



High resolution synchronisation of the EDC and EDML EPICA ice cores volcanic stratigraphies in the framework of the construction of a common EPICA age scale.

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In the framework of the EPICA project, a common time scale for the two deep EPICA ice cores from Dome C (EDC - 75°06'S, 123°23'E, 3233 m a.s.l., Pacific/Indian sector) and Dronning Maud Land (EDML - 75°00'S, 00°04'E, 2892 m a.s.l., Atlantic sector) was set up. Since EDML core was not drilled on a dome, the development of the EDML1 time scale for the EPICA ice core drilled in Dronning Maud Land was carried on by creating a detailed stratigraphic link between this core and the one drilled in Dome C, dated by a simpler 1D ice-flow model. The synchronisation between the two ice cores was built via the identification of several common volcanic signatures. Here we describe the rigorous method that was employed for the synchronisation of the last 52 kyr of the two records using the signature of volcanic sulfate, obtained by high resolution analysis by Fast Ion Chromatography (FIC) and supported by the independent matching of spikes in the solid and liquid electrical conductivity records. More than 200 isochronous volcanic events were identified by comparison of the high resolution sulphate profiles in the two cores. The high number of contemporaneous eruptions found in the two records allows the reconstruction of the glaciological accumulation rates at the two sites (after correction of the snow depths for density, thinning

and upstream contributions) and the comparison with the thermodynamic accumulation (based on the thermodynamic relationship between content of stable isotopes in the ice and accumulation rate). Deviations between glaciological and thermodynamic accumulation rates reflect either a combination of thinning anomalies not reflected by the glaciological model as well as changes in the spatial variability of the upstream surface accumulation rates at DML which differ from the present one. Finally the ratio among snow accumulation rate at the two sites gives information on the different climatic history in Antarctic areas which may be characterised by different atmospheric and oceanic regimes.