

Interactive comment on “Multiphase Boudinage: a case study of Amphibolites in Marble in the Naxos Migmatite core” by Simon Virgo et al.

J. M. V. Pamplona (Referee)

jopamp@dct.uminho.pt

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GENERAL COMMENTS The title of manuscript reflects the contents of the paper. The abstract provide a good summary of the manuscript contents. The manuscript represents some contribution to scientific progress (the data and the use of boudinage as a useful tool in structural analysis). The scientific approaches and the applied methods are valid and outlined. The results are discussed in an appropriate and balanced way taking in consideration related work (in a general way includes appropriate references). The scientific results are sufficient to support the interpretations and conclusions. The conclusions are presented in a clear and well-structured way. It is necessary to add new figures and to improve the quality of others figures, namely make some interpretative sketches, because the geometrical relations between the structures (different types

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and generations of boudins) are the nucleus of the paper and the reader cannot have doubts about these (see manuscript specific comments, relatively to these figures).

SPECIFIC COMMENTS

- Page 1, line 35: “new toolbox” →

Why new (maybe you want to say “a useful tool”)? (Please explain)

- Page 5, line 3-5: “If the distance is high enough, very thin amphibolite layers do not boudinage but act as passive deformation marker horizons in the marble”

What means, “the distance is high enough”? Why “layers do not boudinage but act as passive deformation marker horizons in the marble”?

Page 5, Line 17 (add a graph)

- Page 6, line 7: “Their age relationship with the pinch and swell structures is not fully resolved” Asymmetric folds and pinch-and-swell (in the pictures some of these structures seems like shearband boudins) could be cinematically and chronologically related. See, for example, Fig.1 of the following paper: Pamplona J, Rodrigues BC, Fernández C (2014). Folding as a precursor of asymmetric boudinage in shear zones affecting migmatitic terranes. *Geogaceta*, 55: 15-18

- Page 6, line 26: “and hairline veins” I do not understand the reasons why you included these structures in this section (3.6). In my opinion these structures are late extensional veins (nothing more). I suggest the following structure: 3.6 Brittle boudins 3.6.1 Domino boudins 3.6.2 Torn boudins 3.7 Hairline veins

- Page 7, line 1-2: “The length to width ratio (L/W) of this generation can be as low as 1 but more commonly it is in the order of 3-5 and in extreme cases >8.” → Please, cite other authors for comparing results (you could compare graphically your results with other authors – Make a new figure with a graph).

- Page 8, line 8-11 (introduce a new figure: a sketch that shows the relationships

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between all the generations of boudinage).

- Page 9, line 8-10: "General strain conditions with pure shear and a layer parallel simple shear component may have prevailed in the marbles during some deformation stages" Insert references or explain how do you know this.

- Page 9, line 10: "domino boudins occur in both polarities" I do not understand this phrase, because domino boudins only occur in non-coaxial shear! Please explain!

Figures (The comments/corrections of the figures are, also, in the supplement pdf file)

Figure 1: Add to Figure 1, for example in left corner, a country/regional general map for location of Naxos Island. Add the pattern that you have in the geological map to the Tertiary sediments. The granite symbol is hardly visible in the geological map. Use only the color.

Figure 2: Delete figure 2a (this "Geoeye satellite image", it is unnecessary!) Add a legend to the geological map: Rocks Structures Outcrops locations (1-35)

Figure 4.1: This picture had not enough quality. The structures are not visible. Please change or improve the quality of this picture.

Figure 5b: Show in the picture the interference between the two generations of pinch-and-swell boudins (you could make a sketch to help).

TECHNICAL CORRECTIONS

Please, see corrections of the manuscript and figure captions in the supplement pdf file.

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2017-91/se-2017-91-RC3-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2017-91>, 2017.