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High-resolution synchronization of the EDC and EDML ice-core stratigraphies by comparison of sulfate volcanic signatures over the last 15 kyr.

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In the framework of the EPICA project (European Project for Ice Coring in Antarctica), two deep ice cores have been drilled on the East Antarctic Plateau. The perforation at Dome C (EDC - 75˚06'S, 123˚23'E, 3233 m a.s.l., Pacific/Indian sector) reached 3260 m (few meters from the bedrock) in January 2005, covering a period of about 900 kyr, while the perforation at Kohnen Station (EDML - 75˚00'S, 00˚04'E, 2892 m a.s.l., Atlantic sector) is planned to be completed next year and to cover more than 200 kyr (2564 m were already processed and about 200 m remain to be drilled). These two drilling sites have been chosen by EPICA because of the different paleoclimatic information that can be inferred from the ice core study. EDC ice core is providing the longest record from an ice core, roughly doubling the Vostok ice core record in age and expanding our knowledge of past climatic cycles evolution beyond MIS11. On the other hand, EDML will provide information on the teleconnections between Northern and Southern hemispheres via atmospheric and deep oceanic circulation, because of its geographical location facing the Southern Atlantic Ocean. Due to the difference in annual snow accumulation rate at the two sites (about 25 and 65 kg m^{-2} y^{-1} at Dome C and Kohnen Station respectively), the annual stratigraphy in the EDML ice core is preserved and detectable (probably not only in the Holocene but also in parts of the last glacial period), while EDC was dated using an ice flow model constrained by stratigraphic markers (e.g. volcanic eruptions, dust spikes, the 41 kyr

^{10}Be peak etc.). A reliable high-resolution synchronization of the stratigraphies of the two ice cores will allow transferring the stratigraphic dating from EDML to EDC and will be a powerful tool to evaluate the synchronism or the temporal offset between related climatic events in two different sectors of the Antarctic Plateau. In this optic, a FIC (Fast Ion Chromatography) system (coupled to a CFA – Continuous Flow Analysis setup) was used to reconstruct the paleo-volcanic record at the two sites with very high resolution (ranging from less than 1 to about 3.5 cm per sample). Here we show the results of the synchronization between the two EPICA cores via individuation of synchronous volcanic events for the whole Holocene and the late transition. A preliminary evaluation of changes in the ratio between the annual snow accumulation rates at the two sites are also shown. In addition, the seasonal pattern of biogenic background sulfate was used to build up a reliable stratigraphic dating between volcanic reference horizons.