



*Supplement of*

**Rising atmospheric CO<sub>2</sub> concentrations: the overlooked factor promoting SW Iberian Forest development across the LGM and the last deglaciation?**

**Sandra Domingues Gomes et al.**

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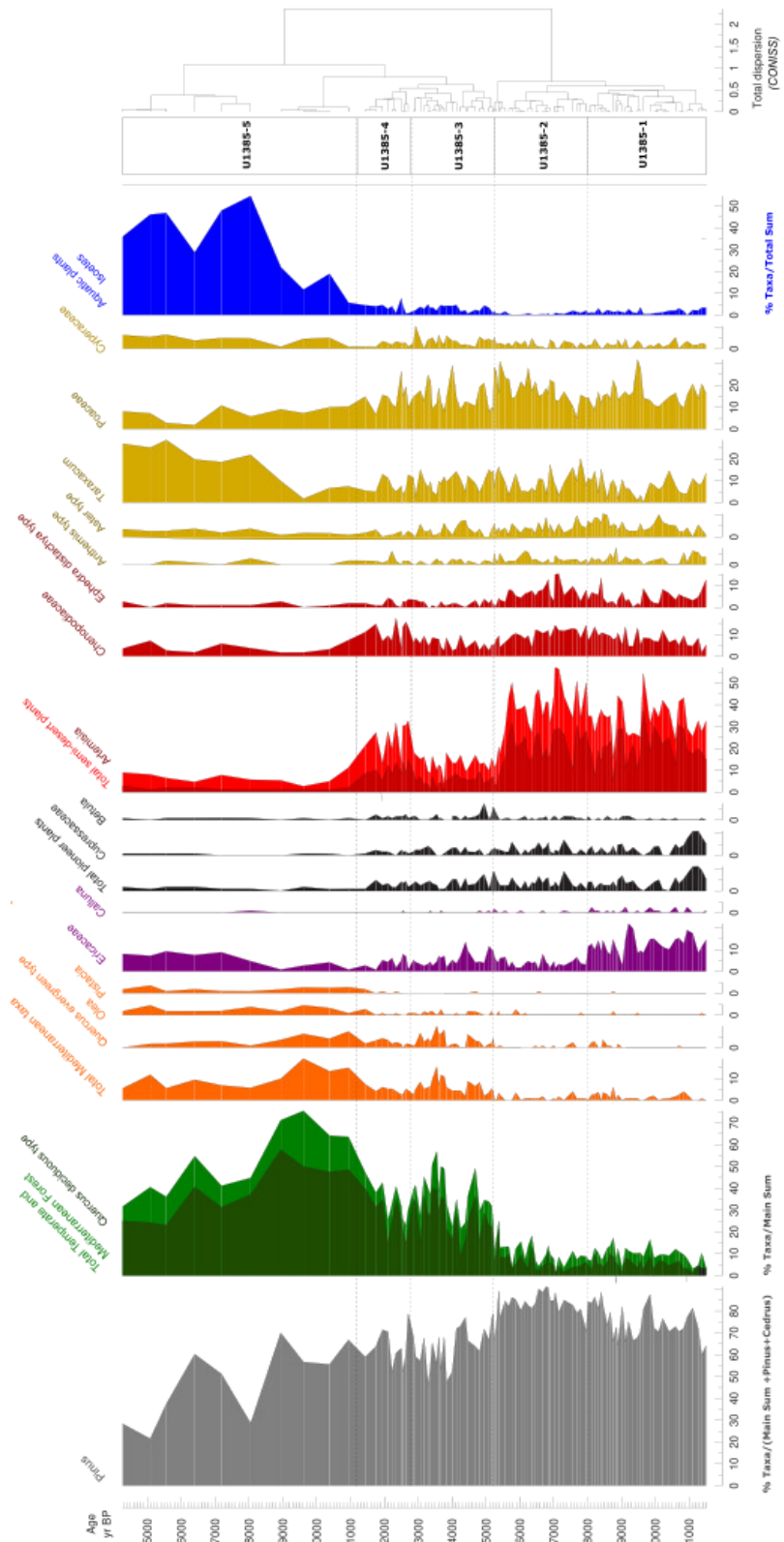
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**Table S1** – Description and interpretation of the pollen record from Site U1385A covering the last 21.5 cal ka BP. Pollen zones are designated after their correspondent Site ID (U1385), followed by the pollen zone number.

