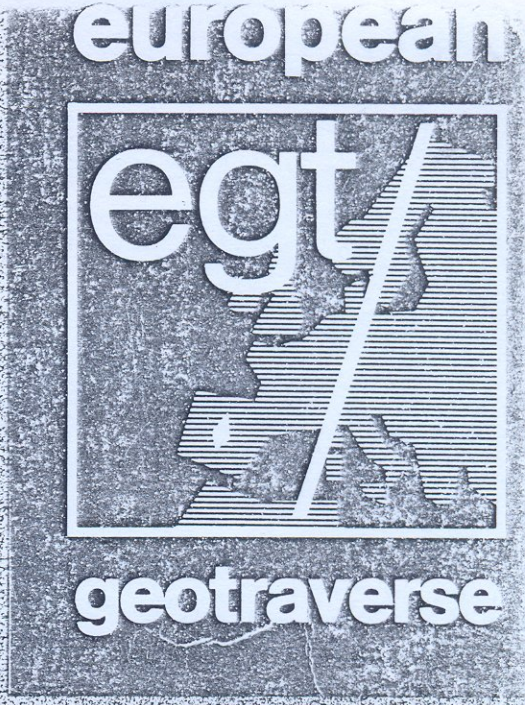

FIFTH EGT WORKSHOP:

THE IBERIAN PENINSULA

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GEODYNAMICS AND DEEP STRUCTURE OF THE VARISCAN FOLD BELT IN IBERIA

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1- Geodynamic evolution of the Iberian segment of the Variscan Fold Belt (Fig. 1).

Based mainly on superficial geology, the Variscan Fold Belt in Iberia has been subdivided in the following terranes (Ribeiro, Quesada and Dallmeyer, 1987): Iberian Terrane, Northern Ophiolite Terrane, Continental Allochthonous Terrane, Southern Ophiolite and Oceanic sequences and South Portuguese Terrane. Taking into account paleomagnetic evidences (Perroud et al, 1984) a geodynamic evolution has been proposed to explain terrane relationships. This evolution can be synthetised as follows: the Armorica Plate is separated from Gondwana by rifting in Cambrian to Silurian times. A southern ocean, Paleothetys, healed in the Southern Ophiolite Terrane, bifurcates towards the North into the main Rheic ocean and the minor Massif Central-Galicia ocean; the Northern Terrane is probably obducted from the last ocean realm. The continental allochthonous terrane derives, probably, from the SW tip of the Continental fragment north of the Massif Central - - Galicia ocean. Closure of Paleothetys starts after Silurian by subduction to ENE below the SW margin of the Iberian Terrane miogeocline, the Ossa-Morena Zone; here, typical calc-alkaline magmatism dominates until lower Carboniferous time, followed diachronously by continental collision (Middle Devonian in N and Lower Devonian in S). So, the polarity of the main subduction is towards the inner part of the Ibero-Armorican arc with production of a tectonic flake. In the outer arc divergent forward thrusting predominates and, in the inner arc, convergent inward back-thrusting is predominant (Ribeiro et al, 1988).

So, superficial geology and geodynamics can provide a geometric and kinematic framework within which surface structure can be extrapolated to lithosphere thicknesses. A model for the deep structure of the Variscan Fold Belt in

Iberia can be proposed, which is the main purpose of the present paper. This model can be tested by geophysical methods (seismic profiling, magnetic and gravity methods).

2- Deep structure of the Iberian segment of the Variscan Fold Belt (Figs. 2,3).

The structure of the Variscan Fold Belt in Iberia is dominated by the presence, in very general terms, of a double vergence giving rise to a general bilateral simmetry. From NE to SW we can recognize inside the Iberian Terrane:

a) Cantabrian Zone (Julivert and Arboleya, 1984; Perez-Estaún et al, 1988) - a tipical thin skinned foreland thrust belt with décollement of Paleozoic cover above a Precambrian basement untouched by the Variscan orogeny.

b) West Asturian Leonese Zone (Bastida et al, 1987) a deeper structural level where the Precambrian basement has been reworked and pervasively deformed by Variscan orogeny. This implies a delamination level inside the crust of this zone, following Bally's terminology (1984).

c) Centro Iberian Zone (Ribeiro et al, in press) - a typical subvertical slate belt; the vergence change along its SW margin; in fact, it is towards the W in the western section, but towards the NE in the eastern section.

On the NW part one can recognize a pile of four main thrust sheets, wich are, from top to bottom: Continental Allochthonous Terrane, Northern Ophiolite Terrane, Lower Allochthonous Thrust Complex with Ossa-Morena affinities and Parautochthonous Thrust Complex with Centro-Iberian affinities.

d) Ossa-Morena Zone (Araújo, in prep.) - the Eastern margin corresponds to a deep flower structure affecting the Precambrian basement along the Cordoba-Badajoz--Portalegre-Tomar shear zone. To the W and SW the SW vergence predominates along a deep thrust belt with Precambrian basement reactivated during Variscan orogeny, with probable delamination at crustal levels.

