THE MERRIONS TUFF – ITS GENESIS

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The Early Devonian Merrions Tuff is a volcanogenic pulse up to 990 m thick, interrupting the more normal deposition of greywacke-slate sequences of the Hill End Trough. It is a distinctive, competent *structural and stratigraphic datum* for the Trough sequence (Fig. 1). Unfolding suggests that it may have had 1½ times to twice its present areal extent of approximately 1,850 km^2 with the major shortening being in an east-west direction.

The Merrions Tuff consists of *juvenile volcaniclastic aggregates* deposited as *subaqueous mass flows* and similarly regionally extensive porphyries here interpreted to be *subaqueously erupted and emplaced lava.*

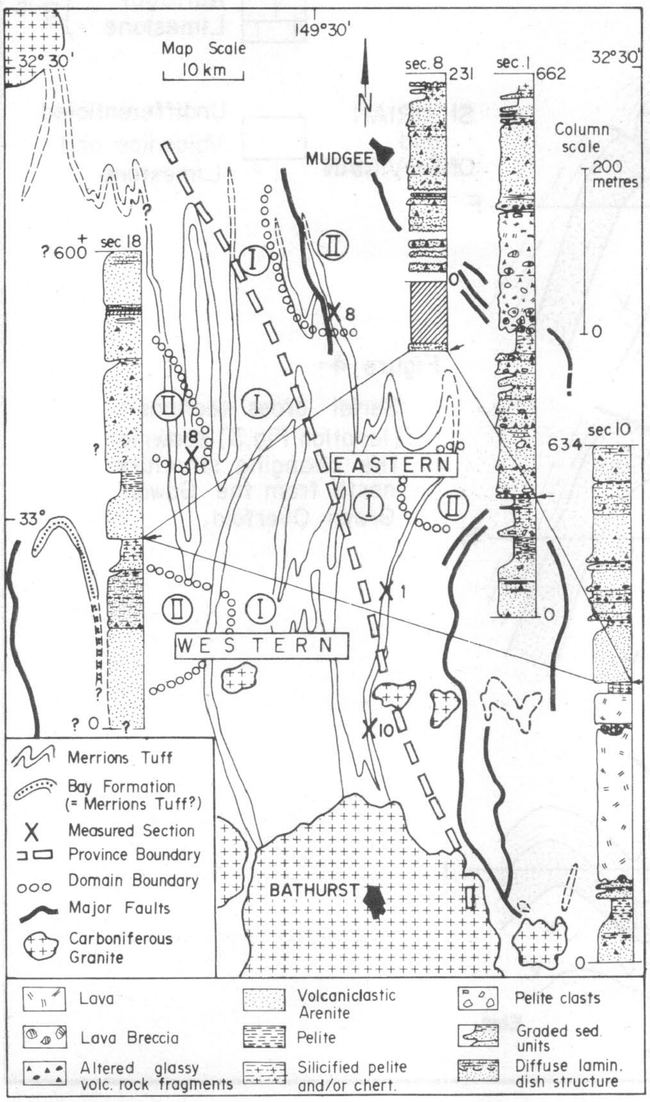

FIGURE 1
Outcrop pattern for the Merrions Tuff. Two main depositional Provinces (the Eastern and Central) are recognized, each of which is subdivided into two Domains (I and II). Representative sections for each Domain are presented. The major time plane within the Formation is shown. Dashed outcrop areas are currently correlated as Merrions Tuff, but little direct evidence exists for these correlations.

Three *lava* units, which together are as volumetrically significant as the volcaniclastic component, are recognizable. They are grossly tabular, but in plan have lobate outlines. They are coherent, sparsely vesicular or amygdaloidal, conformable bodies. Fragmentation occurs only in their tops and bases. It is concluded that the lavas were erupted subaqueously, and that the depth of emplacement may have been about 2 km.

Phenocryst assemblages in the lavas include plagioclase-quartz and plagioclase-quartz-K-felspar. *Chemically* the lavas appear to have been silica intermediate with calc-alkaline affinities.

Sedimentation units, like the Formation as a whole, have a tabular geometry on a regional scale. They have a thick, massive aspect, and show structures indicative of mass emplacement by *highly concentrated sediment flows.* Thin units (up to 2 m) may be continuously graded, indicating that the major transport/grain support mechanism was *turbulent suspension.* The thicker units are either non-graded, graded only near the tops, or display a crude coarse-tail grading near the bases. Other structures include diffuse lamination, outsize clasts, bed amalgamation, minor channelling, and isolated dish structure. The transport/grain support mechanisms in the thicker units are considered to be dominated by *dispersive pressure* with minor contributions from turbulent suspension (more particularly in the upper levels of individual sedimentation units).

Clasts in the volcaniclastic aggregates are volcanic quartz, plagioclase, and variously K-felspar and altered glassy fragments. The similarity between the clast assemblages and phenocryst assemblages in the lavas suggests that the volcaniclastics were derived from a parent magma of similar affinities to those of the lavas.

Regionally the Merrions Tuff can be subdivided into *depositional provinces and domains* (Fig. 1), based on lateral variations in sequence. Lateral variations are controlled by factors including: the inferred presence of several source distribution points for the volcaniclastic component along both the eastern and, to a lesser extent, the western margins of the Trough; ponding generated by eruption of thick lava units on an essentially flat subaqueous palaeotopography; and palaeotopographic lows, particularly along the western margin of the Trough.

MULTIPLE DEFORMATION ASSOCIATED WITH THE WIAGDON FAULT ZONE ALONG THE TURON RIVER, NEAR SOFALA

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