



## RESEARCH PAPER



# Whole-rock and Sm–Nd isotopic geochemistry of Triassic SW Iberia sandstones: implications for provenance

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## Abstract

Whole-rock and Sm–Nd isotopic geochemistry data were used to characterise the probable sources of the Triassic Alentejo and Algarve sandstones. These rocks were deposited in a rift setting, plot within the recycled field in the QFL and discrimination function diagrams for sandstones, thus supporting derivation from a recycled orogenic terrane. They all show negative Eu anomalies, enrichment of LREE, and nearly flat HREE patterns, typical of upper-continental crustal sources. Their Nd  $T_{DM}$  model ages and detrital zircon populations are significantly coincident with those of the Late Devonian–Early Carboniferous Phyllite–Quartzite and Tercenas formations and Early Carboniferous Mira turbidites of the South Portuguese Zone (SPZ), indicating that these may have been their dominant sources, with a minor contribution from the Visean Mértola turbidites. In particular, the Mira turbidites may also be regarded as the dominant source of the eastern Algarve Triassic sandstones. Furthermore, the Nd  $T_{DM}$  model ages and the detrital zircon populations of the central Algarve Triassic sandstones as compared with those of the SPZ Late Carboniferous Brejeira and Late Devonian Ronquillo formations suggest a strong source to sink relationship. Finally, some of the western Algarve Triassic sandstones show older Nd  $T_{DM}$  model ages which have not been recognized in the SPZ basement rocks, and, hence, suggest that these sediments may derive directly from primary remote sources. We advance the suggestion that beyond remote potential sources from the Meguma Terrane, others from the Moroccan Variscan Belt have been reproduced in the Devonian–Carboniferous SPZ basement as the result of sediment recycling. These SPZ would represent intermediate sediment repositories and would be later on reworked and incorporated into the Triassic Algarve Basin, thus indicating multi-cycle sedimentation.

**Keywords** Provenance · Siliciclastic rocks · Petrography · Geochemistry · Local vs remote sedimentary sources

## Geoquímica de roca total e isotópica (Sm–Nd) de las areniscas del Triásico del SW de Iberia: implicaciones para su procedencia

### Resumen

Se han utilizado datos de geoquímica de roca total y de geoquímica isotópica Sm–Nd para caracterizar las áreas fuentes probables de las areniscas del Triásico del Alentejo y Algarve. Estas rocas fueron depositadas en un contexto de rift y se proyectan dentro del campo reciclado, lo que confirma que proceden de un terreno orogénico reciclado. Todas muestran anomalías negativa de Eu, enriquecimiento en LREE y pautas casi planas de HREE, típicas de áreas fuentes situadas en

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