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Geometry of the Iapetus Baltoscandian continental margin; evidence for basement highs from the external imbricate zone.

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The geometry of the Iapetus Baltoscandian continental margin prior to Scandinavian Caledonian collision is important, since only with a detailed initial input can synthetic palaeogeographic and deformation models be correctly applied.
The Scandes comprise ∼SE-directed nappes pierced by tectonic windows exposing basement with condensed, post-Gaskiers-glaciation (582-580Ma) cover sequences. Here, evidence, largely from the Lower Allochthon (external imbricate zone), for major displacement of these basement rocks ('Window Allochthon'), is summarized; palaeogeographically they formed a topographic-high along the Baltoscandian continental margin.
In the Oslo Graben and East Finnmark areas (southernmost/northernmost Scandinavia), the transition from (par)-autochthon to allochthon is preserved (Osen-Roa Nappe Complex/Gaissa Thrust Belt; ORNC/GTB). These areas give reliable templates for other parts of the orogen, where the orogen leading edge has been extensively eroded.
In the ORNC and GTB, bulk shortening was ∼50%, with values rising towards the hinterland; metamorphic grades also increase towards the hinterland. Balanced-sections restore the trailing-edges of the ORNC and GTB to Norwegian coastal areas. In Finnmark, restoration places pre-Marinoan (pre∼650 Ma) GTB anchizone-grade rocks above epizone-grade post-Gaskiers rocks lying unconformably on basement in the Komagfjord tectonic window. In southern Norway, restored pre-Gaskiers ORNC rocks overlie Cambro-Ordovician sediments unconformable on basement in the Atnsjøen/Spekedalen windows and WGR. Caledonian Middle Allochthon deformation in Finnmark was SE-directed and in the GTB E- to ESE-directed. In the Komagfjord window basement, Caledonian imbrication was SE-directed, but the overlying basal Middle Allochthon mylonites have an out-of-sequence E-ESE overprint. Thus the Komagfjord basement/cover lies structurally between the Middle and Lower Allochthons. In the Atnsjøen/Spekedalen windows, SE-directed Caledonian greenschist facies stretching lineations underlie SSE-directed very-low metamorphic grade deformation in the restored ORNC. In both sections, restorations place lower metamorphic grades rocks over higher grades. Thus, stratigraphic, structural and metamorphic evidence indicate that the basement rocks in the windows in southernmost and northernmost Scandinavia are fully allochthonous.
Elsewhere, metamorphic data from the Luo-Pakte/Rombak section indicates that the Rombak window basement is allochthonous. Restoration of the Blaik Nappe Complex (LA) in the Central Scandes produces a stratigraphic repetition over cover sediments on basement in the Børgefjellet tectonic window. The basement window rocks are given to be allochthonous. Thus where data is available, an allochthonous model has been applied.
An allochthonous origin for the Window Allochthon is expected, since the lower part of the overlying Middle Allochthon is often dominated by basement, sometimes with massively thick debris-flow deposits requiring a proximal topographic-high source area. A simplified palaeogeographic model for the Iapetus Baltoscandian continental margin, applicable with minor variations to all of the orogen, shows a thin-shelf sequence seen in the Autochthon, which extends for an unknown distance under the nappe pile, and in the Lower Allochthon, passing into a deeper water basin (Lower Allochthon). Outboard, lay a topographic basement high, with a thin cover succession (Window Allochthon). The basement dominated parts of the Middle Allochthon which lay west of the restored Window Allochthon should properly be assigned to the latter. These passed into a deeper basin (Middle Allochthon sediments) which merged with Iapetus oceanic crust.