

Temperature estimation of volcanic bomb using color of oxidized ash underneath: The August 18, 2000 eruption of Miyakejima

Isoji Miyagi[1], Akihiko Tomiya[2]

[1] GSJ, [2] GSJ, AIST

<http://www.gsj.go.jp/~imiyagi/Works/Event/Miyake2000/>

A hot volcanic bomb can heat underlying ash layer by its residual heat. Heating of volcanic ash under atmospheric oxygen fugacity will result in change in their color from greenish to reddish gray. We heated basaltic volcanic ash (erupted on August 18, 2000, from Miyake-jima summit vent) in electric furnace in the air, and measured their color after heating, and described in the second CIE (1976) color space in terms of L^* , a^* , and b^* values. Heated ash showed a systematic increase in a^* and b^* values with increasing heating temperature. Using this relationship and heat conduction simulation of the bomb, we estimated initial temperature of the Miyakejima bomb to be about 1000 deg-C.