The SW boundary of the Iberian Terrane marks the suture of the Variscan Fold Belt in Iberia. The Southern Ophiolite Terrane and associated oceanic sequences (Fonseca, in prep.) correspond to an ophiolite suture that evolved to a con-

tinent-continent collision suture: an early phase of northward obduction of Middle Devonian age, is followed by a northward subduction from Middle Devonian to Lower Carboniferous (Munha et al, 1986). In the footwall of this structure one find the South Portuguese Terrane (Silva, 1988), an accretionary prism that gradually evolved to a typical foreland thrust belt, with décollement of Carboniferous and Upper Devonian sediments above an undeformed Pre-Upper Devonian Paleozoic sedimentary sequence resting on a Precambrian basement (Ribeiro & Silva, 1983, Silva et al 1988).

If we try to follow surface structures downwards, space problems arise along the boundary between Sw-vergent and NW-vergents structures (Ribeiro et al, in press).

We proposed (Iglesias, Ribeiro and Ribeiro, 1983) that a flake developed along the Variscan suture zone in the Variscan Fold Belt of Iberia. In the flake model, continued subduction to NE and E, below the Iberian Terrane, can be accompanied by obduction of buoyant allochthonous terranes until complete continental collision closes definitely the Variscan oceans.

The flake model is supported by magnetic evidence (Miranda et al, this meeting) and should be tested and precised by seismic profiling.

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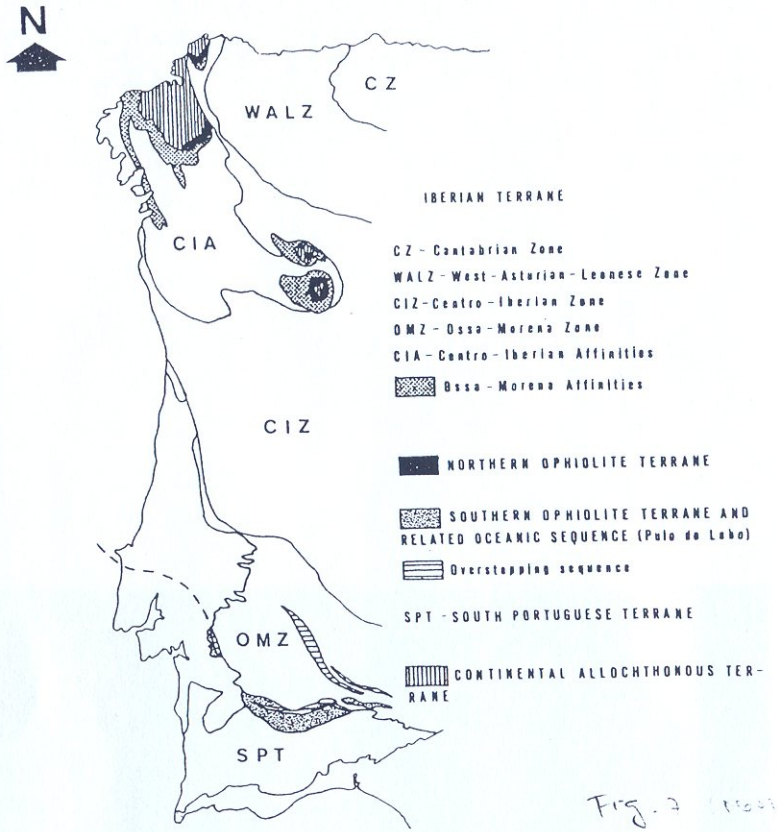
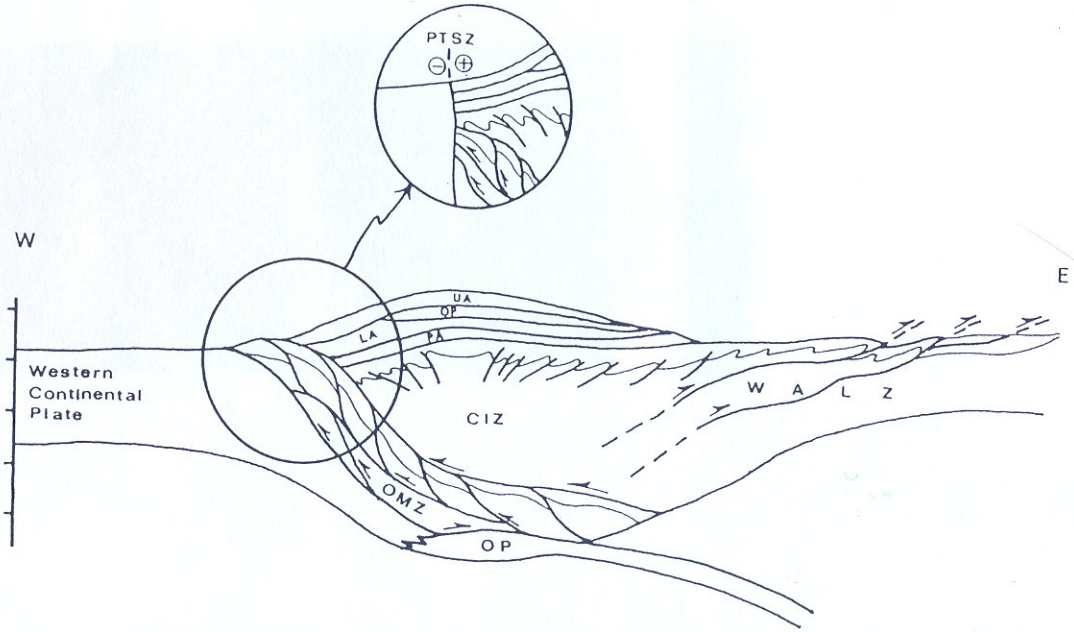


