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First Petrologic and Geochemical Data on the 2010 Merapi Eruption (Indonesia)

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Syn-eruptive monitoring of volcanic fluid, pyroclastic and aerosol phases is one of the main approaches to predict explosivity and duration of a current eruptive event. To constrain the fluid source as well as the pre- and syn-eruptive evolution of fluid - magma system of the 2010 Merapi volcano (Indonesia), we investigated the chemistry of pyroclasts and ashes collected on northern and western slopes on 9th November 2010 (originated from 5th to 6th November 2010 ash falls).

The samples have been polished and investigated using a scanning electron microscopes (coupled with the automatic analyzer of particles by the program "Esprit" working in the module "Feature" in GET). Major element compositions were determined by electron microprobe analysis using two CAMECA SX50 equipped with SAMX automation and wavelength-dispersive spectrometer (WDS) in GET and ISTO. The first data demonstrates common presence of quartz (0.2 - 0.3 %), plagioclase (51 - 60%), alkaline feldspar (3 - 5%), olivine (0.02 - 0.2 %), orthopyroxene (1 - 4 %), clinopyroxene (10 - 16%), Fe-Ti oxides (5 - 10%), F-Cl apatite (0.02 - 0.6 %) in all four basaltic andesite ash samples. Regular association of olivine with quartz suggests thermodynamic disequilibrium attributable to magma mixing or/and contamination processes, as already observed at Merapi. Moreover, strong compositional variations of the residual glasses (3 - 9%) in major elements (SiO_2 from 55 to 71 wt% and MgO from 0.2 to 3.3 wt%), minor components (Cl from 0.04 to 0.20 wt%; MnO from 0.01 to 0.3 wt%), and microlites reflect high heterogeneities, likely due to magma mixing processes.