



Number-size distribution invariance of Iberian Cenozoic basins

G. De Vicente (1,2), F.J. Elorza (1,3), A. Olaiz (1,2), D. García-Castellanos (4), A. Muñoz-Martín (1,2), R. Vegas (1,2) and J. Alvarez (1,2)

(1) Laboratorio de Tectonofísica Aplicada, (2) Departamento de Geodinámica. F.C. Geológicas. Universidad Complutense. 28040 Madrid. Spain (+34 913944827 e-mail: gdv@geo.ucm.es), (3) Departamento de Matemática Aplicada. E.T.S.I. Minas. Universidad Politécnica de Madrid. Spain, (4) Instituto Jaume Almera. C.S.I.C. Barcelona. Spain.

The topographic analyses show properties that turn out to be scale invariants. In many cases, they are tectonic setting and age independent. Specifically, the sizes distribution of geographical objects (islands, lakes) adjusts to potential laws like $N=C/r^D$, where D is the fractal dimension. But this type of relations seem to be met also in objects with a more geological character. This way, the relation is known for the earthquake rupture surface and the number of seisms in a certain area and, more recently, for mayor tectonic plates size distribution.

The cenozoic tectonics of the Iberian Peninsula constructed a series of basins and chains, which distribution relates to a series of upper crust and lithosphere folds perpendicular to the tertiary tectonic stress field, very similar to the current one (N-S to NW-SE).

We have used the SRTM data base with a 90 m pixel, to realize an analysis of the sizes distribution of 55 cenozoic basins of the Iberian foreland, with areas between 85.780 km² (Duero - Ebro Basin) and 20 Km², as those of Meirama or Seu d'Urgell (characteristic lengths, $A^{1/2}$, 293 and 4.5 km), finding a fractal dimension of 0.476 in a range between 100 and 20.000 km². Traditionally, geological studies consider two basins (Duero and Ebro) to the Pyrenees foreland basin. Recently the Pyrenean Orogen concept has begun to include the chains that spread western wards from the geographical Pyrenees (Basque ranges- Cantabrian Mountains), up to Galicia. Our sizes adjustments show a better fractal distribution if these two basins are considered

to be a single one, abounding in the idea of considering, to the joint Duero - Ebro, as the Pyrenean foreland basin.