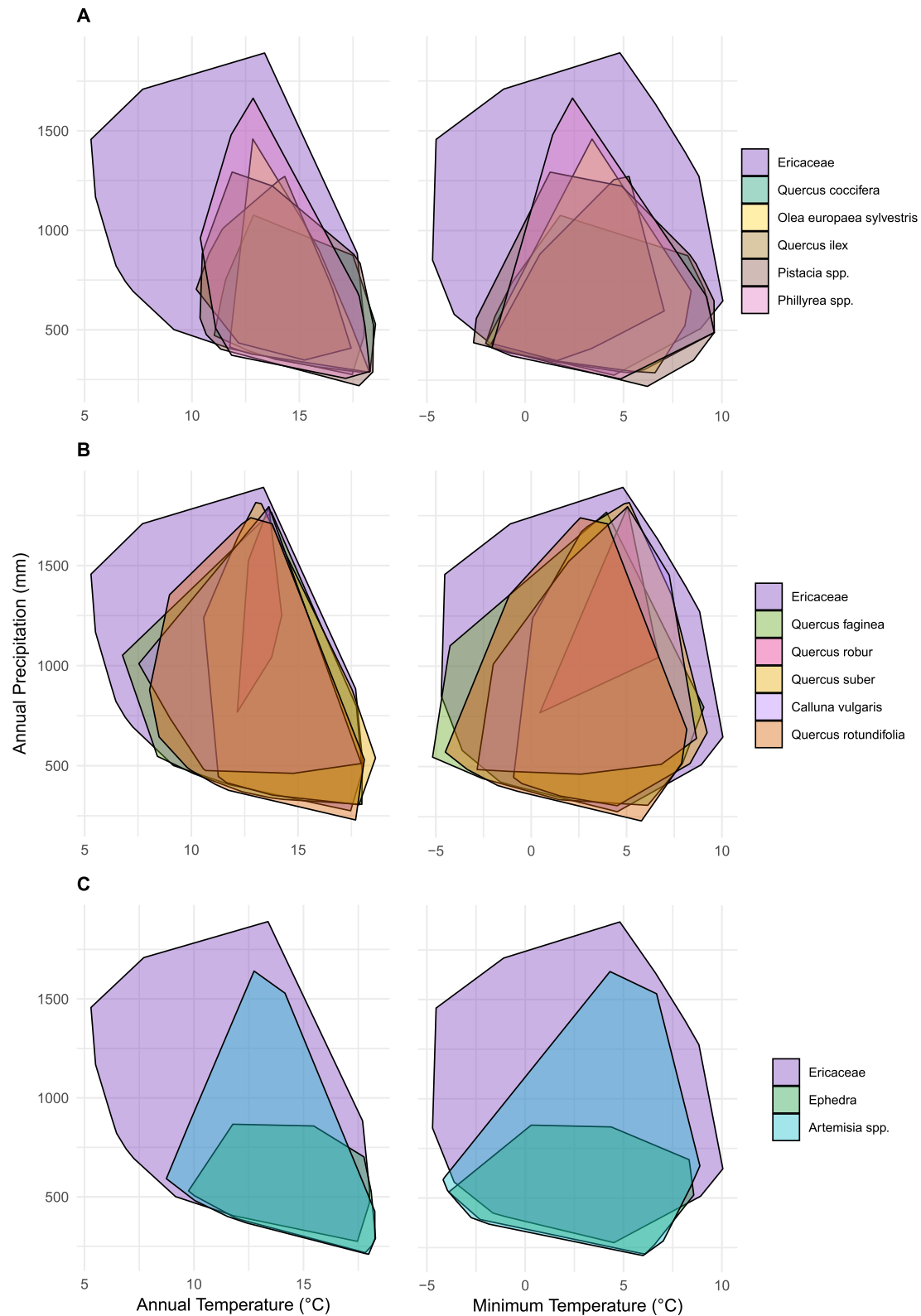
| Pollen Zones | Top Depth (crmcd) | Top Age (cal yr BP) | Pollen signature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| U1385-5      | 0.80              | 4260                | Highest values of TMF (~70%) and Mediterranean taxa (~15%), characterised by the increase of temperate and Mediterranean taxa and marked reduction of semi-desert taxa. Expansion of <i>Isoetes</i> undiff. After an initial increase to its maximum values reduction of TMF (~40%) and Mediterranean taxa (~5%) as well <i>Pinus</i> sp.; subtle expansion of heathland and semi-desert taxa. Increase in the <i>Taraxacum</i> -type group.                                                                                                               |
| U1385-4      | 1.60              | 11190               | Slight decrease of TMF (~30%) and Mediterranean taxa. Re-expansion of semi-desert taxa (~25%) at the beginning followed by a decrease along the zone.                                                                                                                                                                                                                                                                                                                                                                                                      |
| U1385-3      | 1.90              | 12780               | Re-expansion and establishment of TMF (~35%) and Mediterranean taxa (~10%) followed by the retraction and slowdown of the TMF, Mediterranean taxa, and slight increase of semi-desertic taxa. Marked decline of semi-desert taxa, a gradual increase of TMF as well as Mediterranean taxa, and subtle expansion of heathland taxa by the end of the zone. Subtle recovery of the pioneer taxa as well as <i>Isoetes</i> sp. Start of the gradual decline of <i>Pinus</i> sp..                                                                              |
| U1385-2      | 2.42              | 15230               | Highest values in <i>Pinus</i> sp. (~80%) as well as semi-desert taxa (reaching 55%). Slight decline of semi-desert taxa with a subtle increase in TMF (driven by the <i>Quercus deciduous</i> type). Additionally, there is an increase in Poaceae taxa.                                                                                                                                                                                                                                                                                                  |
| U1385-1      | 2.96              | 17990               | Semi-desert taxa still dominant, despite a modest decrease (~30% average). TMF consistent with the previous zone but an increase of <i>Alnus</i> is observed. Mediterranean taxa faintly recover at the expenses of <i>Quercus evergreen</i> and <i>Cistus</i> . Pioneer taxa are also showing a consistent pattern promoted by the presence of <i>Betula</i> and Cupressaceae. Dominance and subtle increase of semi-desert plants (average 35%) with a recover of the TMF (average ~10%). There is a faint expression of Mediterranean taxa at the start |

