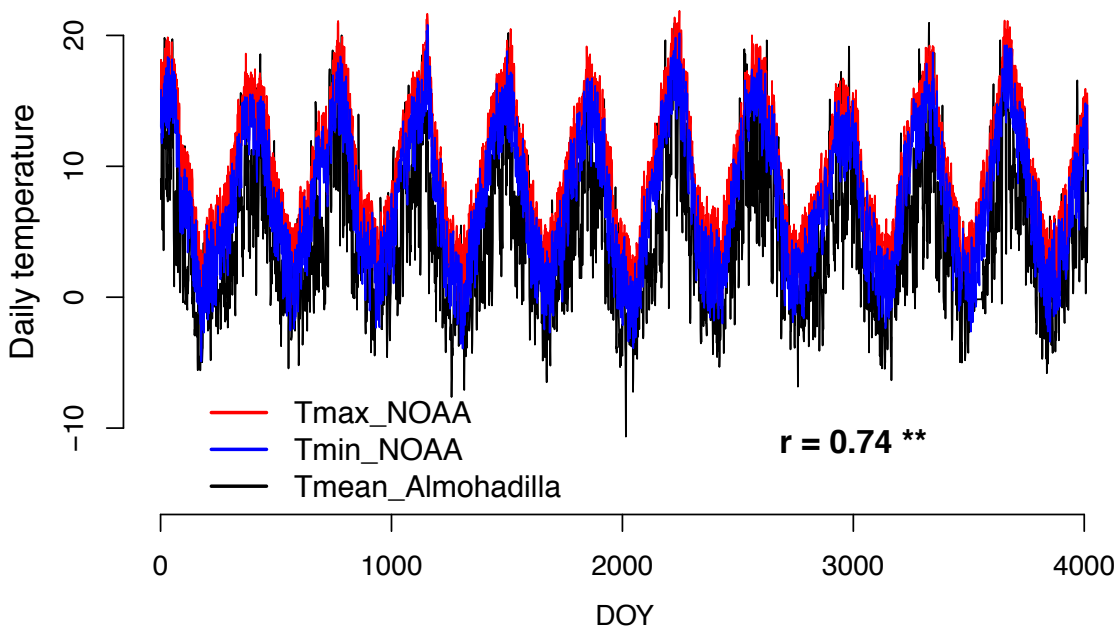


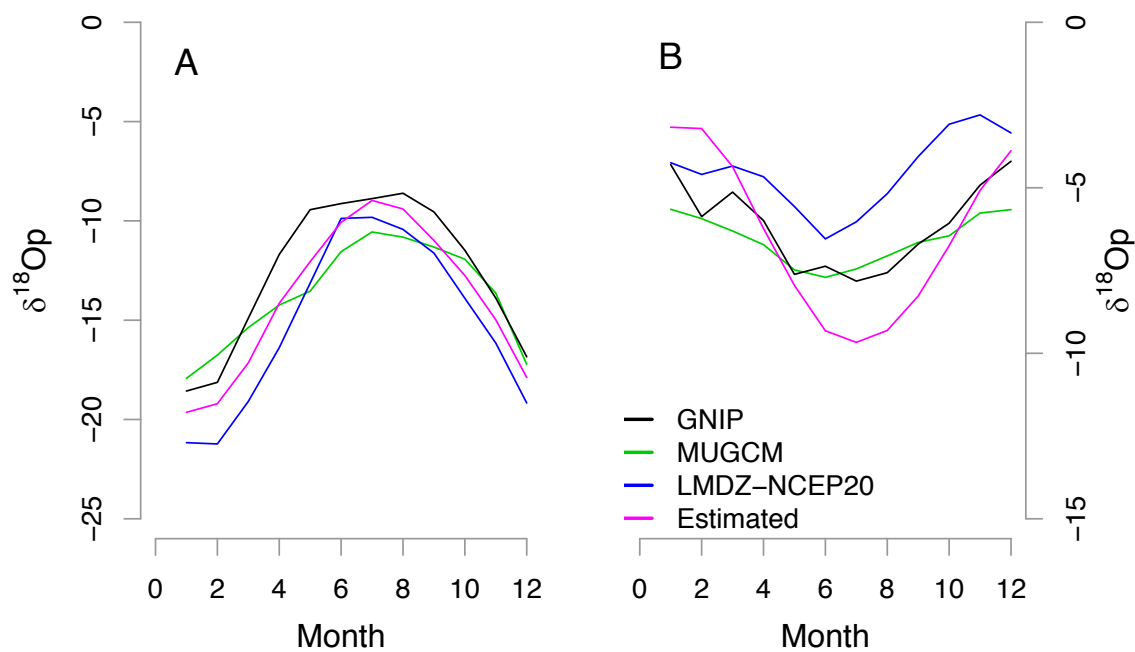
Supplementary Material

Figure SM1 Daily local mean temperature variations (black; La Almohadilla site at 41°11'S-71°47'W, data measured and provided by IANIGLA) against maximum (red) and minimum (blue) temperature from NOAA reanalysis corrected to respect the monthly mean values detected at Bariloche over the period 2002-2012. The correlation coefficient between local data and corrected temperature reanalysis is at 99% confidence level (**).