Fig. 1- Variscan terranes in the Iberian Fold Belt.



UA- upper allochthonous
OP- ophiolite
LA- lower allochthonous
PA- parautochthonous

CIZ- Centro-Iberian Zone
WALZ- West-Asturian-Leonese Zone
OMZ- Ossa-Morena Zone
PTSZ- Porto-Tomar shear zone

Fig. 2- Flake model in the north branch of the Iberian Fold Belt.

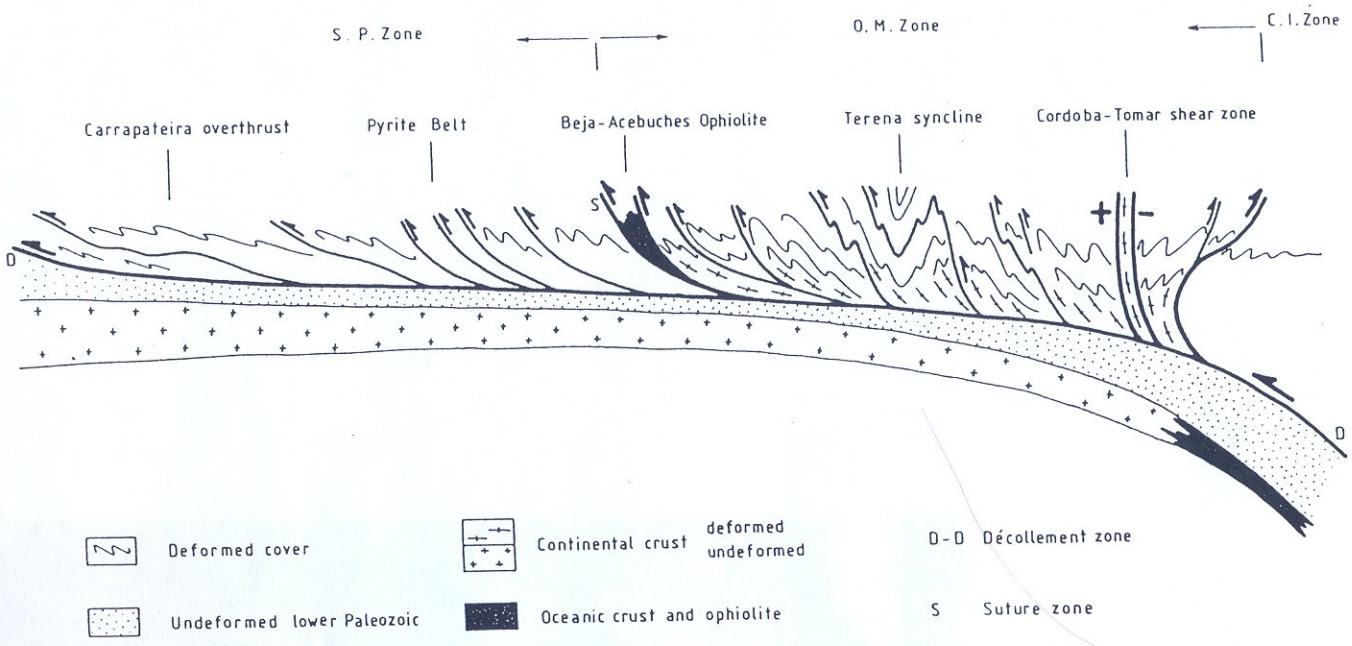


Fig. 3 - Deep structure of the South Portuguese Variscan orogen.