

Contour maps of petrological parameters on P-T plane: A case of Nishinoshima volcano, Tokyo Japan

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Contents of this Report:

Nishinoshima is an active volcanic island located (27°14'49"N 140°52'28"E) on the volcanic front of the Izu-Bonin arc. Only the historical eruptive record in Nishinoshima is the activity during 1973-1974 AD produced 0.017 DRE km³ (Nakano, 2013; Sato, 1977). Onset of the current activity was recognized on 20th November 2013 and is continuing at the present time, 5th September, 2014.

In order to prepare for future eruptions in Nishinoshima volcano, we calculate petrological parameters for some representative compositions (Table 1) using the rhyolite MELTS program (Asimow and Ghiorso, 1998; Ghiorso and Sack, 1995; Gualda et al., 2012). Parameters obtained over the range of pressure from atmospheric to 16 k bar with 0.1 k bar step, temperature from 700 to 1400 °C with 1 °C step, oxygen fugacity FMQ, FMQ+1, FMQ+2 log unit, and water concentration 0.1, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 6.0, 8.0, and 10 wt.% H₂O (about 4.7 million of combinations of P, T, H₂O, and fO₂) are summarized into a suite of contour maps on pressure-temperature plane (e.g., Fig. 1) using a PERL script and the GMT program (Wessel and Smith, 1998), and htmlized them cross-linked to develop a convenient tool for volcanology and igneous petrology.

An example of citation:

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Table 1: Composition of the starting materials. All the analytical figures are described in wt.%. Iron concentrations reported separately (Fe₂O₃ and FeO) are summarized as tFeO = 0.9 * Fe₂O₃ + FeO wt.%. 20140603: Nishino-shima scoria 3rd Jun 2014 (courtesy of Captain Haruo Takamine). 1973-74: Nishino-shima ejecta 1973-74 (Umino and Nakano, 2007).

Sample ID	20140603	1973-74
SiO ₂	58.7	58.3
TiO ₂	1.1	1.1
Al ₂ O ₃	15.2	15.1
tFeO	9.27	9.45
MnO	0.2	0.2
MgO	2.2	2.6
CaO	6.1	6.4
Na ₂ O	4.3	4.1
K ₂ O	1.2	1.1
P ₂ O ₅	0.3	0.3
Total	98.57	98.65

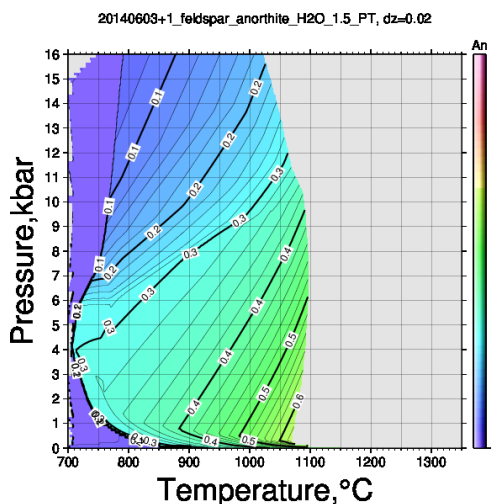


Figure 1: Contour map showing An (mol) in plagioclase for the bulk rock composition 20140603 (Table. 1; this study) and 1.5 wt. % H₂O.

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