

little previous sorting had taken place. This may include deposition directly from a
083 pyroclastic flow erupted either subaerially or in a shallow subaqueous
environment.

c) Deposition of the volcanoclastic did not initially interrupt the established sedimentation patterns in the basin, as indicated by the continuance of Que River Shale style deposition. This seems to indicate a fairly distal source for the volcanics, at least initially.

d) The change in magmatic style going upsequence indicates the emergence of several different eruptive centres, perhaps located close to the source of deposition.

3.4. Sedimentary petrology and depositional mechanisms

The characteristics of most of the clastic units examined indicate a mass flow mode of deposition. Usually, units display typical mass flow deposit structures, such as normally graded bases of beds, massive zones, and cross bedded tops. In the thick dominantly volcanic units, a mass flow origin seems to be the only realistic option, as the deposits themselves are thick (up to 30m), and structureless. Some internal variation is commonly visible, such as vertical grainsize variation, and variations in the percentage of matrix.

A common texture noted in drill core has been a type of reverse grading at the base of units that overly or were presumed to overly shale units. The base of the coarse overriding unit is commonly enriched in mud sized material, with the percentage of mud material decreasing to zero over a few tens of centimetres. These units may grade directly from shale horizons, or may directly overlie similar volcanoclastic units, and in some cases be erosive into the tops of these units. These features suggest that the flow carrying the volcanic material was in some way eroding and incorporating the underlying material. This is evident in the examples where the bases of these units grade directly into distinct shale horizons. In the cases where there is no immediately underlying shale, but the unit still has a mud enriched base, it suggests that the small layer of mud that was existing previously has been totally eroded. For this type of erosion and incorporation of the material at the base of the flow to occur, the flow would be required to be more expanded than is accepted for typical mass flow deposits, where flow occurs as plug flow along a basal high shear zone (Allen, 1982).

One possible explanation may be that deposition is occurring from flows that are more expanded than is commonly believed. The incorporation and intimate mixing of the shaly material, rather than incorporation of mud as intraclasts suggests that the underlying sediment usually has been somewhat unconsolidated, and that the overriding flow has not been separated from the substrate by a typical basal shear zone.

3.5. "Pyroclastic" textures