1. ABOUT THE DATASET

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Title: Pollen data and charcoal data of the Iberian Peninsula (version 3)

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Description: Sedimentary charcoal, preserved in lakes, peatbogs and other anoxic environments, has been widely used as an indicator of past changes in fire regimes. Pollen records can be used to reconstruct past climate changes by deriving a statistical relationship between modern pollen abundance and modern climate and applying this relationship to fossil pollen assemblages. Here, we present pollen data and charcoal data from the Iberian Peninsula.

The pollen data file includes basic information (e.g., latitude, longitude, elevation, source of the data, citation for original publication), age information (IPE age and IntCal20 mean and median ages and age uncertainties) and pollen counts for 205 taxa by depth (cm) for 120 sites (122 entities).

The charcoal data file includes basic information (e.g., latitude, longitude, elevation, charcoal. count type and unit), age information (IntCal20 mean and median age and age uncertainties) and charcoal quantity by depth (cm) for 55 sites (78 entities).

*Previous updates (Version 2)*

There are four main updates to the second version of Pollen data and charcoal data of the Iberian Peninsula: (1) the quality of the new age models created using IntCal20 calibration curve has been improved; (2) 9 more pollen entities have been added (ALCUDIA, ALGENDAR, GALDANA, CPORTER, ESGRAU, HTIMONER, TRAVESS1, PRATVILA, SONBOU) and one pollen entity removed (BAJONDI: the new age model cannot be correctly generated because of limited date information); 4 more charcoal entities have been added (El Payo core\_50, El Payo core\_50100, El Payo core\_100150, El Payo core\_150plus); (3) some charcoal entity names and charcoal site names have been edited to make them comparable with original sources and the Reading Palaeofire database (Harrison et al. 2021, https://doi.org/10.17864/1947.319); (4) some references and coordinates have been edited for consistency.

*Latest updates (Version 3)*

In the second version of Iberia pollen data: (1) the dates of QUINTA02 were wrong; (2) the core-top dates of MAI, MOLINAES, PATATERO, XL were post-modern carbon dates; (3) The entity name of EIX was wrong, it should be ELX; (4) GALDANA, ESGRAU, LLIGAT, Castello Lagoon core EM and HINOJOS partly or fully included marine-type dates, which needed marine curve calibration to get the appropriate age models. In relation to the second version of Iberia charcoal data, (1) Castello Lagoon core EM and Hinojos Marsh\_core S1 include marine-type dates, so age models need to apply the marine calibration curve for these dates; (2) some samples of Espinosa de Cerrato core, Gador core and N-GUA needed to be removed because of disturbed layers or hiatus according to their original references; (3) some samples of PozoN\_2015 core needed to be removed based on apparent unreported hiatus diagnosed during age modelling.

Thus, we provide a third version of the Iberia pollen and charcoal data. A date information file (Iberia\_data\_dates\_v3.csv) is also available now.

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2. TERMS OF USE

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3. PROJECT AND FUNDING INFORMATION

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Title: Pollen data and charcoal data of the Iberian Peninsula (version 3)

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4. CONTENTS

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Iberia\_pollen\_records\_v3.csv

Iberia\_charcoal\_records\_v3.csv

Iberia\_data\_dates\_v3.csv

Iberia\_pollen\_records\_v3.csv

121 entities have IntCal20 ages. 8 entities (BANYOLES\_1, Marbore composite, VILLUERCAS, BSM08, PORTALET, ENOL, Estanya Catena, ZONARcombined) have both IPE ages provided by the original authors and IntCal20 ages. Villarquemado does not have IntCal20 age but has IPE age provided by the original authors.

Pollen taxa were amalgamated in this dataset (please check METHODS for more details). Please note this can cause differences when compared with the raw published pollen data elsewhere.

***Table 1. Definition of the Iberia\_pollen\_records\_v3 table.***

|  |  |  |  |
| --- | --- | --- | --- |
| Field name | Definition | Data type | Notes |
| site\_name | Site name as given by original authors | Text |  |
| entity\_name | Name of entity, where an entity may be a separate core from the same site. | Text |  |
| latitude | Latitude of the sampling entity, given in decimal degrees, where N is positive and S is negative | Float | Numeric value between -90 and 90 |
| longitude | Longitude of the sampling entity in decimal degrees, where E is positive and W is negative | Float | Numeric value between -180 and 180 |
| elevation | Elevation of the sampling entity in meters above (+) or below (-) sea level | Float |  |
| source | Sources where the pollen data are obtained | Text | EPD: European Pollen Database (www.europeanpollendatabase.net)PANGAEA: www.pangaea.de/author: all other records were provided directly by the original authors |
| reference | Original references that record the information of pollen sites | Text |  |
| avg\_depth..cm. | Average depth in the sedimentary sequence | Float | The unit of depth is centimeter (cm) |
| IPE.age..cal. | Age models provided by the original authors (IPE, Instituto Pirenaico de Ecología) | Integer |  |
| INTCAL2020\_mean | Mean age of the sample | Integer |  |
| INTCAL2020\_median | Median age of the sample | Integer |  |
| INTCAL2020\_uncert\_5 | Lower bound of the 95% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_95 | Upper bound of the 95% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_25 | Lower bound of the 75% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_75 | Upper bound of the 75% confidence interval for the median age | Integer |  |
| Taxa from Abies to Zygophyllaceae | Pollen count of each taxon | Float | At a few sites, pollen data are shown as relative abundance (percentages).  |

