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**SUPPORTING INFORMATION**

**Phylogenetic conservatism of species range size is the combined outcome of phylogeny and environmental stability**

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**Appendix S1** References for Table 1, palaeocoordinates of the 104 studied fossil localities and species-level phylogenetic trees for each chronozone of the early Pliensbachian with and without branch length recalculation

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**Table S1.1** Palaeocoordinates of the 104 studied fossil localities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Locality code** | **Locality name** | **Country** | **Province** | **Palaeolongitude** | **Palaeolatitude** |
| **Ab-LEFT** | Lefterochori | ALBANIA | MED | -3.14 | 26.02 |
| **Ag-CHEL** | Massif de Chellata | ALGERIA | MED | -16.25 | 37.77 |
| **Al-AMBE** | Amberg (Bavaria) | GERMANY | NWE | 11.87 | 49.45 |
| **Al-BAVA** | Bavarian Alps  | GERMANY | MED | 12.25 | 46.48 |
| **Al-DONA** | Donaueschingen | GERMANY | NWE | 8.6 | 48.00 |
| **Al-GOTT** | Göttingen (N Kassel) | GERMANY | NWE | 10.07 | 51.78 |
| **Al-OSNA** | Osnabrück | GERMANY | NWE | 8.05 | 52.27 |
| **Al-OSTR** | Östringen | GERMANY | NWE | 8.71 | 49.22 |
| **Al-PLIE** | Pliensbach | GERMANY | NWE | 9.35 | 48.63 |
| **Al-SGIT** | Salzgitter | GERMANY | NWE | 10.53 | 52.27 |
| **Al-WUTA** | Wutachgebiet, Klettgau | GERMANY | NWE | 8.48 | 47.83 |
| **Au-ENZE** | Enzesfeld | AUSTRIA | MED | 14.75 | 41.92 |
| **Au-LIEN** | Lienz | AUSTRIA | MED | 12.35 | 42.26 |
| **Au-SALZ** | Salzburg  | AUSTRIA | MED | 11.48 | 43.16 |
| **Au-VORA** | Vorarlberg | AUSTRIA | MED | 9.73 | 42.37 |
| **Bu-BALK** | Occidental Balkans  | BULGARIA | NWE | 18.05 | 47.57 |
| **Bu-KOTE** | Klippe de Kotel  | BULGARIA | MED | 19.27 | 46.53 |
| **CH-BIVI** | Bivio | SWITZERLAND | MED | 12.56 | 44.76 |
| **CH-HELV** | Helvetic (Valais, Glaris) | SWITZERLAND | NWE | 10.23 | 44.9 |
| **CH-KLSC** | Klippes central Switzerland | SWITZERLAND | NWE | 9.81 | 44.61 |
| **CH-PRSU** | Swiss Prealps | SWITZERLAND | NWE | 8.99 | 44.56 |
| **CH-TESS** | Tessin, Brianza, Varèse, Como  | SWITZERLAND | MED | -1.75 | 38.85 |
| **Da-BORN** | Bornholm | DENMARK | NWE | 14.7 | 55.1 |
| **Es-ASTU** | Asturies | SPAIN | NWE | -9.99 | 49.49 |
| **Es-BEAR** | Betic Archidona | SPAIN | MED | -11.18 | 42.85 |
| **Es-BEJA** | Betic Jaen  | SPAIN | MED | -10.4 | 43.18 |
| **Es-BENE** | Betic NE (Almeria) | SPAIN | MED | -9.52 | 43.51 |
| **Es-BIDA** | Bidassoa | SPAIN | NWE | -8.22 | 47.43 |
| **Es-IBNE** | Iberic NE (Zaragoza) | SPAIN | NWE | -8.25 | 44.56 |
| **Es-IBNW** | Iberic NW (Logrono) | SPAIN | NWE | -8.59 | 46.19 |
| **Es-SIMA** | Sierras marginales | SPAIN | NWE | -5.51 | 44.63 |
| **Fr-ALNO** | Alsace Nord  | FRANCE | NWE | 7.67 | 48.9 |
| **Fr-ALSU** | Alsace Sud, Belfort | FRANCE | NWE | 7.33 | 47.75 |
| **Fr-ARIE** | Ariège | FRANCE | NWE | 1.6 | 42.97 |
| **Fr-AUXO** | Auxois | FRANCE | NWE | 4.43 | 47.53 |
| **Fr-BASQ** | Pays Basque  | FRANCE | NWE | -7.69 | 47.2 |
| **Fr-BAZO** | Bazois | FRANCE | NWE | 3.67 | 47.25 |
| **Fr-BUGE** | Bugey | FRANCE | NWE | 5.43 | 45.95 |
| **Fr-CAUE** | Causses Est | FRANCE | NWE | 3.62 | 44.38 |
| **Fr-CAUS** | Causses Sud | FRANCE | NWE | 2.97 | 43.97 |
| **Fr-CAUW** | Causses Ouest | FRANCE | NWE | 3.13 | 44.18 |
| **Fr-CHAR** | Charollais | FRANCE | NWE | 4.23 | 46.58 |
| **Fr-CHER** | Cher, Indre, SW Nièvre | FRANCE | NWE | 2.52 | 46.72 |
| **Fr-CORB** | Corbières | FRANCE | NWE | 2.9 | 43.22 |
| **Fr-DAUP** | Bassin dauphinois | FRANCE | NWE | 7.38 | 44.33 |
| **Fr-DIBA** | Côtes Dijonnaise Beaunoise  | FRANCE | NWE | 4.73 | 47.05 |
