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Major felsic volcanism during the interbasaltic ”quiet period” of the Antrim plateau basalts

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Large Igneous Provinces (LIPs) are among the most spectacular acts on the geological stage and are associated with large volumes of magma over short time periods. The surface expression of such activity, in turn, is controlled by the length, duration and activity of lava effusion vs. volcanic quiet periods in flood basalt fields. However, the general tendency in LIP research has been to quantify the rates and volumes of production of the short-lived flood basalt eruptions, leaving a paucity of information on how evolved magmas are related to the trap forming volcanism. We therefore focus on the felsic/evolved rocks in NE Ireland to unravel the relationship of felsic to basaltic volcanism in this part of the North Atlantic Igneous Province.

The volcanic centres of NW-Ireland; Slieve Gullion, Carlingford, Tardree and the Mournes, have been systematically dated by 40Ar/39Ar. We found that they are of overlapping age within the uncertainties of the method, apart from the Mournes Centre, which is considerably younger. The former group can be chrono-stratigraphically linked to the Interbasaltic Formation (62.6 – 59.6 Ma), a pause in the stratigraphy of the Antrim plateau basalts (Northern Ireland), part of the North Atlantic Igneous Province. The new data contradict the widely held belief that the Slieve Gullion and Carlingford centres formed during and after the final stages of plateau basalt activity. Our new data not only put Slieve Gullion and Carlingford firmly into the interbasaltic period, this new ‘stratigraphic correlation’ puts most felsic volcanic and subvolcanic activity in NE Ireland into this time interval, with the Mournes being the only exception. Localized central-volcano-type felsic magmatism thus prevailed during this interbasaltic ‘period of quiescence’, extending well beyond the preserved basaltic lava fields.