Madrid, 27 October 2015

José López–Gómez
Editor-in-Chief, Journal of Iberian Geology
Universidad Complutense de Madrid, Madrid, Spain

Dear Mr. López–Gómez,

We are pleased to submit the following manuscript:

Strength of the Iberian intraplate lithosphere: Cenozoic deformations and seismicity

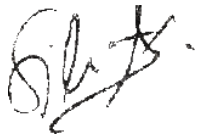
by myself, G. de Vicente, D. Gómez–Ortiz and F.J. Elorza.

The purpose of this paper is to study the lithospheric strength in the centre of the Iberia (Central System mountain range and Duero and Madrid sedimentary basins) by a 2D finite element model. Several studies have addressed this subject (e.g. Tejero & Ruiz, 2002; Gómez–Ortiz *et al*., 2005b; Jiménez–Díaz *et al*., 2012), providing a wide range of values, and even with shallow ductile levels or brittle-ductile transitions that do not totally account for the depth of the intraplate seismicity. The present work reduce the strength estimate uncertainties by constraining the crustal structure (by a density model), modelling a dry upper crust (suggested by Cenozoic deformations), and checking wet/dry mantle, compressional/shear/tensional regimes and strain rates of 10^{-15}–10^{-17} s^{-1}.

The role of strength in the seismicity and Cenozoic evolution is examined. Only a dry mantle under strike-slip/extension and 10^{-15} s^{-1}, or under extension and 10^{-16} s^{-1}, causes a strong lithosphere. The lithospheric strength and the elastic thickness are lower in the mountain chain than in the basins. These strength anisotropies determine the Central System uplift and the biharmonic folding of the Iberian lithosphere during Alpine Orogeny. The seismogenic thickness bounds the seismic activity in the upper-middle crust, and the decreasing crustal strength from Duero Basin to Madrid Basin is related to the parallel increasing Plio–Quaternary deformations and seismicity. However, the deformation due to intraplate stresses from the African–Eurasian convergence is mainly elastic and ductile, resulting in the low seismicity characteristic of the Iberian intraplate.

We hope you will consider it for publication in Journal of Iberian Geology.

Yours sincerely,



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