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Inherited arc signature in Ediacaran and Early Cambrian basins of the Ossa-Morena Zone (Iberian Massif, Portugal): Paleogeographic link with European and North African Cadomian correlatives

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Abstract

Geochemical data from clastic rocks of the Ossa-Morena Zone (Iberian Massif) show that the main source for the Ediacaran and the Early Cambrian sediments was a recycled Cadomian magmatic arc along the northern Gondwana margin. The geodynamic scenario for this segment of the Avalonian-Cadomian active margin is considered in terms of three main stages: (1) The 570–540 Ma evolution of an active continental margin evolving oblique collision with accretion of oceanic crust, a continental magmatic arc and the development of related marginal basins; (2) the Ediacaran–Early Cambrian transition (540–520 Ma) coeval with important orogenic magmatism and the formation of transtensional basins with detritus derived from remnants of the magmatic arc; and (3) Gondwana fragmentation with the formation of Early Cambrian (520–510 Ma) shallow-water platforms in transtensional grabens accompanied by rift-related magmatism. These processes are comparable to similar Cadomian successions in other regions of Gondwanan Europe and Northwest Africa. Ediacaran and Early Cambrian basins preserved in the Ossa-Morena Zone (Portugal and Spain), the North Armorican Cadomian Belt (France), the Saxo-Thuringian Zone (Germany), the Western Meseta and the Western High-Atlas (Morocco) share a similar geotectonic evolution, probably situated in the same paleogeographic West African peri-Gondwanan region of the Avalonian-Cadomian active margin.

Keywords: Geochemistry of sediments; Ediacaran; Early Cambrian; Northern Gondwana margin; Cadomian orogeny; Ossa-Morena zone

1. Introduction

The geochemical signature of clastic sediments results mainly from the mineral composition and degree of weathering of the source region of the detritus, as well as the influence of transport, sorting and diagenetic processes associated with the geodynamic setting of a particular basin (e.g. McLennan et al., 1990).

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