**Characteristics and comparison of pyroclastic deposits**

Speaker: Lee Yen-Ching Date: 2013/10/31

**Abstract**

Pyroclastic deposits are commonly defined as “generated by disruption as a direct result of volcanic action”, and admit as much as 25% by volume of epiclastic, organic chemical sedimentary and diagenetic admixtures. In spite of classifying pyroclasts according to size and components, we can’t reconstruct their depositional environments. It is just as we need other viewpoint of them, for example, types of explosive volcanic eruptions. This seminar gives an account of differences between subaerial and submarine eruptions. For subaerial pyroclastics, as examplified by the Plinian eruptions occurred at Somma-Vesuvius Caldera in Italy, the deposits are capped by ashes and pumices for each eruption succession. For phreatomagmatic deposits, which are accumulated in high-energy condition as evidenced by cross-laminated layers, moreover, there are lithic clasts, pumice and breccia mixture beds show reverse grading, caused by dense pyroclastic flows. For normal grading with lithic-rich pyroclastic deposits represent fallout deposits.

AS for Submarine pyroclastic deposits, we take example as Magog group at the southwest Quebec Appalachians in Canada, where we recognize several beds, the bedded tuff and lapilli tuff (BTL), bedded lapilli tuff (BL) and bedded tuff (BT). We separate BTL to upper division and lower division by their contrasting composition and sedimentary structures. We suggest that basal set of lower division being emplace rapidly from one depositional event, which is obviously typical deposit of volcanic debris flows; in upper set, Inverse grading of lapilli-size fragments indicate buoyancy operated within the flow, at the uppermost, crude normal grading stem from limited turbulence. In upper division, ash beds have sedimentary textures that change up-section from ill-defined massive bed to better-defined and normally graded beds overlain by parallel lamination, which indicates deposition by high-to low-concentration turbidity currents. On the whole, we conclude that BTL to be the nonvolcanic turbidities. The BL consists of massive beds with diffuse contacts, some beds are normally graded, and the top is enrich in finer pumice and shards, which is interpreted as subaqueous volcanic debris-flow deposits; the BT, in which the basal beds contain large nonvolcanic mudstone rip-up clasts indicate erosion, and the composition and structure are similar to the upper division of the BTL facies, is ash-turbidite deposits.

Although we point out ambient water influence the deposition of Submarine eruptions, the example of Mineral King metavolcanic rock in the Sierra Nevada, California, emphasize that water would not incorporation with pyroclastic deposits in some cases. The thickness, high velocity, and abundant fine material of the erupted gas-solids mixture prevented water blend into the flow.

Reference

* Schmid, R. (1981). **Descriptive nomenclature and classification of pyroclastic deposits and fragments: recommendations of the IUGS Subcommission on the Systematics of Igneous Rocks.** *Geology*, *9*(1), 41-43.
* Cioni, R., Santacroce, R., & Sbrana, A. (1999). **Pyroclastic deposits as a guide for reconstructing the multi-stage evolution of the Somma-Vesuvius Caldera.***Bulletin of Volcanology*, *61*(4), 207-222.
* Cousineau, P. A. (1994). **Subaqueous pyroclastic deposits in an Ordovician fore-arc basin; an example from the Saint-Victor Formation, Quebec Appalachians, Canada.** *Journal of Sedimentary Research*, *64*(4a), 867-880.
* Kokelaar, P., & Busby, C. (1992). **Subaqueous explosive eruption and welding of pyroclastic deposits.** *Science*, *257*(5067), 196-201.