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The North Atlantic Caledonides: from Iapetus Opening to the Scandian Collision and Beyond

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The North Atlantic Caledonides record a full Wilson cycle including all its phases starting with opening of the Iapetus Ocean, accretion of island arcs and potentially microcontinents, and major collision between Baltica and Laurentia (Gasser et al. 2024). The latter was followed by an orogenic collapse phase giving foundation to future opening of the Atlantic Ocean. Traditionally, it is assumed that the Caledonian Orogeny commenced in the latest Cambrian and terminated in the Early Devonian. However, the Arctic sector of the North Atlantic Caledonides yields evidence for major tectonothermal event peaking in the Late Devonian and lasting until the Mississippian. This event is manifested for example by formation of regionally metamorphosed rocks in greenschist-to-eclogite facies, locally reaching ultrahigh pressure conditions (Gilotti et al. 2024; Kośmińska et al. 2020). All these rocks are thought to have Laurentian ancestry. Hence, the current understanding of the North Atlantic Caledonides is not comprehensive without taking into account the events responsible for formation of the aforementioned rock units within the Laurentian portion of the orogen. Interestingly, this latest phase of the Caledonian Orogeny in the North Atlantic region is contemporaneous with the major phase of the Variscan Orogeny farther south. The question arises whether these two orogenic cycles are indeed separate entities or perhaps they are tightly connected and represent different evolutionary phases of the same superorogenic cycle, eventually leading to the formation of Pangea.

References

Gasser, D., J. Majka, J. Jakob, and C.J. Barnes (2024), A review of the Caledonian Wilson cycle from a North Atlantic perspective, *J. Geol. Soc*. **181**, 3, DOI: 10.1144/jgs2023-211.

Gilotti, J.A., W.C. McClelland, W. Cao, and M.A. Coble (2024), Exhumation of an ultrahigh-pressure slice from the upper plate of the Caledonian orogen—a record from titanite in North-East Greenland, *Tectonics* **43**, 1, e2023TC007810, DOI: 10.1029/2023TC007810.

Kośmińska, K., F.S. Spear, J. Majka, K. Faehnrich, M. Manecki, K. Piepjohn, and W.K. Dallmann (2020), Deciphering late Devonian–early Carboniferous P–T–t path of mylonitized garnet-mica schists from Prins Karls Forland, Svalbard, *J. Metamorph. Geol*. **38**, 5, 471–493, DOI: 10.1111/jmg.12529.

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