



Overview of the 2012-13 basaltic fissure eruption of Tolbachik, Kamchatka, Russia

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On 27 November 2012 a short-lived swarm of shallow (<10 km) earthquakes marked the onset of a new eruption from the Tolbachik volcanic complex, in east-central Kamchatka, Russia. The 3.5-km-long radial eruptive fissure opened on the south flank between 1500-2000 m a.s.l. Lava fountaining from multiple small vents ceased after several days and the eruption continued from vents at the southern end of the fissure. Almost continuous lava fountains up to 200 m high issued from a small lava lake located inside the broad, open crater of the largest cinder cone. While explosive activity was rather mild, initial discharge of lava was very high (up to 400 m³/s) and by the end of December 'a' a lava flows had travelled up to 17 km from the vent. SiO₂ concentrations for the plagioclase-phyric lava were 54 wt.%, but then decreased to 52 wt.%. In January 2013 lava was transported through a system of lava tubes 1 km long and up to 5 m wide. From tube exit points it propagated in the form of channelized lava streams (velocities 1-3 m/s; discharge rates 30-50 m³/s); on lower slopes of the volcano it propagated mostly as 'a' a flows. Lava channels were frequently dammed by floating clinker and accretionary lava balls, which caused flooding of proximal areas by ropy/shelly/slabby pahoehoe lavas. Locally small volumes of lava were extruded through the upper surfaces and lateral levees of 'a' a lava to form very slowly inflating entrail pahoehoe lava lobes. Starting in mid-February the average intensity of the eruption gradually declined, with sporadic bursts in February and April. By May discharge rates of lava had decreased to approximately 15 m³/s and most of lava started to flow as entrail pahoehoe. By the beginning of June the volume of erupted products (dominantly lavas) reached 0.52 km³. The effusion of lava continued until the end of August, when the lava lake in the crater of the active cinder cone became inactive. Weak strombolian outbursts from 1-3 small vents on the bottom of the crater continued until September 5, 2013. Total volume of the erupted products reached approximately 0.7 km³, which is ~0.3 km³ less than estimates for the total eruptive volume from the previous eruption at Tolbachik in 1975-76.