

# Volcanic synchronization of Dome Fuji and Dome C Antarctic deep ice cores over the past 216 kyr

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Two deep ice cores, Dome Fuji (DF) and EPICA Dome C (EDC), drilled at remote dome summits in Antarctica, were volcanically synchronized to improve our understanding of their chronologies. Within the past 216 kyr, 1401 volcanic tie points have been identified. DFO2006 is the chronology for the DF core that strictly follows O<sub>2</sub>/N<sub>2</sub> age constraints with interpolation using an ice flow model. AICC2012 is the chronology for five cores including the EDC core, and is characterized by glaciological approaches combining ice flow modelling with various age markers. A precise comparison between the two chronologies was performed. The age differences between them are within 2 kyr, except at Marine Isotope Stage (MIS) 5. DFO2006 gives ages older than AICC2012, with peak values of a difference of 4.5 kyr and 3.1 kyr at MIS 5d and MIS 5b, respectively. Accordingly, the ratios of duration (AICC2012/DFO2006) range between 1.4 at MIS 5e and 0.7 at MIS 5a. When making a comparison with accurately dated speleothem records, the age of DFO2006 agrees well at MIS5d, while the age of AICC2012 agrees well at MIS5b, supporting their accuracy at these stages. In addition, we found that glaciological approaches tend to give chronologies with younger ages and with longer durations than age markers suggest at MIS 5d-6. Therefore, we hypothesize that the causes of the DFO2006/AICC2012 age differences at MIS 5 are: (i) overestimation in surface mass balance at around MIS 5d-6 in the glaciological approach and (ii) an error in one of the O<sub>2</sub>/N<sub>2</sub> age constraints by ~3 kyr at MIS 5b. Overall, we improved our knowledge of the timing and duration of climatic stages at MIS 5. This new understanding will be incorporated into the production of the next common age scale.

## References

Fujita, S., Parrenin, F., Severi, M., Motoyama, H., and Wolff, E.: Volcanic synchronization of Dome Fuji and Dome C Antarctic deep ice cores over the past 216 kyr, *Clim. Past Discuss.*, 11, 407-445, 10.5194/cpd-11-407-2015, 2015.