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A Baltican ancestry of the Liverpool Land eclogite terrane, East Greenland

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The Liverpool Land basement horst, East Greenland, comprises two Caledonian terranes with vastly different tectonomagmatic and metamorphic histories, separated by the composite Gubbedalen shear zone. The upper plate is dominated by the Mesoproterozoic Krummedal Sequence metasediments intruded by the 446 - 438 Ma Hurry Inlet composite pluton and the 424 Ma Hodal-Storefjord monzodiorite, which based on petrography and geochemistry are inferred to have formed in a magmatic arc along the eastern margin of Laurentia. The Liverpool Land eclogite terrane (LLET) in the lower plate consists of orthogneisses formed at 1645-1640 Ma and affected by eclogite facies metamorphism at 400 Ma and anatexis at 388-385 Ma. The occurrence of garnet peridotites is also prominent within this terrane. Amphibolite facies metamorphism associated with exhumation of the LLET dates to ca 385-383 Ma. The main fabric of the Gubbedalen shear zone, formed under amphibolite facies conditions, at ca 385 Ma was overprinted at ca 380 Ma by greenschist facies textures with the same kinematics, testifying to the role of the shear zone in the exhumation of the LLET. The large difference in composition and PT-t history between the two terranes is underlined by the lack of Silurian plutons in the LLET, and the converse lack of indications of Devonian metamorphism in the upper plate. Protolith ages (ca 100 Ma younger than any dated orthogneiss in the East Greenland basement), the timing of HP-metamorphism and the occurrence of garnet peridotites distinguish the LLET from all other known terranes in East Greenland. These observations clearly point to an exotic provenance of the LLET with respect to Laurentia. On the other hand the composition, protolith ages, PT-t path are strikingly similar to those of the Western Gneiss Region in the Scandinavian Caledonides, the conjugate side of the collisional zone. These similarities lead us to propose a Baltican origin for LLET. Amalgamation of LLET to the Laurentian continent, and juxtaposition with the Laurentian Ordovician-Silurian arc terrane occurred in the Mid-Devonian.