Introduction

A broad expanse of Ordovician and Silurian strata underlies the rolling hills of the Southern Uplands, forming a distinctive geological terrane that extends westward across Northern Ireland and into the Irish Republic. The terrane formed as an accretionary thrust complex at the Laurentian continental margin during Late Ordovician to mid Silurian subduction of the Iapetus Ocean. It was built up by a series of southward-propagating, imbricate thrust faults that structurally repeated an oceanic sequence. In the north of the terrane, the older fault-defined tracts consist of a thin basal assemblage of black, graptolitic mudstone (Moffat Shale Group) — in a few places accompanied by chert and basaltic lava (Crawford Group) — overlain by a very much thicker accumulation of turbiditic sandstone (P220190) deposited in a series of huge submarine fans. The turbidite deposits dominate the succession such that thousands of metres of sandstone beds may overlie only a few metres of Moffat Shale Group mudstone. In the south of the terrane, the younger tracts do not contain a basal mudstone unit. Either the floor thrust of the accretionary complex climbed to a higher stratigraphical level, or oceanic mudstone was not deposited in the foreland basin setting that was the likely depositional environment for the younger turbidite successions (P912315).

As the submarine fans built out from the Laurentian continental shelf they encroached onto progressively younger levels of the oceanic sequence that was continually approaching the continental margin as the oceanic plate was subducted. As this happened, sections of the sedimentary package (and occasionally vestiges of the subjacent volcanic rocks) were intermittently stripped from the subducting oceanic plate and thrust beneath the stack of similar stripped-off slices that made up the growing accretionary complex (P912315). Occasionally, oceanic volcanoes were caught up in this process so that in a few places masses of lava are interleaved with the turbidites. Though the accretionary thrusts were originally at a relatively low angle, they were subsequently steepened, partly by the growth of the accretionary complex and partly by subsequent tectonic events, and now appear as near-vertical, major strike faults running from north-east to south-west and separating tracts of steeply inclined and north-east-striking beds (P912325).

Each tract has an internal sense of younging towards the north whereas the minimum age of each tract decreases southwards. Further, the time interval represented by the Moffat Shale Group increases southward through successive tracts showing that the onset of turbiditic sedimentation
occurred progressively later southward (P912326 and P912327). Although the sandstones comprise the vast majority of the succession, those in any one tract are either of the same biostratigraphical age as, or only slightly younger than, the youngest part of the underlying Moffat Shale Group; very close biostratigraphical control is provided by locally abundant graptolite faunas (P912316 and P912317). The Crawford Group may range down to the Arenig whilst the overlying Moffat Shale Group is restricted to the Caradoc in the northern tracts but spans the Caradoc to Llandovery interval in the southern tracts. The age of the turbidite successions follows the top of the Moffat Shale Group in becoming younger southwards: Caradoc and Ashgill in the north of the terrane in the Tappins, Barrhill and Scaur groups, Llandovery (and early Wenlock locally) in the Gala, Ettrick and Hawick groups, and entirely Wenlock in the Riccarton Group which comprises the southernmost tracts.

For over 100 years, the region has been divided, for convenience, into three parts: a Northern Belt, consisting of the Ordovician sandstones (the Leadhills Supergroup — though in its original usage the ‘Northern Belt’ did not include the Tappins Group) with inliers of Moffat Shale Group and Crawford Group; a Central Belt of Llandovery sandstones, again with inliers of Moffat Shale and (rarely) Crawford Group rocks; and a Southern Belt of Wenlock sandstones without inliers of Moffat Shale or Crawford groups. The Northern and Central belts remain useful general concepts, with the boundary recognised as the Orlock Bridge Fault, but with the recognition that Central Belt tracts extend up into the Wenlock, the distinction between it and the Southern Belt has diminished.

Bibliography


Leggett, J K. 1987. The Southern Uplands as an accretionary prism: the importance of analogues in


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