Okmok volcano, Aleutian Arc, Alaska, produced five weeks of explosive eruption in July/August 2008 from vents in a 10-km-wide caldera. Water from lakes in the caldera interacted with erupting magma (~56% SiO2) as evidenced by white steam clouds, fine grain size of deposits, and consumption of caldera lakes during eruption. Study of this eruption will improve understanding of hazards from Aleutian phreatomagmatic eruptions.

We logged sections within the caldera and on caldera flanks. Grain-size analysis on samples from 25 sites and tephra componentry on selected samples was carried out. MODIS data show wind directions and plume distributions during eruption. SEM analysis of grain shape and surface features examines variations in water-magma interaction during eruption.

The opening sequence on July 12 produced a 16-km-high column, the eruption’s highest, and emplaced 3 basal units of ash and lapilli on east caldera flanks. Upper units are fine-medium ash with facies including layers of 2-6-mm ash pellets, medium ash laminae interpreted as ‘mud rain’, and very fine ‘ash mist’ deposits. Upper units compose the majority of deposit thicknesses within 5 km of vents but thin more rapidly than basal units and disappear at 15 km from vents. We interpret that excess water in the plume scrubbed fine-medium ash, emplacing ash pellets and ‘mud rain’ in proximal sites, leaving little fine-medium ash to deposit in distal sites. Combining grain-size, grain-shape, and surface feature data may show variations in water-magma ratio during the eruption, which will be compared with ground observations, satellite images, and seismic signal.