



Punctuated Caledonian accretion on the fragmented (East Avalonian) Palaeozoic margin of Peri-Gondwana – a record from Anglesey (Ynys Môn), NW Wales, UK

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Late Neoproterozoic accretion at the outboard margin of East Avalonia is recorded on Anglesey in ca. 650 Ma metamorphism in the Coedana Complex, the ca. 615 Ma supra-subduction zone Coedana Granite, and ca. 560 Ma exhumation of the Penmynydd Zone blueschists. However, much of Anglesey's present architecture is a product of accretionary collisions that commenced in the Early Ordovician when coaxial to intensely non-coaxial deformation assembled the Late Neoproterozoic rocks with the Middle Cambrian (to earliest? Ordovician) Monian Supergroup greenschist facies metasediments.

In western Anglesey, the Monian Supergroup rocks record initial (D1) NW-facing coaxial deformation but SE-vergent, strongly non-coaxial, D2/D3 strain reorients the earlier structures after an episode of mafic magmatism. In northern Anglesey, Monian Supergroup rocks record only SE-facing deformation from the onset of collision. Deformed mafic igneous rocks and slices of garnetiferous basement gneiss are located between these structurally distinct regions and suggest separation of the Monian tracts prior to the (earliest-Arenig?) onset of collision. This cycle is contemporaneous with Penobscottian accretion in the northern Appalachians and Newfoundland.

The Monian rocks were at surface (and deeply weathered?) before sub-aerial eruption of the (mid-Arenig?) Church Bay Tuff Formation. The tuffs are overlain unconformably by a Upper Arenig to Llandovery marine transtensional foreland basin succession. Renewed convergence resulted in a SSE-vergent (late-Salinic?) fold and thrust imbricate stack. Locally, thrusts override molasse deposits derived from an advancing thrust sheet and the basal thrust must have been emergent at the foot of an active fault. This theme of active over-riding of tectonic molasse is continued in Anglesey until the Early Devonian at least. The axially sourced fluvial Old Red Sandstone of central eastern Anglesey is arranged in south-vergent folds and thrusts during Acadian deformation.

This fragment of the UK Caledonides is an important trans-Atlantic link to the Appalachian geology of North America. The geology of Ynys Môn serves to remind us of the geometrical complexity of the continental fragments that make up Palaeozoic peri-Gondwana, and of the episodic collision that accompanied punctuated accretion of the orogenic wedge. There is no single key to a solution – only total geology.