

# PANGAEA AMALGAMATION AND BREAK-UP: NEW RADIO-METRIC CONSTRAINTS ON SEDIMENT PROVENANCE IN LATE CARBONIFEROUS AND LATE TRIASSIC BASINS OF SW IBERIA

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The subject of this provenance study are greywacke and sandstone strata that define a key unconformity in SW Iberia, where late Triassic strata (Algarve Basin) overlie previously deformed and metamorphosed late Carboniferous basement (South Portuguese Zone). This angular unconformity records the transition from Pangea's amalgamation to its break-up with: i) development of marine basins of Moscovian age with turbiditic sedimentation (Brejeira Formation; ca. 310-305 Ma); ii) post-305 Ma deformation as a result of orogenic bending; iii) development of series of coalescing, fluvia-deltaic wedges and axial braided rivers containing detritus that were transported by fluvial and aeolian processes at ca. 200 Ma (late Triassic, Silves Formation). The chondrite-normalized REE patterns of the Carboniferous and Triassic samples show a tendency for a slight depletion of the total amount of REE through time. Both sequences share some characteristics of the patterns such as a strong enrichment of the LREE relative to HREE that present no evidences of fractionation, and a negative Eu-anomaly, suggesting an evolved, felsic igneous or metamorphic source or their erosional detritus. They have geochemical signatures that closely resemble the upper continental crust, and plot in the field of active continental margins on trace-element based discrimination diagrams. The detrital zircons from studied samples include: i) simple grains with oscillatory growth zoning consistent with a precipitation from the melt phase of felsic to intermediate magmas, ii) simple, needle-shaped, acicular, medium to large grains that can be derived from mafic and/or peralkaline magmas; iii) composite grains, composed of a core surrounded by generally concentric zoned or unzoned (low or high luminescent) overgrowths. The Carboniferous greywackes have a higher content of rounded zircons, which is in contrast to the Triassic sandstones that contain 60-70% of euhedral to subhedral zircons. U-Pb detrital zircon data from the Carboniferous greywackes exhibit an age range distinct from the overlying Triassic sandstones demonstrating that there must have been a significant change in the source region. The Carboniferous samples include major peaks at ca. 671 and 632 Ma (Cryogenian), early Devonian (ca. 392 Ma) and several other zircon populations of early Ediacaran, late Ordovician, Silurian and late Devonian age. In the Triassic sandstones, ca. 634, 623 and 605 Ma age clusters are the most dominant while early Ediacaran and early Paleozoic ages are rare. Late Carboniferous zircon ages are absent from all samples, and only one Permian age was obtained from the Triassic sandstones. From the available data it can be stated that equivalents of the Carboniferous greywackes cannot be considered a source of overlying Triassic sandstones. Instead they must have originated from rocks with very rare post- ca. 590 Ma zircon crystallization episodes, implying that the detritus must come from a source outside SW Iberia (Pan-African belt of North Africa?). The detrital zircon data of the Carboniferous greywackes overlap those of the SW Iberia but, also include significant late Ordovician and Silurian age populations that are not common of SW Iberia. A mixed provenance including the contribution from SW Iberia and another external source (Avalonia?) is assumed.