| **Fr-ENCO** | Massif des Encombres | FRANCE | NWE | 8.42 | 44.26 |
| **Fr-GARD** | Gard, Ardèche  | FRANCE | NWE | 4.08 | 44.08 |
| **Fr-JURA** | Jura | FRANCE | NWE | 5.88 | 46.95 |
| **Fr-LORR** | Lorraine | FRANCE | NWE | 6.2 | 48.68 |
| **Fr-LYON** | Lyonnais | FRANCE | NWE | 4.73 | 45.8 |
| **Fr-MACH** | Côtes Maconnaise Chalonnaise  | FRANCE | NWE | 4.68 | 46.75 |
| **Fr-NORM** | Normandie | FRANCE | NWE | -0.35 | 49.18 |
| **Fr-OISA** | Oisans Nord | FRANCE | NWE | 7.62 | 43.98 |
| **Fr-PRFR** | French Prealps & klippes | FRANCE | NWE | 6.9 | 45.73 |
| **Fr-QUER** | Quercy | FRANCE | NWE | 1.8 | 44.07 |
| **Fr-RODE** | Détroit de Rodez  | FRANCE | NWE | 2.57 | 44.33 |
| **Gl-JAME** | Jameson Land | GREENLAND | NWE | 4.74 | 64.69 |
| **Gr-EPIR** | Epire | GREECE | MED | -0.8 | 25.2 |
| **Ho-BAKO** | Bakony | HUNGARY | MED | 10.09 | 40.59 |
| **Ho-VILL** | Villany | HUNGARY | MED | 14.44 | 44.51 |
| **It-CAGL** | Cagli | ITALY | MED | -4.86 | 33.49 |
| **It-CAMA** | Campiglia Marittima | ITALY | MED | -5.44 | 34.48 |
| **It-CETO** | Monte di Cetona | ITALY | MED | -5.12 | 34.02 |
| **It-CORF** | Corfino (Toscane) | ITALY | MED | -5.63 | 35.14 |
| **It-FAIT** | Monte Faito | ITALY | MED | -5.5 | 33.66 |
| **It-FILE** | Filettino | ITALY | MED | -4.8 | 32.45 |
| **It-LOMB** | Lombardie (Brescia) | ITALY | MED | 0.00 | 37.97 |
| **It-MACE** | Macerata | ITALY | MED | -4.65 | 33.08 |
| **It-TAOR** | Taormina | ITALY | MED | -4.41 | 27.88 |
| **Lu-LUXE** | Luxembourg | LUXEMBOURG | NWE | 6.13 | 49.61 |
| **Ma-BSOR** | Oriental Beni Snassen  | MOROCCO | MED | -22.66 | 41.44 |
| **Ma-HABM** | High Atlas, Beni-Mellal | MOROCCO | MED | -23.95 | 39.94 |
| **Ma-HABR** | High Atlas (Jb Bou-Rharraf)  | MOROCCO | MED | -21.01 | 38.78 |
| **Ma-HAMI** | High Atlas, Midelt | MOROCCO | MED | -22.56 | 39.06 |
| **Ma-MASE** | Moyen Atlas septentrional | MOROCCO | MED | -23.58 | 40.83 |
| **Ma-SRIF** | Rides Sud-rifaines  | MOROCCO | MED | -27.86 | 42.1 |
| **Pl-SWIN** | Swinoujscie | POLAND | NWE | 14.25 | 53.92 |
| **Po-ALGA** | Algarve | PORTUGAL | MED | -18.92 | 44.73 |
| **Po-BEIR** | Beira Maritima | PORTUGAL | NWE | -16.24 | 47.12 |
| **Po-COIM** | Coimbra | PORTUGAL | NWE | -15.66 | 47.42 |
| **Ro-BANA** | Banat | ROMANIA | NWE | 20.86 | 46.72 |
| **Ro-BIHO** | Bihor (SE Apuseni Mts) | ROMANIA | NWE | 20.73 | 48.83 |
| **Ro-DOBR** | Dobrogea Nord | ROMANIA | NWE | 25.27 | 47.24 |
| **Ro-PADU** | Padurea (NE Apuseni Mts) | ROMANIA | NWE | 20.24 | 49.45 |
| **Ro-PERS** | Persani Mts (Carpates) | ROMANIA | NWE | 22.32 | 46.99 |
| **Sl-FATR** | Fatra | SLOVAKIA | MED | 11.46 | 41.5 |
| **Sl-KSLO** | Karst slovaque | SLOVAKIA | MED | 13.42 | 41.09 |
| **Su-SKAN** | Skanie | SWEDEN | NWE | 12.98 | 55.57 |
| **Ts-ZAGH** | Zaghouan | TUNISIA | MED | -13.09 | 36.6 |
| **Tu-LYCI** | Nappes lyciennes | TURKEY | MED | 4.67 | 25.29 |
| **Tu-POAK** | Pontides Ak Dagh (Amasia) | TURKEY | MED | 36.31 | 41.47 |
| **Tu-POAN** | Pontides Ankara | TURKEY | MED | 34.13 | 41.75 |
| **Tu-PONE** | Pontides NE (Kirikli) | TURKEY | MED | 40.59 | 40.82 |
| **Tu-PONW** | Pontides W (Bilecik) | TURKEY | MED | 31.62 | 41.95 |
| **UK-DORS** | Dorset coast | UK | NWE | -2.9 | 50.74 |
| **UK-GLOU** | Gloucestershire, Oxford | UK | NWE | -2.08 | 51.9 |
| **UK-LEIC** | Leicestershire | UK | NWE | -1.14 | 52.64 |
| **UK-LINC** | Lincolnshire | UK | NWE | -0.54 | 53.23 |
| **UK-MIDL** | Midlands, Northamp., Warick. | UK | NWE | -1.17 | 52.34 |
| **UK-MULL** | Mull | UK | NWE | -5.71 | 56.47 |
| **UK-RAAS** | Raasay | UK | NWE | -6.19 | 57.41 |
| **UK-SOME** | Somerset, Avon | UK | NWE | -2.64 | 51.4 |
| **UK-YORK** | Yorkshire coast | UK | NWE | -0.53 | 54.44 |

