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Central European temperature variations over the past two millennia recorded in a stalagmite from western Switzerland

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European temperature reconstructions covering the last two millennia are almost entirely based on tree rings and therefore clearly biased towards summer. Reconstructions of mean annual air or cold season temperatures are much rarer. To fill this distinct data gap, we present a bi-annually resolved 2000 year-long speleothem-based oxygen isotope (δ18O) record from Milandre Cave in western Switzerland. Calibration of the Milandre Cave δ18O record using observational and reconstructed temperature data reveals that calcite δ18O values are closely related to changes in cold-season (fall-winter-spring) temperatures. The M6 δ18O record unveils temperature variations of up to 2°C during the last two millennia, with the temperature difference between the warmest decade of the Medieval Climate Anomaly (950–1250 CE) and the coldest decade of the Little Ice Age (1400–1700 CE) amounting to $\sim$1.7°C. In general, higher cold season temperatures prevailed between 450 and 600 CE and 1000 and1150 CE. Lower temperatures were recorded between 650 and 900 CE and 1350 and1700 CE. Modeled cold season temperatures for the past millennium compare remarkably well with our reconstruction, and confirm the importance of both, solar forcing and internal variability, in driving Central European cold season temperatures.