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# *Interactive comment on* "An anticlockwise metamorphic P-T path and nappe stacking in the Reisa Nappe Complex in the Scandinavian Caledonides, northern Norway: evidence for weakening of lower continental crust before and during continental collision" *by* Carly Faber et al.

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10. August 2018: Review of manuscript for Solid Earth by Carly Faber and co-authors: An anticlockwise metamorphic P-T path and nappe stacking in the Reisa Nappe Complex in the Scandinavian Caledonides, northern Norway: evidence for weakening of lower continental crust before and during continental collision

I have already commented on an early version of an 'early-version' manuscript (PhD



thesis chapter) from late last year (2017) when Carly Faber submitted and later defended it as part of her PhD at the University of Tromsø. We had a good discussion on a number of issues at the time, and I had a several comments, which as far as I can see (and remember) now have been dealt with in very good manner in this revised and improved version submitted for Solid Earth.

The paper is both well written and is almost without spelling and technical errors, it is an excellent revision from the earlier PhD manuscript. Figures (maps w/structural information and cross-section) and micrographs are well drafted and of good quality, respectively. Diagrams with geochronological results and metamorphic phase petrology modelling (Perplex) are well presented and of good quality. Interpretations of the metamorphic petrology are well supported by the data. There can be little doubt that there was a an Early-Silurian (∼440-438 Ma) high-temperature regional metamorphic event associated with local partial melting and abundant emplacement of mafic and some granitic igneous rocks, which was succeeded by an overall regional pressure increase associated with nappe amalgamation and emplacement.

The title of this paper is therefore well-supported by the data it presents.

In the abstract the term 'northern' Norway is used, this term includes the entire 3-county-region from Trøndelag to North Cape and all of Finnmark. I suggest they replace it with 'northernmost Troms in northern Norway' just to avoid the idea that all of Northern Norway is discussed here.

The regional geology and tectonic setting are also well-presented and the manuscript now also uses the well-established geological information from the Magerøy nappe in the type locality at Magerøya and in its lateral continuations in west Finnmark (Sørøya, Porsanger peninsula, Hjelmsøya) in a better way than the original drafts for the PhD. Correlations between this now discontinuous tectonic unit into the study area in north-easternmost Troms are better constrained.

The paper is well-organized with systematic descriptions of the lithological variations,

petrography, structure and metamorphic petrology of the individual tectonic units discussed. Each unit is well established and documented. Irrespective of future work, this is data that will remain important for any further investigations and tectonic interpretations of the region.

The geochronology and metamorphic petrography- and petrology is well-presented and integrated with the structural observations. This work is now of excellent quality. I have no comments to suggest improvements to this part of the work, and it is obvious to me that this work is now ready for publication in Solid Earth.

In the discussion and conclusion, the authors use the convincingly documented anticlockwise PT-time path during the Scandian assembly of the nappe stack in the study area to discuss large-scale tectonic model(s) that may explain their observations. This is done with care and the different models discussed are well treated. Previous ideas regarding the Kalak Nappe Complex (exotic or not?) are discussed and both models are also considered. Their conclusions are soundly based on the data presented and previous studies.

From this it is clear that the use of references (local both Caledonian and general regarding methods and models) are good. I foound that the Andersen (1981, Structure of the Magerøy nappe) paper referred to in txt is missing from ref-list, and there is a spelling error in ref Engvik et al. 200, Austrheim′s name is with a single r (not a double 'r' as in the list).

In conclusion: I find that this is an excellent and important contribution to the understanding of the Caledonian infrastructure of northernmost Norway and that the paper should be published in 'Solid Earth' as presented by the authors in this manuscript.

Congratulations with the nice work, Torgeir B Andersen

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