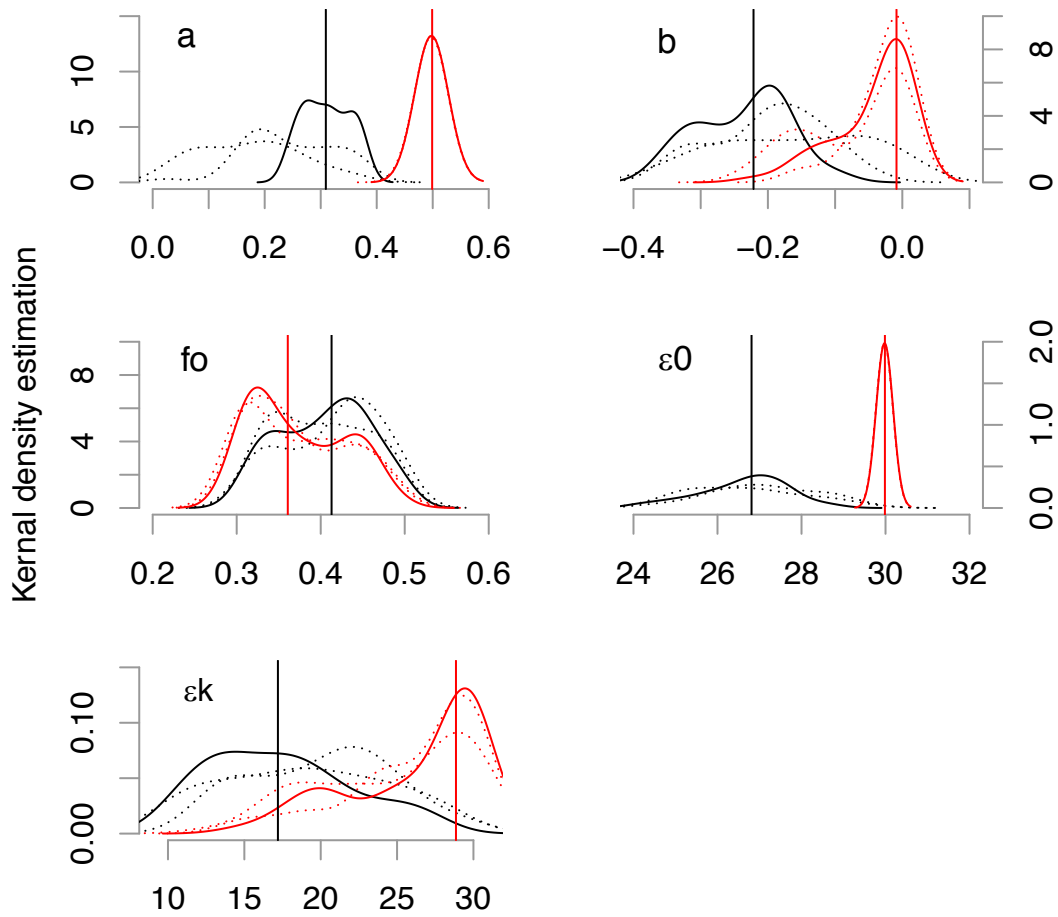
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13 **Figure SM2** Averaged monthly distribution of $\delta^{18}\text{O}_p$ from GNIP data, GCM simulations
14 (MUGCM and LMDZ-NCEP20) and estimated values from Eq. 2 in Quebec (A) and Argentina
15 (B).

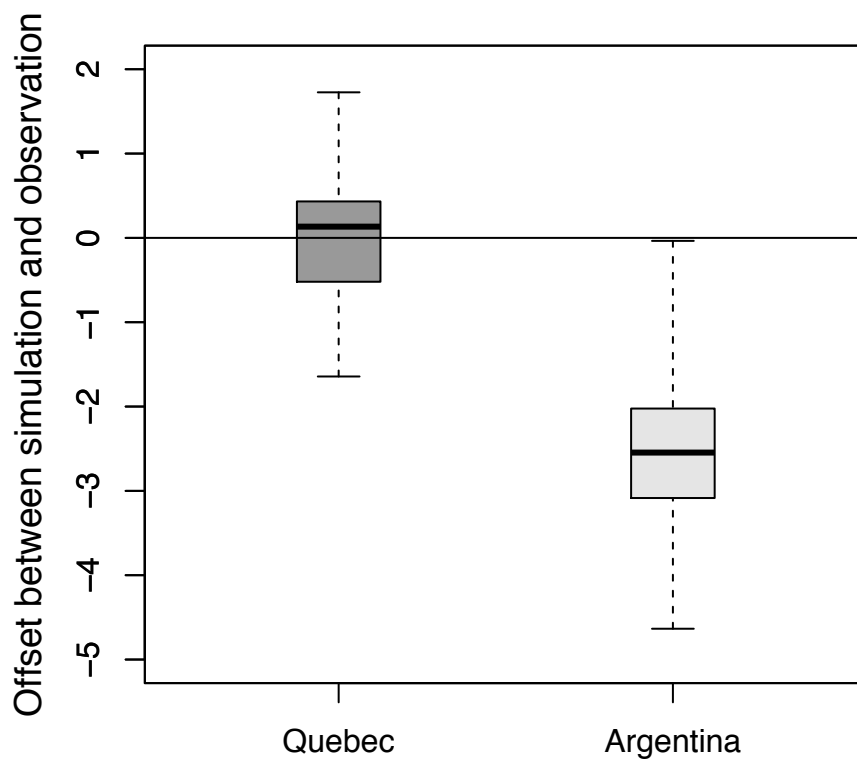


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20 **Figure SM3** Posterior densities of the calibrated parameters (f_0 , ε_0 , a , b and ε_k) for Quebec (black)
 21 and Argentina (red) computed over the whole period. The dashed lines are the posterior densities
 22 of the calibrated parameters over two equal intervals (1950-1977 and 1978-2005 for *P. mariana*;
 23 1952-1981 and 1982-2011 for *N. pumilio*). Vertical lines are the values of a plausible block of
 24 parameters retained in the MCMC optimization (see Table 1).



27 **Figure SM4** Distribution of offset between simulated and observed values of $\delta^{18}\text{O}_{\text{TR}}$.
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