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

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Contents of this Report:

Miyakejima volcano is an active stratovolcano located (34°04'55"N 139°31'33"E) on the volcanic front of the Izu-Bonin arc. The activity of Miyakejima volcano in 2000 AD formed a small caldera with approximately 1.7 km in diameter and 0.6 km^3 (Hasegawa et al., 2001) on the place where a former Hatchodaira caldera formed during the 2.5 ka eruption which was believed to be buried by the subsequent eruptions (Tsukui and Suzuki, 1998). In order to prepare for future eruptions in Miyakejima volcano, I report some useful petrological parameters for selected 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 1 atmosphere 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.% H_2O (combination of P, T, H_2O, and fO_2 is about 4.7 million) are summarized into a suite of contour maps on pressure-temperature plane (e.g., Fig. 1) using my PERL script and the GMT program (Wessel and Smith, 1998), and htmlized them cross-linked to develop a convenient tool.

An example of citation:

Miyagi (2014) Contour maps of some useful petrological parameters on Pressure-Temperature plane: A case of Miyakejima volcano, Tokyo Japan. Open-File Report, Geological Survey of Japan, no.593.

Table 1: Composition of the starting materials. All the analytical figures are described in wt.%. Iron concentrations reported separately (Fe_2O_3 and FeO) are summarized as tFeO = 0.9 * Fe_2O_3 + FeO wt.%. #1: Sanbon-dake Isshiki (1960). #2: MI in Olivine Saito et al. (2005). #3: 2000 Submarine M-3 Amma-Miyasaka et al. (2005).

	NI1960 _11 #1	GS2005 _3e1-1 #2	MAM2005 _M3 #3
SiO_2	59.25	50.23	52.1
TiO_2	0.69	1.33	1.42
Al_2O_3	17.40	18.20	14.66
tFeO	7.07	10.33	13.36
MnO	0.21	0.23	0.20
MgO	2.89	3.06	3.95
CaO	7.77	12.46	8.90
Na_2O	3.32	2.71	2.85
K_2O	0.53	0.33	0.58
P_2O_5	0.02	0.07	0.16
Total	95.58	97.46	94.70

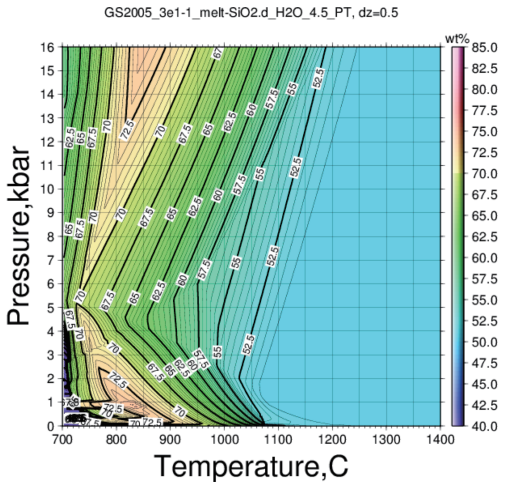

Figure 1: Contour map showing SiO_2 concentration (wt.%) of melt for the bulk composition GS2005_3e-1 (Table. 1; Saito et al. (2005)).

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