

**TITLE:** Holocene gravitational collapse and explosive eruption of Mount Popa, Myanmar.

**AUTHORS (FIRST NAME, LAST NAME):** Marina Belousova<sup>1,3</sup>, Alexander Belousov<sup>1,3</sup>, Khin Zaw<sup>2</sup>

**INSTITUTIONS (ALL):** 1. Earth Observatory of Singapore, Singapore, Singapore.  
2. University of Tasmania, Hobart , TAS, Australia.  
3. Institute of Volcanology and Seismology, Petropavlovsk-Kamchatsky, Russian Federation.

**ABSTRACT BODY:** One of the best preserved volcanoes in Myanmar is Mount Popa - a separately standing cone 1518 m a.s.l. The volcano is built on Pliocene sandstones of Arrawaddy Formation. Its complex volcanic edifice is composed of lava flows and domes; the composition ranges from basalts to dacites. Potassium-Argon age obtained from one of the lava flows provided the age  $4.30 \pm 0.55$  Ma (Cumming et al., 2009). However there are questionable reports of possible volcanic activity ~800 BP and 442 BC. The goal of our work was to determine the timing and type of the most recent eruptions of the volcano as well as the origin and age of relatively recent volcanoclastic fan coming out from the crater breach (previously described as lahar or debris flow by Stephenson and Marshall, 1984).

We have determined that major part of the young volcanoclastic fan represents typical debris avalanche deposit ( $S=27$  km<sup>2</sup>,  $V\sim 3$  km<sup>3</sup>,  $H=1.1$  km,  $L= 11$  km,  $H/L=0.1$ ) composed of block facies. The hummocky surface of the avalanche has multiple radial ravines and transverse pressure ridges formed during the avalanche propagation and deposition. In its proximal and NE parts the surface of the fan is smooth, covered by deposit of scoriaceous pyroclastic flow. The contact between the avalanche and the pyroclastic flow indicates no significant depositional time gap. Probably the edifice of Mount Popa was destabilized by intrusion of magma and the collapse triggered explosive eruption. No blast deposit was found in the area, so the collapse scenario was of Shiveluch type. Along its outer boundaries the avalanche scraped and displaced the underlying deposit of Arrawaddy Formation. Under the bulldozed sandstones we found two layers of buried paleosol separated by thin layer of fine-grained ash. Calibrated C<sup>14</sup> ages of the paleosol layers are correspondingly 12820-12650 and 8590-8400 BP. Paleosol on top of the volcanoclastic fan provided a calibrated C<sup>14</sup> age of 2700-2640 BP (analyses by Beta Analytic).

We conclude that the latest period of volcanic activity of Mount Popa took place in the beginning of Holocene. It included several mild explosive eruptions probably of vulcanian type ~ 12700-8500 BP, followed by large scale edifice collapse ~ 8000 BP, then followed (probably immediately) by strong magmatic eruption with deposition of the PF. We have not found evidences of the eruptions ~800 BP and 442 BC; they could be of very small scales, or possibly were misinterpreted non-volcanic events: crater wall collapses, mudflows etc.