Iberia\_charcoal\_records\_v3.csv:

***Table 2. Definition of the Iberia\_charcoal\_records\_v3 table.***

|  |  |  |  |
| --- | --- | --- | --- |
| Field name | Definition | Data type | Notes |
| site\_name | Site name as given by original authors or as defined by us where there was no unique name given to the site | Text |  |
| entity\_name | Name of entity, where an entity may be a separate core from the site or a separate type of measurement on the same core | Text |  |
| latitude | Latitude of the sampling entity, given in decimal degrees, where N is positive and S is negative | Float | Numeric value between -90 and 90 |
| longitude | Longitude of the sampling entity in decimal degrees, where E is positive and W is negative | Float | Numeric value between -180 and 180 |
| elevation | Elevation of the sampling entity in meters above (+) or below (-) sea level | Float |  |
| TYPE | The unit type of the measured charcoal values (e.g. concentration, influx) | Text | “TYPE” is used to do charcoal accumulation transformation |
| reference | Source of charcoal data | Text |  |
| avg\_depth..cm. | Average depth in the sedimentary sequence | Float | The unit of depth is centimeter (cm) |
| charcoal.quantity | Quantity of charcoal measured in the sample | Float |  |
| units | Charcoal measurement unit | Text | “unit” is used to distinguish micro and macro entities |
| INTCAL2020\_mean | Mean age of the sample | Integer |  |
| INTCAL2020\_median | Median age of the sample | Integer |  |
| INTCAL2020\_uncert\_5 | Lower bound of the 95% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_25 | Lower bound of the 75% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_75 | Upper bound of the 75% confidence interval for the median age | Integer |  |
| INTCAL2020\_uncert\_95 | Upper bound of the 95% confidence interval for the median age | Integer |  |

Iberia\_data\_dates\_v3.csv

***Table 3. Definition of the Iberia\_data\_dates\_v3 table.***

|  |  |  |  |
| --- | --- | --- | --- |
| Field name | Definition | Data type | Notes |
| site\_name | Site name as given by original authors | Text |  |
| entity\_name | Name of entity, where an entity may be a separate core from the same site. | Text |  |
| lab\_number | Unique identifying codeassigned by the datinglaboratory | Text |  |
| date\_type | Technique used to obtainthe date measurement | Text | Selected from predefined list |
| avg\_depth | Average depth in thesedimentary sequence, in centimeters |  |  |
| thickness | Thickness of the sampleused for dating, in centimeters | Float |  |
| material\_dated | Material from which thedate was obtained, ifapplicable | Text | Selected from predefined list |
| age\_C14 | Uncalibrated radiocarbonage | Float |  |
| error | Analytical or measurementerror on the date | Float |  |
| age\_calib | The calendar age of a date | Float |  |
| age\_calib\_error | Error on the calendar age of a date | Integer |  |
| age\_used | Indicates whether date wasused by the author(s) in theconstruction of the originalage model | Text | Selected from predefined list |
| notes | Additional commentsregarding a date record (e.g. reasons for why a datewas not used in the originalage model.) | Text |  |

5. METHODS

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Pollen data were obtained from the European Pollen Database (EPD, www.europeanpollendatabase.net), from PANGAEA (www.pangaea.de/) or provided by the authors (as indicated). Non-pollen palynomorphs (e.g. fungi, algae), introduced species, and fire-insensitive plants (e.g. obligate aquatics) were removed from the assemblages before analysis. Some pollen taxa are not identified consistently by palynologists or occur at very few sites, so some pollen types were amalgamated to higher taxonomic groups (mostly genera for trees, families for herbaceous taxa) for consistency across the records. This amalgamation was done in order to create a data set that was compatible with the SPECIAL Modern Pollen Database (Harrison, 2019), which is used as a training data set for climate reconstructions. Charcoal data were obtained from the Global Charcoal Database (Power et al., 2010; Marlon et al., 2016) or provided by the original authors (as indicated). New age models were created for both the pollen and the charcoal records using the IntCal20 calibration curve (Reimer et al., 2020) and the BACON Bayesian age-modelling tool in the rbacon package (2.5.0) in CRAN (Blaauw and Christeny, 2011) with the help of ageR package (Villegas-Diaz et al., 2021).

