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"EDML1": a chronology for the EPICA deep ice core from Dronning Maud Land, Antarctica, over the last 150 000 years

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Abstract. A chronology called EDML1 has been developed for the EPICA ice core from Dronning Maud Land (EDML). EDML1 is closely interlinked with EDC3, the new chronology for the EPICA ice core from Dome-C (EDC) through a stratigraphic match between EDML and EDC that consists of 322 volcanic match points over the last 128 ka. The EDC3 chronology comprises a glaciological model at EDC, which is constrained and later selectively tuned using primary dating information from EDC as well as from EDML, the latter being transferred using the tight stratigraphic link between the two cores. Finally, EDML1 was built by exporting EDC3 to EDML. For ages younger than 41 ka BP the new synchronized time scale EDML1/EDC3 is based on dated volcanic events and on a match to the Greenlandic ice core chronology GICC05 via ^{10}Be and methane. The internal consistency between EDML1 and EDC3 is estimated to be typically ~6 years and always less than 450 years over the last 128 ka (always less than 130 years over the last 60 ka), which reflects an unprecedented synchrony of time scales. EDML1 ends at 150 ka BP (2417 m depth) because the match between EDML and EDC becomes ambiguous further down. This hints at a complex ice flow history for the deepest 350 m of the EDML ice core.

Final Revised Paper (PDF, 1667 KB) | Supplement (536 KB) | Discussion Paper (CPD)

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