

ASTER application to volcanic survey, Viedma volcano, Andean Austral Volcanic Zone

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Recent active volcanism of the Andean Austral Volcanic Zone (AVZ) has exclusively erupted adakitic andesites and dacites due to slab melting of the Chile ridge subduction system adjacent to the AVZ. In order to understand tectono-magmatic processes of the past and present collision system, it is very important to investigate development of each volcano in the AVZ. However, only a few recent eruption events have been reported in detail from the AVZ due to the vast glaciers covering this area, in addition to lack of transportation accesses.

In this study, we conducted a survey on Viedma volcano, one of five volcanoes (Lautaro, Viedma, Aguilera, Reclus and Monte Burney) in the AVZ using remote sensing techniques. The Viedma volcano is situated at the northeast of the Viedma Lake, and exposes only a part of the older edifice above the surface of the glacier. It is assumed that the latest eruption occurred from a vent submerged by the glacier in 1988 (Killian, 1991). The 1988 eruption generated deposits of ash and pumice on the Patagonian glacier and produced a mud-flow that reached the Viedma Lake. Stern and Killian (1996) have reported bulk-chemical composition of pumice on the surface of the Viedma glacier. However, details of petrologic and geological data from the volcano have not been still obtained.

We focused on the older edifice of the Viedma volcano to understand build-up processes and to deduce compositional variation using data of an optical sensor ASTER (Advanced Spaceborne Thermal Emission and Reflection radiometer). ASTER is highly effective in geological research, which covers a wide spectral region, i.e., three bands in the visible and infrared, six bands in the short wavelength infrared and five bands in the thermal infrared. The volcano edifice is divided into bright part and dark part based on the visible infrared range observation. Creating a stereoscopic image, the form of the volcano in three dimensions was observed. This observation implies that the concaves, considered to be calderas, are likely resulted from the glacier erosion. Using the bands in the visible and thermal infrared region, the SiO₂wt% was calculated. The dark part and the bright part show about 51% and 63% in SiO₂ content respectively, indicating that the Viedma volcano has wide variety of SiO₂wt%, compared to the previous literature (64-66wt% in SiO₂; Stern and Killian, 1996). In this presentation, we will report the results of further image-analysis.