

Accepted Manuscript

Understanding volcanic geomorphology from derivatives and wavelet analysis: A case study at Miyakejima Volcano, Izu Islands, Japan

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PII: S0377-0273(17)30238-X

DOI: <https://doi.org/10.1016/j.jvolgeores.2018.02.007>

Reference: VOLGEO 6306

To appear in: *Journal of Volcanology and Geothermal Research*

Received date: 18 April 2017

Revised date: 2 February 2018

Accepted date: 7 February 2018



Please cite this article as: C. Gomez , Understanding volcanic geomorphology from derivatives and wavelet analysis: A case study at Miyakejima Volcano, Izu Islands, Japan. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Volgeo*(2017), <https://doi.org/10.1016/j.jvolgeores.2018.02.007>

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**Understanding Volcanic Geomorphology from Derivatives and Wavelet
Analysis: A case study at Miyakejima Volcano, Izu Islands, Japan**

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Submitted to Journal of Volcanology and Geothermal Research
(April 2017)

Abstract

From feature recognition to multiscale analysis, the human brain do this computation almost instantaneously, but reproducing this process for effective computation is still a challenge. Although it is a growing field in computational geomorphology, there has been only limited investigation of those issues on volcanoes. For the present study, we investigated Miyakejima, a volcanic island in the Izu archipelago, located 200 km south of Tokyo City (Japan). The island has experienced numerous Quaternary and historical eruptions, which have been recorded in details and therefore provide a solid foundation to experiment remote-sensing methods and compare the results to existing data. In the present study, the author examines the use of DEM derivatives and wavelet decomposition 5 m DEM available from the Geographic Authority of Japan was used. It was pre-processed to generate grid data with QGIS. The data was then analyzed with remote sensing techniques and wavelet analysis in ENVI and Matlab. Results have shown that the combination of 'Elevation' with 'Local Data Range Variation' and 'Relief Mapping' as a RGB image composite provides a powerful visual interpretation tool, but the feature separation remains a subjective analysis provided a more appropriate dataset for computer-based analysis and

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