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Eruptive Sequence of Rinjani Caldera, 13th Century, Lombok, Indonesia

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Rinjani Volcanic Complex located at northern part Lombok Island is centered by a large stratovolcano, Rinjani volcano, which is the volume of 100 km^3 and 3726m high (Nasution et al., 2003). A caldera of 6x8 km in diameter lies western side of the summit formed at mid-13th century (Nasution et al., 2010; Lavigne et al., 2013). Sequence of the caldera forming eruption is reconstructed from original stratigraphy of eruptive deposits and consists of 6 phases with no prominent time interval between them. Phase 1 is a small phreatic eruption produced thin ash fall bed only occurrs proximal of the summit. Phase 2 is large plinian eruption dipersed pumice lapilli to western side and extending to adjacent islands. Pumice lapilli become finer and lithic fragments increase upward in the fall bed. Phase 3 is defined by widely extending pyroclastic flow deposit consists of vaguely bedded unsorted ash with subordinating rounded pumice lapilli. Its thickness varies from several to 50 cm especially thickens local topographic depression and eroding underlying pumice fall bed. This deposit extends more than 50 km from the probable source and reached Gili Island isolated by ocean suggesting extremely dilute pyroclastic flow possibly caused by plinian eruption column collapse from high altitude. Phase 4 is unstable plinian eruption implied by graded pumice lapilli bed intercalated by multiple thin ash beds. Phase 5 is characterized by enormous pyroclastic flow effusion resulting thick and massive pumiceous lapilli tuffs extending more than 30 km from the source. Proximally fines depleted lithic breccia including andesite lavas and minor amount of granodiorite are interbedded with massive pumiceous lapilli tuff. Thickly stratified lapilli tuff beds exposes along the coastline suggest the pyroclastic flow caused the secondary explosions and formed littral cone at the ocean entry. Phase 6 is last plinian eruption dispersed pumice fall of limited extent which is smaller than preceding plinian phases 2 and 4. Petrological analysis shows magma composition changes between phase 3 and 4 suggesting formation of new vent or widening pre-existing vent eventually causes the caldera formation.

Keywords: volcano, caldera, pyroclastic flow, Indonesia, ash, icecore