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The viscosity of latitic melts: preliminary results

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The viscosity of silicate liquids is one of the most important parameter controlling the behaviour of magma and the evolution of igneous rocks. Viscosity allows to understand and model magmatic and volcanic processes such as magma generation, ascent of magma, differentiation of magma and volcanic eruptions. The main parameters which govern the viscosity of magmas are bulk composition of the melt and temperature (Bottinga and Weill, 1972; Shaw, 1972; Persikov, 1991; Giordano and Dingwell, 2003), gas bubble content (Lejeune et al., 1999), dissolved volatiles, pressure (Kushiro et al., 1976; Scarfe et al., 1987; Behrens and Schulze, 2003) and dispersed crystals (Lejeune and Richet, 1995; Bouhifd et al., 2004).

Viscosity experiments on latitic melts were made to investigate the mixing-mingling processes interesting Monte Pilato eruption (Aeolian Islands, Italy), which is a rhyolitic eruption characterized by the final emission of an obsidian lava flow (Rocche Rosse, 729 A.D.) containing latitic and trachytic enclaves of different shape and size.

For the first time, the viscosity of a natural latitic melt from Rocche Rosse lava flow was measured in the low viscosity range using the falling sphere method. The H_2O content of the melts ranged from 1.1 to 4.63 wt%. Experiments were carried out in an internally heated gas pressure vessel (IHPV) at 200 and 500 MPa confining pressure and T between 1323 and 1473K. The velocity of Pt spheres was used to measure the melt viscosity. The position of Pt sphere in quenched samples was monitored before and after the experiments using X-ray images.

Here we expose preliminary results. The viscosity decreases with increasing of temperature and H_2O content in the melt, there is no evidence of pressure effect between 200 and 500MPa at 1473K for a melt containing 2.39 wt% H2O. These results added to the viscosity ranges of rhyolites, already known, will be used to model the in-

teraction process between latitic and rhyolitic melts and its role in the Monte Pilato eruption.