

Interactive comment on “Geometry of the inverted Cretaceous Chañarcillo Basin based on 2-D gravity and field data. An approach to the structure of the western Central Andes of northern Chile” by F. Martínez et al.

A. M. Casas (Referee)

acasas@unizar.es

Received and published: 18 October 2015

The paper by F. Martínez et al. shows an interesting application of gravimetry to the geometry of inverted basins in the western Central Andes of Chile. The paper shows interesting structural data and provides a new interesting approach to basin inversion geometry. Figures are very explicative and of good quality and the field photographs shown are truly spectacular. Previous works are correctly acknowledged and a thorough, multidisciplinary revision of geological literature about these basins is presented. The geometrical reconstruction of basins is sound, although I am not sure that they

C1223

can be considered as back-arc basins as the authors state (or at least a large-scale sketch would be welcome to show them within this kind tectonic setting). The gravimetric modeling shown in the paper is also consistent, although some uncertainties remain with respect to the in-depth geometry of some parts of the basin (an implicit problem in gravimetric surveys). There are minor changes that could be done to improve the quality of the paper, which I expose in the following points:

Some details about the gravity survey would be welcome, daily drift of the gravity meter, overall estimation of the accuracy of the survey considering corrections, extent to which the topographic correction was applied (only far or also near?), software (if any) used to apply corrections. . .

In my opinion, presentation of gravimetric data should always include the Bouguer anomaly and the considered regional anomaly, showing in a figure how the regional anomaly was calculated (or taken from previous works). This would be useful for possible re-interpretation of anomalies in the future and also for considering larger-scale anomalies related to changes in crustal thickness, which is also interesting in this case, given the length of the profiles and their tectonic setting. In fact, this is not a question of this particular paper since you can find this (in my opinion) important matter lacking in much of the published material.

The difference between densities measured in the laboratory and the ones necessary to fit the gravity models is also an interesting question, that also arises in many works dealing with gravity surveys. Maybe more density measurements could give a more accurate value, but I understand that this can be a difficult task. Besides, heterogeneity of sedimentary units, difficulty in sampling all the lithologies present and, as the authors state, fracturing, can change the actual values to be found at depth.

Minor points

Table 1 gravels instead of grabels Substitute Tertiary by Cenozoic throughout, figures included

C1224

C1225