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Tectonic implications of U-Pb zircon analysis of metasedimentary cover sequences upon basement rocks of the Tornetresk-Lofoten geotransect, North Norway

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The Tornetrask-Lofoten geotransect along latitude 68.5oN exposes the Baltic basement-cover contact for several hundred kilometers across a broad range of orogenic settings. Beginning with the autochthonous boundary in Sweden and progressing westward, it crosses the basal foreland thrust belt, the east-and-west flanks of the external Rombak window, and finally the boundary with the major internal window underlain by the West Troms (WT) and Lofoten-Vesteralen (LV) basement terranes. Caledonian metamorphic conditions in basement-cover units increase from east to west, from unmetamorphosed to the eclogite-facies, as does strain. We report U-Pb LA-ICPMS ages on detrital zircon populations from cover units exposed in each of these orogenic settings. Two samples from the autochthonous/parautochthonous Dividal Group, one from the foreland (Skibotn) and one from the Rombak window (Bjornfjell), yield two distinct zircon age peaks at 2.7Ga and 1.8Ga, which are typical for the Baltic basement in this region. The WT-LV terranes compose a huge (15,000 km2), mostly plutonic, Archaean to Paleoproterozoic basement complex that underlies the stack of east-directed thrust nappes that overrode it during the Caledonian cont-cont collision, wherein the Baltic continental margin was subducted beneath Laurentia. Structurally isolated bodies of deformed metasedimentary rocks have strongly transposed and obscured contacts with surrounding WT-LV plutonic rocks, leaving debatable their significance for tectonic models involving the positions of possible pre-Caledonian microcontinental sutures, the Caledonian A-type subduction zone boundary, and the Iapetan suture between Laurentia and Baltica. We analyzed zircons from 5 different siliciclastic metasedimentary packages tectonically sandwiched by WT-LV basement granite, which are described from east to west. 1) The Storvann Group had previously been interpreted as the kyanite-grade cover to Baltica, and two zircon age peaks at 2.7Ga and 1.8Ga appear to verify this assignment. 2) The Ft. Dietel quartzite at Engeløya has a solitary age peak at c.480 Ma indicating that it contains detritus from an Iapetan (Gampian-Taconic) magmatic arc terrane, likely correlating to the Uppermost Allochthon. 3) The Gullesfjord quartzite (Hinnøya) previously was interpreted as supracrustal enclaves within an Archaean granite pluton, but detrital zircon ages are dominated by 1.1Ga and 1.35Ga ages ($\sim$90%) with minor 1.85Ga, 2.5Ga, and 2.7Ga; the younger zircons, interpreted to reflect Laurentian heritage, are much younger than the LV basement (2.3-1.8 Ga) that lies above and below it. 4) The Andoya quartzite has a solitary 2.7Ga age population indicating it was sourced from Archean-Paleoproterozoic basement (WT) directly underlying it. The most outboard sample, 5) the Leknes Group quartzite, has an age population of 1.0-1.2Ga interpreted to reflect Laurentian heritage. In conclusion, the Storvann and Bjornfjell samples clearly correlate with the Dividal Baltic cover at Skibotn. The Andoya metasedimentary package appears to be the depositional cover to Archean-Paleoproterozoic WT basement, narrowing down its pre-Baltican suture with the Svecofinninan craton south of our study area. The Leknes and Gullesfjord groups are exotic Laurentian terranes and the Fort Dietel quartzite is Iapetan, and we interpret their basal contacts to relate to the Laurentian (above) and Baltican (below) suture.