

## ***Interactive comment on “Where to find 1.5 million yr old ice for the IPICS “Oldest Ice” ice core” by H. Fischer et al.***

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Extending the ice core record to 1.5 Ma is one of the priorities of the ice core community as well established by the IPICS initiative (2008). However beyond the difficulties inherent to such an ambitious project, site(s) selection is a challenge which may take longer to be tackled than initially thought. In this context, the manuscript by Fisher et al., with contributions of all major players of the ice core community with logistical and drilling capacities, is extremely welcome. The basic assumptions have evolved between the original IPICS document ice sheet model and the Fisher et al. study. In both cases, appropriate sites should be characterized by reasonably high ice thickness, low accumulation rate, a low ice velocity and a rather flat bedrock. However the lack of basal melting simply mentioned in IPICS (2008) is elevated as a key criteria for getting

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undisturbed records. In turn, Fisher et al., pay attention to the temperature profile and to conditions ensuring no melting at the base ; the variability of the geothermal flux then becomes a key parameter. As a result, suitable sites are more or less limited to regions where ice thickness does not exceed 2500 m. This is an interesting but very constraining result. Its consequences, e.g. a compression of a typical 40000 years cycle over less than 3 meters with unavoidable difficulties in interpreting results due to diffusion of climatic and environmental signals recorded both in the gaseous and solid phases, are carefully explored. This interesting manuscript should be published. I have only some minor editorial comments. Page 2773 : Line 24 EPICA community members, 2006 should be replaced by EPICA community members, 2004 Page 2774 line 4 to 6 : with CO<sub>2</sub> leading the climate change in the Northern Hemisphere but being in phase (Parrenin et al., 2013) or slightly lagging the warming in the Southern Ocean region (Pedro et al., 2012; Shakun et al., 2012). This sentence is written implicitly assuming that the results recently published for the last Termination (the three articles cited refer to it) systematically apply to all terminations of the last 8 glacial cycles. This may not be the case and in any event is not at all firmly documented. This needs rewriting. Line 9 : may be cite the recent paper of Abe Ouchi et al. (Nature) Page 2776, line 10. I suggest to slightly extend this paragraph (for example mention that some basal melting can help to get undisturbed sequences...). Page 2782 line 14 : EPICA Community Membres 2004 (not 2006 ?) Page 2787 line 14 : I suggest to specify : present-day accumulation rates (as previous cited figures relate to long-term average values)

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