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Statistical properties of Antarctic ice cores: an update, with the latest data from Siple Dome and a revised Taylor Dome timescale

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Analyses of the relationship between the best cross dated Antarctic and Greenland ice cores (Byrd and GISP2/GRIP) have shown that there is a significant relationship between the two hemispheres. Here, we show that the new Siple Dome record, which is independently dated but highly correlated with Byrd, confirms this general picture. For the most part, the dating precision remains too low to determine whether there is coherence with the Greenland records for timescales shorter than about two millennia; a clear relationship with Greenland is only demonstrable for the largest longest-lived millennial-scale events. Certain features of the Siple Dome record do, however, show that at least some large magnitude events are only of regional significance. First, millennial-scale variations at Siple Dome are highly coherent with those at Taylor Dome and Dome C during the well-dated Holocene, but are not coherent with GISP2. Second, Siple Dome displays a rapid warming event at about 20 ka, and an enigmatic low-snow-accumulation event at ~15 ka, neither of which have been observed in other Antarctic cores. The latter event, if it also occurred at Taylor Dome, would largely reconcile the Taylor Dome record with other East Antarctic ice core records.