˚23'E, Pacific sector) in order to reconstruct the paleo-volcanic history of the last 8 glacial-interglacial climatic cycles. Measurements were carried out by FIC (Fast Ion Chromatography) and spikes of volcanic origin were discriminated from the biogenic background by using a statistical approach. For recent times, a comparison among signatures recorded in several Antarctic ice cores is presented and differences in the deposition at different sites are interpreted in terms of changes in patterns of atmospheric circulation over the time. For older ages (last 400 kyr) the EDC volcanic profile is here compared with a climatic proxy for paleo-

temperature (δD) in order to investigate possible links between climate changes and volcanism in a time interval expanding of about 4 times the longest range up to now covered by Greenland ice cores. A first attempt to find out similar frequencies between variations in the occurrence of volcanic events and the δD profile is carried out by spectral analysis. Long-range trends of both the number of volcanic events per unit time (1 kyr) and total sulfate deposition (volcanic flux) is discussed taking into account the effects of a decreasing temporal resolution and post-depositional diffusion of sulfate in the ice.