

Visual observation methods of outcropping volcanic structures: application for planetary volcanology

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Accumulation of the remote sensing data in the explorations of the moon and planets makes opportunities for the detailed discussions about the evolution of volcanic structures and eruption mechanisms based on the meso-scale structures outcropping on the surface. It means that the field techniques of outcrop observation on the earth can be applied directly to the explorations of other planets. Application of the field technique of the earth's field survey to the exploration of moon and planets can also highlight more efficient and accurate ways of the observation of the outcrop even in the earth's field works. Here, the author introduces several examples about the technique of the outcrop observation and the problem to obtain information on volcanic evolution and eruptive mechanisms.

The 2000 AD collapse caldera of Miyakejima volcano provides excellent outcrop of the internal structures of volcanic edifice. Because of the steep and high cliff of the outcrop refuses direct access to the outcropping structures, the analysis of the volcanic structures used photogrammetric methods based on the detailed telephotographs taken from the opposite side of the crater. Combining the numerous photographs, a three-dimensional model was reconstructed for the measurement of the size of the targets. Identification of the volcanic structures from photograph is, in some cases, difficult owing to the variation of the visual characteristics depending on the condition of the outcrop (lighting, wetting, dust cover, etc.). Observation of "type outcrop" in various conditions is crucial to cover the range of the variation of the visual characteristics of volcanic structures.

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