Age relations and geochemistry of Precambrian rocks of Shetland

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The Shetland Islands occupy a central position in the North Atlantic region and provide a geological link between widely dispersed fragments of the North Atlantic Craton. The current disposition of geological units in Shetland reflects Caledonian orogenesis that affected previously metamorphosed terranes correlated with the Lewisian, Moine and Dalradian sequences of mainland Scotland, together with the Ordovician Shetland Ophiolite. Major fault structures on Shetland have been correlated with the Moine Thrust and Great Glen Faults of the Scottish highlands.

We have undertaken U-Pb dating to test some of these correlations and to better understand the Precambrian history of Shetland. Our results confirm a late Archaean age for gabbroic and granitic basement gneisses of the North Roe area, previously assigned to the Lewisian. These rocks show little pre-Caledonian disturbance. Gneissic basement inliers east of the Walls Boundary Fault, however, include both units that have returned late Archaean ages, and those that represent more juvenile crustal additions in the Neoproterozoic. These inliers are tectonically intercalated with previously poorly dated meta-sedimentary sequences of the Yell Sound Group and associated intrusive rocks. Our work has indicated that the YSL likely accumulated from detritus sourced from the Grenville-Sveconorwegian orogens, i.e. broadly correlated with the Moine supergroup, and underwent high-grade metamorphism and magmatism ca 970 to 960 Ma ago. Together with the ca 930 to 920 Ma metamorphic event identified previously within the Westing Group on the island of Unst [1], this adds to the regional evidence for post-1000 Ma ‘Renlandian’ tectonism along what was the margin of eastern Laurentia [2,3].

[1] Cutts et al. (2009) *J.Geol.Soc.London,* **166,** 1033-1047. [2] Cawood et al. (2010) *Geology* **38,** 99-102. [3] Cawood et al. (2015) *Bull.Geol.Soc.Am.*, **127,** 349–371.