

# **Resuspension of Relic Volcanic Ash and Dust from Katmai: Still an Aviation Hazard**

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## **Abstract**

Northwest winds were strong enough to continuously resuspend relic volcanic ash from the Katmai volcano cluster and the Valley of Ten Thousand Smokes on 20–21 September 2003. The ash cloud reached over 1600 m and extended over 230 km into the Gulf of Alaska. Several factors influenced the resuspension of the ash: 1) the atmosphere and land surface were very dry prior to the event, further enabling the resuspension and subsequent atmospheric transport of the relic volcanic ash; 2) the production of winds strong enough to entrain and lift the ash over 1600 m into the atmosphere; 3) the complex terrain with numerous mountains interspersed with valleys, channels, and gaps; 4) the superadiabatic lapse rate for the troposphere below 850 mb; and 5) the presence of a strong subsidence inversion around 1400–1600 m. The authors propose that the strong winds are due to accelerations in a superadiabatic atmosphere below 850 mb that is buoyant to both upward and downward perturbations resulting in a hydraulic flow that exposes the lee side of the mountains to sweeping, high-speed turbulent winds near the base of the lee slope. Some unique features of the ash cloud are also examined, including its hazardous nature to aviation. Finally, this paper provides the forecaster with the ability to 1) recognize the conditions needed for relic volcanic ash resuspension and 2) respond immediately to such an event.

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