

## Supplementary Material

# Drought increases since the mid-20<sup>th</sup> century revealed by a 389-year reconstructed precipitation from the northern South American Altiplano

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## Supplementary results:

### S1. Regional tree-ring chronology and stats.

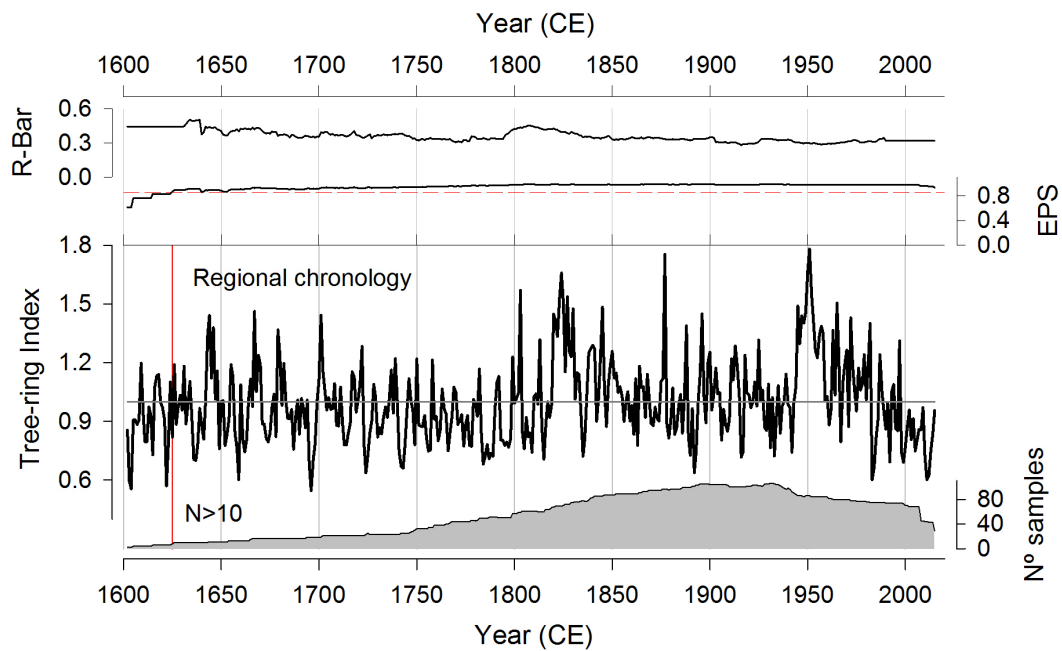


Figure S1. Regional “signal free” chronology of *Polylepis tarapacana* for the northern South American Altiplano, with its respective R-Bar and EPS statistics, and the number of tree ring series variations for the period 1602-2015 CE. The dashed horizontal red line represents the EPS 0.85 threshold. The vertical red line indicates the year since the chronology is represented with more than 10 ring-width series.

