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Interactive comment on "Kinematics of subduction in the Ibero-Armorican arc constrained by 3D microstructural analysis of garnet and pseudomorphed lawsonite porphyroblasts from Ile de Groix (Variscan belt)" *by* Domingo Aerden et al.

Anonymous Referee #1

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The proposed manuscript presents high-resolution 3D microstructural analysis of inclusion trails in garnet- and pseudomorphed lawsonite porphyroblasts from Ile de Groix high-pressure/low-temperature metamorphic rocks. The premise of the study is commendable and the acquired data are of quality. I have no doubt that a lot of work went into gathering all the presented results.

The goal of this manuscript is clearly important, the considered area is indeed a key-target for understanding the development of subduction zones driving, at leat in part, the evolution of the European Variscan belt.

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Discussion paper

The authors address one of the major questions posed by the analysis of the internal zonesof orogens: The syn-metamorphic structures and micro-structures observed should they be interpreted in terms of progressive deformation, most often non-coaxial uni-direction shearing, or in terms of superposed deformation Âń phases Âż giving rise to fold interference structures ? The authors argue that the Âń emblematic Âż Ile de Groix sheath folds are the result of vertical shortening and horizontal shearing superposed on steeply dipping pre-existing foliations and folds with variable plunges.

Although the method chosen to interpret the observed microstructures (i.e. inclusion trails in porphyroblasts) is still being discussed within the structural geologists community, this manuscript contributes in an interesting, and sometimes somewhat provocative, way to the current stimulating debate on the polarity of variscan subductions. It therefore deserves to be published.

On formal aspects, my main concerns are: - Some sentences are really useless in the proposed manuscript. - The concluding paragraph could be revised to better separate the data obtained from the analysis of the study area and their geodynamic consequences.

On the proposed scientific background, I think it will be really good to go deeper in the description of the relationships between superposed deformation and metamorphic P-T paths of the studied samples in order to enforce the proposed kinematic framework. As regards the way on how to interpret the observed supreposed structures, some interpretations are very little supported by reliable data or observations (i.e. lines 353 and 393- 396).

Attached, the original text with comments and suggestions. Hoping it helps.

Please also note the supplement to this comment:
https://se.copernicus.org/preprints/se-2020-175/se-2020-175-RC1-supplement.pdf

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