

Interactive comment on “Transverse jointing in foreland fold-and-thrust belts: a remote sensing analysis in the eastern Pyrenees” by Stefano Tavani et al.

Anonymous Referee #1

Received and published: 2 June 2020

The manuscript entitled "Transverse jointing in foreland fold-and-thrust belts: a remote sensing analysis in the eastern Pyrenees" reports high quality data derived from orthophotos analysis of joints in the Pyrenean Ebro Basin. Joint pattern is then presented in an unparalleled way as it covers basin-scale width, and the role of the foredeep-forebulge onto the upper crust is discussed. Data are clearly presented, some minor information are missing, and the figures are overall of high quality. Putting aside the editorial choice of including this study in a special issue about fluids, fractures and faults while fluids are out of the scope of this manuscript, it still suffer some important points that needs to be adressed. 1) The first one is that the overall interpretation seems heavily model driven. Indeed the E-W fractures are interpreted as forebulge-parallel

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extension, which make sense, but the systematic attribution of the N-S fractures to across strike extension can be argued against: - an alternate interpretation would be to consider the N-S fractures as related to LPS, postponing the E-W, forebulge related fractures, leading to similar patterns than the one described. The occurrence of a NNE-SSW (what is the mean strike of it?) goes well into this alternate scenario, as the Ebro Basin underwent a regional 20° Clockwise rotation during paleogene, as reconstructed by the paleomagnetic data (Parès et al., 1988, Physics of the Earth and Planetary Interiors, Volume 52, Issue 3-4, p. 267-282). This rotation does not seem to have been considered by the authors, and I think this needs addressed. Two important things are missing to back up the interpretation of the authors: relative chronology; and observation and report of systematic occurrence of N-S joints with E-W joints. 2) I would be interested to see reported the length of the fracture tracks for each set, I am sure it could be of interest as well to solve the problem I mentioned in my first comment.

There is also minor remarks: Page 2, line 26-27: "Even in arched systems, the forebulge, the foredeep, and the belt tend to be nearly parallel to each other locally" → can you report related references?

Page 4, line 28-29: "The NE and SE portions of the study area are highly vegetated (Fig. 3d,e) and only a few joint traces have been mapped there." → how does it affect the statistic? Why not leaving these out?

Page 5: Why did you choose these lengths for the triangular mesh? Do you need it to be one order of magnitude longer than the longest fractures? Can you discuss the impact?

Figure 2 C-F: The north is not really clear from this representation.

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-70>, 2020.

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