Velocity structure of Merapi volcano, Indonesia derived from spatial autocorrelation method

Wiwit Suryanto (1), Ahmad Ainur Rofiq (1), Ade Anggraini (1), Jean-Philippe Metaxian (2), François Beauducel (3), Agus Budi Santoso (4), and I Gusti Made Agung Nandaka (4)

(1) Universitas Gadjah Mada, Geophysics, Physics, Indonesia (ws@ugm.ac.id), (2) Universite de Savoie, Le Bourget du Lac, France, (3) Institut de Physique du Globe de Paris, France, (4) Balai Penyelelidikan dan Pengembangan Teknologi Kebencanaan Geologi, Yogyakarta, Indonesia

In 2012, a consortium of several research institutions from France coordinated by IRD establishing the DOMER-API project which aims to integrate geophysics, geochemistry, and physical volcanology to model the structure and behavior of the Merapi volcano. The activities are included to characterize the magma storage region to reconcile the previous estimates of the reservoir depth obtained by seismology, deformation, and potential methods. Since October 2013 a total of 46, 3-component broad-band seismometers are operated until April 2015 and installed in around Merapi volcano. We perform a spatial autocorrelation calculations using simultaneous recordings of 27 stations, each used as a reference to generate a Rayleigh wave dispersion curve calculated based on the autocorrelation ratio. The dispersion curve represents the shear wave velocity structure beneath each reference station that can be spatially interpolated into a 3D velocity model below the Merapi. The shear wave velocity varies from 500 m/s near the surface of the volcano edifice and about 3000 m/s at a depth of 10 km. The low shear wave velocity distribution below the summit from the depth of 2 – 6 km from the mean sea level indicates the magma reservoir of Merapi.