### S2. Comparisons among hydroclimatic reconstructions from the central and south Tropical Andes

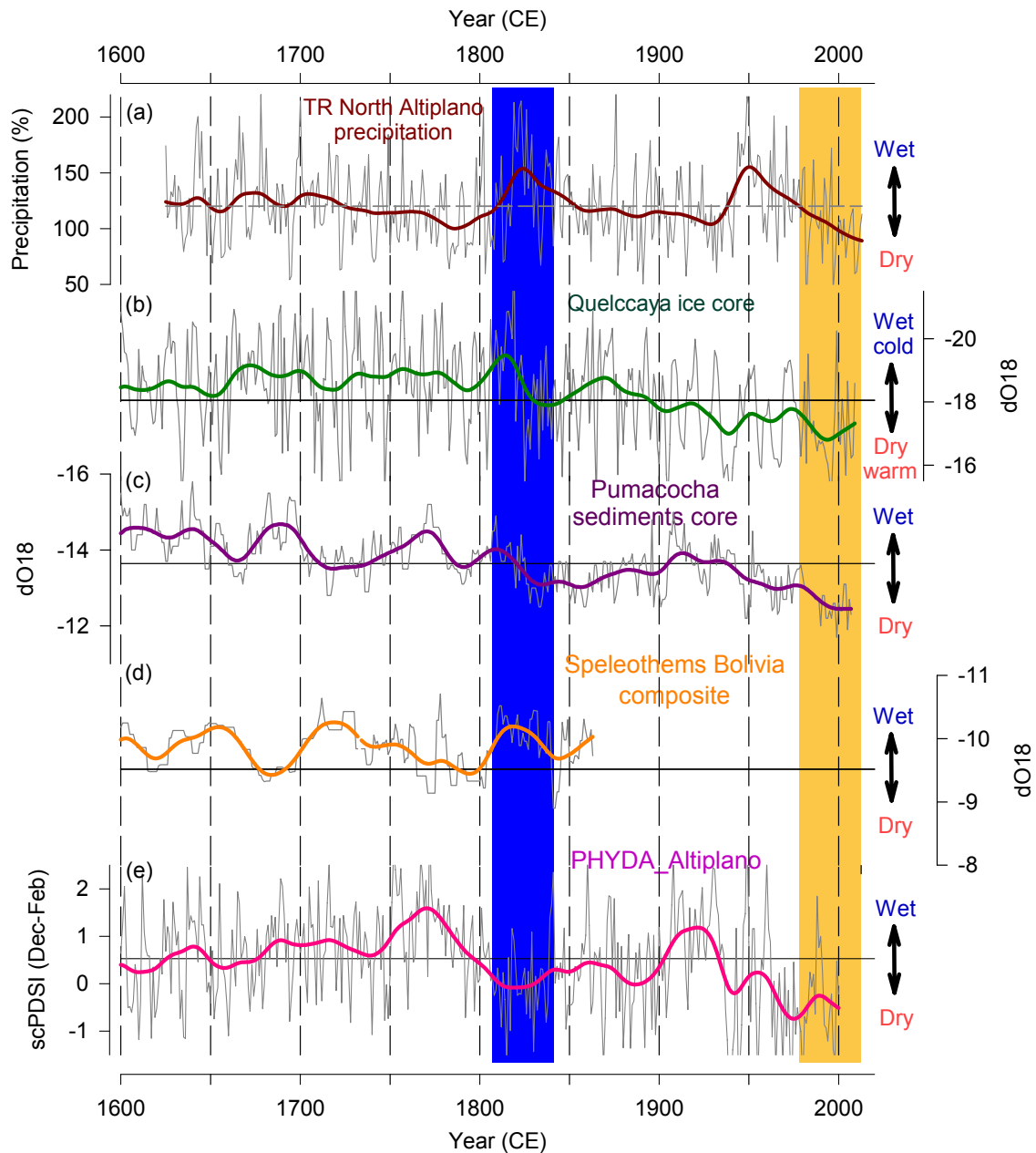


Figure S2: Comparison among five hydroclimate reconstructions from the central and south sectors of the Tropical Andes. The 35-year smoothed spline (thick lines) highlights the multi-decadal variability of the five paleoenvironmental records. From top to bottom: (a) precipitation from the northern sector of the Altiplano (this study), (b)  $\delta\text{O}18$  stable isotope records from the Quelccaya ice core, Peru (Thompson et al., 2006), (c) the  $\delta\text{O}18$  stable isotope records from Pumacocha lake sediment, Peru (Bird et al., 2011), (d) the  $\delta\text{O}18$  stable isotope records from the composite speleothem data from the eastern Bolivian Andes caves (Apaéstegui et al., 2018) and (e) the composite scPDSI from the entire Altiplano ( $17^{\circ}$ - $23^{\circ}$  S;  $66^{\circ}$ - $70^{\circ}$  W). Shaded background represents long-

term drought (yellow) and wet periods (blue) coincidences among the at least four reconstructions.

