



Reconstructing air surface temperature in Antarctica over the past millennium based on water stable isotopes

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Last millennium temperature changes over Antarctica are still relatively uncertain. This has several origins: 1) The number of high resolution ice cores is small, in particular on the Antarctic Plateau; 2) The instrumental records are short which limits the calibration period for reconstructions and the assessment of the methodologies; 3) The link between isotope records from ice cores and local climate are complex and may depend on the spatial and time scales investigated. Here, we combine the information brought by stable oxygen isotopes in ice cores, climate model results and recent observations to obtain a better understanding of last millennium temperature changes over Antarctica. We first assess the potential of statistical reconstructions methods and data assimilation-based methods in a pseudo-proxy framework. In a second step, the data assimilation method tested and improved in this idealized framework is applied to real data to provide new reconstructions of temperature over the last millennium. This new reconstruction is then compared to available ones and recent observations.