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First data on the volatile fluxes from passively degassing volcanoes of the Kuril Island arc

Dmitry Melnikov (1), Nataliya Malik (1), Ilya Chaplygin (2), and Mikhail Zelenski (3)

(1) Institute of volcanology and seismology FEB RAS, Petropavlovsk-Kamchatsky, Russian Federation (dvm@kscnet.ru), (2) Institute of Geology of Ore Deposits, Mineralogy, Petrography and Geochemistry RAS, Moscow, Russian Federation, (3) Institute of Experimental Mineralogy RAS, Chernogolovka, Russian Federation

We report the first data on the volatile fluxes from passively degassing volcanoes of Kuril Island arc in the North-Western Pacific measured in 2015-2016. Four volcanoes: Ebeko on the northern Paramushir Island, Kuntomintar and Pallace on the Central Shishkotan and Ketoy islands, and Kudryavy on the southern Iturup island are representative for the whole Kuril arc as having the largest and strongest fumarolic fields among 40 of the active volcanoes of the arc. The fluxes were measured using scanning DOAS, remote miniDOAS, plume MultiGas and direct sampling techniques using the SO₂ flux from the DOAS data and ratios measured by MultiGas (SO₂/CO₂, SO₂/H₂S, SO₂/H₂O) and direct sampling (SO₂/HCl). For Kudryavy volcano the ratios were applied that have been measured by Taran et al. (1995) and Fischer et al. (1998) using direct sampling. Until now, for Kuril arc only the SO₂ flux from Kudryavy was measured by the COSPEC technique in 1995 by Fischer et al. (1998) with an average SO₂ flux of 75 t/d. Our data give for Kudryavy in October 2016 a value of 340 t/d. The total measured SO₂ flux in 2015-2016 from the passively degassing volcanoes of the Kuril arc is near 1000 t/d. This value is an excellent agreement with the estimation made in Taran (2009) using a comparative plume height technique based on visual observations. Averaged fluxes (in ton/day) of mayor (Range of vent temperatures °C, SO₂, CO₂, H₂O, HCl, total flux) components of volcanic emissions from Kurilian volcanoes in 2016: Ebeko - 97-490 °C, 100 (SO₂), 81 (CO₂), 1120 (H₂O), 17 (HCl), 1319; Kuntomintar - 130-260 °C, 54 (SO₂), 157 (CO₂), 1064 (H₂O), 8 (HCl), 1283; Pallas - 140-720 °C, 450 (SO₂), 78 (CO₂), 3800 (H₂O), 120 (HCl), 4448; Kudryavy - 130-920 °C, 340 (SO₂), 131 (CO₂), 4445 (H₂O), 85 (HCl), 5001. Total (± 20%): 930 (SO₂), 450 (CO₂), 10400 (H₂O), 230 (HCl), 12050 (total flux). This work was supported by grant from the Russian Science Foundation # 15-17-20011.

References: Taran et al. (1995) GCA, 59, 1741-1761; Fischer et al. (1998) EPSL, 160, 81-96; Taran (2009) GCA, 73, 1067-1091