ELSEVIER

Tectonophysics 246 (1995) 113–128

TECTONOPHYSICS

The Ibero–Armorican Arc: A collision effect against an irregular continent?

R. Dias, A. Ribeiro

Departamento Geologia, Faculdade Ciências, Universidade de Lisboa, Edifício C2-5° piso, Campo Grande, 1700 Lisboa, Portugal

Received 4 March 1994; accepted 9 November 1994

Abstract

The Ibero–Armorican Arc is the main Variscan macrostructure in western Europe. Although it was recognized in the 1920s, its genesis is still debatable and the proposed models for its generation questionable. However, even if some doubts persist, it seems that most agree on the general geodynamic evolution of this virgation in both branches. In the Middle to Late Devonian, Iberia was deformed by a sinistral transpressive regime, while in the northern branch thrusting events were predominant. In the Carboniferous, a dextral transpression begins to predominate in the Armorican branch, while the southern branch was deformed by southward thrusting. In an attempt to correlate these events, we propose that during the Late Devonian a Cantabrian indentor moved northward, producing the oblique closure of the southern part of the Rheic Ocean and an almost orthogonal closure in central Europe. In the Carboniferous, the collision with the irregular margin of Laurasia induced a rotation of the indentor; the intracontinental deformation was then achieved by dextral transpression in the northern branch and thrusting in the southern one.

1. Introduction

Most of the pre-Mesozoic formations of southern Europe were deformed in the Devonian to Carboniferous, during the Variscan orogeny. This Paleozoic belt can be followed for more than 3000 km, from southern Iberia to northeastern Bohemia. While presenting only a slightly sinuous trend in Central Europe, this belt is highly distorted at its western end, giving rise to the Ibero–Armorican Arc (Fig. 1). Although the continuity between the Iberian and the Central European structures has been recognized since Argand (1924) and Carey (1958), the mechanisms responsible for this arcuate shape are still controversial.

Since the early 1970s, with the advent of the concept of plate tectonics, several geodynamic models have been proposed to explain the evolution of the Variscan belt (e.g., Bard, 1971; Dewey and Burke, 1973; Bard et al., 1980; Lorenz and Nicholls, 1984; Matte, 1986a and Matte, 1986b). The recognition of intense deformation zones underlain by ophiolites and high pressure remnants, has lead to the identification of lithospheric plates. Most of the times, similar conclusions were drawn using palaeomagnetic, geophysical and biostratigraphic data. Although there is a fair agreement about the application of plate tectonics to the Variscan orogeny, the problems began when trying to identify the major oceans active during the Paleozoic, as well as their rela-

SSDI 0040-1951(94)00253-3