of the zone while the pioneer plants retracted. Marked expression of pioneer plants (Cupressaceae reaching 10%). High values of semi-desert taxa (~30%) as well Ericaceae (average ~10%).

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**Figure S1** – Pollen diagram for IODP Site U1385A covering the interval from 21500 to ~4260 cal BP (we extended the data to a younger age to give a better perspective of the taxa variation), showing the taxonomic groups aggregated by different colours, and respective CONISS zonation.



**Figure S2** – Environmental space of temperate mediterranean plants represented by convex hulls constrained using Annual precipitation (mm) Vs annual temperature °C (left side) and minimum temperature °C (right side) across the Iberian Peninsula. Comparison of the climatic distributions of A) *Erica* spp. vs Mediterranean taxa; B) *Erica* spp. vs the dominant *Quercus* spp.; C) *Erica* spp. vs Grassland (*Artemisia* spp. + *Ephedra fragilis*). Climatic variables were

extracted from the WorldClim 2.1 database (1970–2000, 2.5 arc-seconds resolution), cropped to the extent of the Iberian Peninsula. Species occurrence data were obtained from the Global Biodiversity Information Facility (GBIF) and cleaned to remove duplicates and spatial outliers. Convex hulls were computed using the *chull()* function in R (version 4.3.3), applied to complete-case combinations of the two bioclimatic variables per species group.