

Interactive comment on “Non-cylindrical parasitic folding and strain partitioning during the Pan-African Lufilian orogeny in the Chambishi-Nkana Basin, Central African Copperbelt” by Koen Torremans et al.

Anonymous Referee #2

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Review comments on the paper Non-cylindrical parasitic folding and strain partitioning during the Pan-African Lufilian orogeny in the Chambishi-Nkana Basin, Central African Copperbelt. By Koen Torremans, Philippe Muchez and Manuel Sintubin

The paper presents field structural data from a part of a fold belt, exposed by extensive mining operations. These field data provide the base for a model of fold development and strain distribution. According to this model, different types of folds originated during a single deformation episode. Different fold styles and intensities are related to different lithofacies and variations in the mechanical properties of these facies. The

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topic of the paper is clearly relevant for the scope of the journal. Apart from some minor language problems (marked on the file), the paper is well presented. The proposed model appears to be plausible. However, the result of the authors' interpretation of their data does not provide a unique solution. There are a number of different models, which can be envisaged. These models need to be discussed and evaluated, in order to convince the reader, that the authors' model is the best one. For example, the following questions need to be addressed:

• How much of the total strain is represented by the folds? In other fold belts, strain is generally distributed between folds and, e.g., foliation. In particular the argillaceous rocks may take up a shortening of 50% simply by cleavage formation. The mentioned thin sections could be of help and may be used and documented.

• Another factor, which may be considered is (pressure) solution. Some of the field images show examples of veins, which document some kind of remobilization. The authors need to show whether the effect of solution/remobilization processes is important for the fold formation or not.

• According to the conclusive model on Figure 13, all of the field examples are situated at one and the same fold limb. Since the fold is shown as changing northwards, the fold intensity is shown as decreasing northwards. It requires discussion, whether the fold intensity in the north, close to the axial trace of the regional fold, is similarly low. In other words, the authors have to make sure that the fold intensity in the north is not increasing towards the axial trace of the fold. In addition, the influence of the gabbros (as shown on the map, Figure 4) on the strength of the rocks in the northern section has to be discussed.

• Figures 1 and 2 show a regional-scale bending of fold traces. How much does this effect the structural changes in the present area?

• What is the relationship of the presented structures to structures in the underlying basement rocks? Are there indications of re-activation of basement structures?

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Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2018-6/se-2018-6-RC2-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2018-6>, 2018.

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