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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. SiO_2 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 0.52km3. 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 $\sim$0.3 km3 less than estimates for the total eruptive volume from the previous eruption at Tolbachik in 1975-76.