

## Ordovician volcanism in Snowdonia

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During the Lower Palaeozoic, Wales was the site of a basin in which marine sediments, muds, silts and sands accumulated. The basin lay on the edge of a continental plate on the south-eastern side of the Iapetus ocean. In Ordovician times intense volcanic activity, related to the south-eastern subduction of the oceanic plate, shifted temporally and spatially across the basin. In central and north Snowdonia the volcanic rocks, interbedded with main marine sediments, are of Caradoc (Soudleyan-Longvillian) age.

The volcanic rocks dominate the high peaks and ridges and include extensive acidic ash-flow tuffs which have characters of both lavas and pyroclastics. A clear understanding of the process of their eruption and emplacement has only recently been established by observations of pyroclastic eruptions (e.g. Mt Pelee, Mayon, Mt Lamington, Mount St Helens, etc.) and detailed studies of geologically young deposits (e.g. Taupo ash flow tuffs, New Zealand; Badelier Tuff, New Mexico, etc.). These studies have shown that many ash-flow tuffs are produced by the collapse of an eruption column and led to the belief that they are diagnostic of a subaerial environment.

Reconstruction of the volcanic environments of Ordovician age in Snowdonia is made difficult by the folding and faulting of the sequence during the Caledonian (end Silurian - early Devonian) and the associated low grade regional metamorphism which obscures the delicate original fabrics of the volcanic rocks. However, through detailed mapping (British Geological Survey Bangor (106), Snowdon (119) 1:50,000 Sheets) a detailed stratigraphy has been established. Using this stratigraphy, the relationship of the extrusive volcanic rocks to their eruptive centres has been determined and the lateral variation in the ash-flow tuffs distinguished

by detailed microscopic and mesoscopic examination of serial sections along their outcrop. The context of the extrusive volcanic rocks has been established by environmental interpretation of the associated sediments.

Using these techniques, interpretation of the Capel Curig Volcanic Formation has shown that acidic ash-flow tuffs are capable of transgressing from a subaerial environment and that the evolution of the Lower Rhyolitic Tuff Formation was largely controlled by an asymmetric downsag caldera sited close to a Caradocian shoreline.

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