

Clim. Past Discuss., referee comment RC1
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Comment on cp-2022-23

Felix Riede (Referee)

Referee comment on "Climatic and societal impacts in Scandinavia following the 536 and 540 CE volcanic double event" by Evelien van Dijk et al., Clim. Past Discuss.,
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The manuscript "Climate and society impacts in Scandinavia following the 536/540 CE volcanic double event" makes a major contribution to our understanding of and recent debate about the climatic perturbations and societal impacts in the 6th century CE. The manuscript is lengthy and ambitious in its attempt to integrate new climate modelling work with terrestrial proxies and archaeological evidence for abandonment and resilience. In a novel and important analytical step, the author team explicitly link the results of their climate models (e.g. temperature and precipitation surfaces) to on-the-ground consequences by linking them to agricultural production via a growing degree model. This conversion allows them to make a very strong case for regional differences in impact (i.e. the magnitude of change away from the optimal conditions) as well as prior vulnerability (i.e. the dependence on sensitive crops or lack of economic buffering) across different regions.

While the paper is already ambitious in its scope, I wonder why - when zooming out - the situation in Norway is only compared to Sweden, especially as the title suggests a pan-Scandinavian perspective. There is ample literature on the societal changes that occurred in Denmark at this time and the climate model data are also interesting in this regard (i.e. any impacts are more likely to be indirect rather than climatically-forced). Some relevant literature is also missing - and here I refer particularly to my own core area of expertise (= archaeology). What is really exciting about the disciplinary coupling in this paper is, however, that the authors could in principle make retrodictions about the vulnerability about specific households or communities based on their preexisting economic and social network positions. I would urge the author therefore not to focus all too much on impacts (= resilience or its lack) but to really highlight how vulnerable these communities already were prior to any disturbance (please see the attached pdf for further information).

In places, the paper would benefit tremendously from a tightening of terminology and language; also a thorough double-checking of technical terms and their spelling for consistency would be good. I have added a number of specific and mostly technical

comments in the attached file.

I greatly look forward to seeing your revised version and the final version in due time.

Please also note the supplement to this comment:

<https://cp.copernicus.org/preprints/cp-2022-23/cp-2022-23-RC1-supplement.pdf>