We provide a csv file for pollen data, a csv file for charcoal data and a csv file for dates information formatted in UTF-8. Both pollen and charcoal data files include basic information for each entity (Site name, Entity name, Latitude, Longitude, Elevation, Reference), depth in cm, IntCal20 ages including median, mean, 5% uncertainty, 25% uncertainty, 75% uncertainty, 95% uncertainty values. In addition, the pollen data file contains pollen counts for 205 taxa and IPE ages for 9 entities (Villarquemado, BANYOLES\_1, Marbore composite, VILLUERCAS, BSM08, PORTALET, ENOL, Estanya Catena, ZONARcombined). The charcoal data file includes additional information on charcoal type, charcoal unit and charcoal quantity. The dates information file provides details about dates that were used to derive the age models.

References:

Harrison, S. P., R. Villegas-Diaz, E. Cruz-Silva, D. Gallagher, D. Kesner, P. Lincoln, Y. Shen, L. Sweeney, D. Colombaroli, A. Ali, C. Barhoumi, Y. Bergeron, T. Blyakharchuk, P. Bobek, R. Bradshaw, J. L. Clear, S. Czerwiński, A. L. Daniau, J. Dodson, K. J. Edwards, M. E. Edwards, A. Feurdean, D. Foster, K. Gajewski, M. Gałka, M. Garneau, T. Giesecke, G. Gil Romera, M. P. Girardin, D. Hoefer, K. Huang, J. Inoue, E. Jamrichová, N. Jasiunis, W. Jiang, G. Jiménez-Moreno, M. Karpińska-Kołaczek, P. Kołaczek, N. Kuosmanen, M. Lamentowicz, M. Lavoie, F. Li, J. Li, O. Lisitsyna, J. A. López-Sáez, R. Luelmo-Lautenschlaeger, G. Magnan, E. K. Magyari, A. Maksims, K. Marcisz, E. Marinova, J. Marlon, S. Mensing, J. Miroslaw-Grabowska, W. Oswald, S. Pérez-Díaz, R. Pérez-Obiol, S. Piilo, A. Poska, X. Qin, C. C. Remy, P. Richard, S. Salonen, N. Sasaki, H. Schneider, W. Shotyk, M. Stancikaite, D. Šteinberga, N. Stivrins, H. Takahara, Z. Tan, L. Trasune, C. E. Umbanhowar, M. Väliranta, J. Vassiljev, X. Xiao, Q. Xu, X. Xu, E. Zawisza, Y. Zhao and Z. Zhou. : The Reading Palaeofire database: an expanded global resource to document changes in fire regimes from sedimentary charcoal records, Earth System Science Data Discussions, 1-30, 2021 [preprint].

Blaauw, M. and Christeny, J. A.: Flexible paleoclimate age-depth models using an autoregressive gamma process, Bayesian Anal., 6(3), 457–474, doi:10.1214/11-BA618, 2011.

Harrison, S.P., 2019. Modern Pollen Data for Climate Reconstructions, version 1 (SMPDS). University of Reading Dataset. http://dx.doi.org/10.17864/1947.194. https://researchdata.reading.ac.uk/id/eprint/194

Marlon, J. R., Kelly, R., Daniau, A.-L., Vannière, B., Power, M. J., Bartlein, P., Higuera, P., Blarquez, O., Brewer, S., Brücher, T., Feurdean, A., Romera, G. G., Iglesias, V., Maezumi, S. Y., Magi, B., Courtney Mustaphi, C. J. and Zhihai, T.: Reconstructions of biomass burning from sediment-charcoal records to improve data–model comparisons, Biogeosciences, 13(11), 3225–3244, doi:10.5194/bg-13-3225-2016, 2016.

Power, M. J., Marlon, J. R., Bartlein, P. J. and Harrison, S. P.: Fire history and the global charcoal database: A new tool for hypothesis testing and data exploration, Palaeogeogr. Palaeoclimatol. Palaeoecol., 291(1–2), 52–59, doi:10.1016/j.palaeo.2009.09.014, 2010.

Reimer, P. J., Austin, W. E. N., Bard, E., Bayliss, A., Blackwell, P. G., Bronk Ramsey, C., Butzin, M., Cheng, H., Edwards, R. L., Friedrich, M., Grootes, P. M., Guilderson, T. P., Hajdas, I., Heaton, T. J., Hogg, A. G., Hughen, K. A., Kromer, B., Manning, S. W., Muscheler, R., Palmer, J. G., Pearson, C., Van Der Plicht, J., Reimer, R. W., Richards, D. A., Scott, E. M., Southon, J. R., Turney, C. S. M., Wacker, L., Adolphi, F., Büntgen, U., Capano, M., Fahrni, S. M., Fogtmann-Schulz, A., Friedrich, R., Köhler, P., Kudsk, S., Miyake, F., Olsen, J., Reinig, F., Sakamoto, M., Sookdeo, A. and Talamo, S.: The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0-55 cal kBP), Radiocarbon, 62(4), 725–757, doi:10.1017/RDC.2020.41, 2020.

Villegas-Diaz, R., Cruz-Silva, E. and Harrison, S. P.: ageR: Supervised Age Models, , doi:doi:10.5281/zenodo.4636716, 2021.