



Dating ice cores by local insolation tuning: A comparison between wavelet analysis and peak-to-peak matching techniques

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A companion paper presents results of a new dating method applied on the Vostok ice core records, using in parallel two proxies of local insolation (the air content and O₂/N₂ ratio of the air trapped in ice). It offers new possibilities for estimating leads and lags between local climate recorded in Antarctica and Northern Hemisphere solar forcing. In this presentation, we want to focus on technical aspects of this new methodology. Moreover, we would like to present some implication for Antarctic ice core records other than the Vostok ones.

The method can be divided into three main steps. A tuning target is first identified for both O₂/N₂ ratio and the air content. Therefore, spectral features of several insolation curves are identified and compared to those of the records. Integrated summer insolation (ISI) is selected as tuning target. Second, both the tuning targets and the ice core records are filtered in the astronomical frequency bands (precession and obliquity). Several filtering methods are compared. In each case the lead/lag between record and target is computed, leading to very similar results. Third, several methods exist to estimate the time delay between two series. We compare the results obtained from wavelet transform analysis and peak-to-peak matching. This comparison suggests rather large uncertainties (up to a few thousand years in the case of air content) related with the choice of the method. Further analysis will be conducted to analyse more precisely the origin of the discrepancy and their consequences.