**Calculation method**

Geographic distances among localities were calculated with the following procedure. Present-day geographic coordinates and the corresponding palaeogeographic blocs were recorded for each locality. The paths of the main blocs (Eurasia, Iberia, Africa) are well constrained by oceanic magnetic anomalies, but only from the Bathonian (c. 168 Ma) to the Recent. Since no major movement of the Pangea occurred much before Callovian times (c. 166 Ma), we assume that during the early Pliensbachian, the African, Eurasian and Iberian plates were in the same relative position than during the Bathonian. We used the rotation poles established by Müller et al*.* (2008) and Torsvik et al*.* (2008). The paths of the Adria and Anatolia blocs, together with the position of the Middle-East Basin, were constrained using the tectonic reconstructions established by Ricou (1994), Golonka (2007), and Barrier et al*.* (2008). Computations of palaeocoordinates were made by setting the age of the early Pliensbachian to 189 Ma and by considering Eurasia as fixed. The early Pliensbachian map showing the palaeolocation of the 104 localities (Fig. 1) was drawn using the ArcGIS software (v.8.2, ESRI Inc. 2002 https://www.arcgis.com/) and modules developed by Bruno Vrielynck (UPMC, Paris). Once palaeolocations were computed, the triangular matrix of great circle (i.e. orthodromic) distances between each pair of localities was calculated using QGIS v.2.0.1 (QGIS Development Team, 2013, Open Source Geospatial Foundation Project, http://www.qgis.org/en/site/). The use of great circle distances implies that emerged lands are ignored in the calculation of inter-locality distances. Used in most studies on present-day and past marine and freshwater environments (e.g. Kiessling & Aberhan, 2007; Miller et al*.*, 2009; Astorga et al*.*, 2012; Wetzel et al*.*, 2012; Brayard & Escarguel, 2013), this technique avoids many ad hoc hypotheses about the dispersal routes of organisms.

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**Figure S1.1** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Jamesoni chronozone with recalculated branch lengths



**Figure S1.2** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Ibex chronozone with recalculated branch lengths



**Figure S1.3** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Davoei chronozone with recalculated branch lengths



**Figure S1.4** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Jamesoni chronozone without recalculated branch lengths



**Figure S1.5** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Ibex chronozone without recalculated branch lengths





**Figure S1.6** Species-level phylogenetic tree for ammonites of the western Tethys and adjacent areas (after Hardy et al., 2012) of the Davoei chronozone without recalculated branch lengths