

## **Experimental Approaches to Phreatomagmatism**

B Zimanowski (Physikalisch Vulkanologisches Labor, Universitaet Wuerzburg, Pleicherwall 1, D-97070 Wuerzburg, Germany; ph. + 4 9 - 9 3 1 - 3 1 2 3 7 9 ; f a x + 4 9 - 9 3 1 - 3 1 2 3 7 8 ; e-mail:zimano@geologie.uni-wuerzburg.de)

The specific material properties of water and of magma play the major role in the process of magma-water interaction. Phreatomagmatism can range from passive thermal granulation of magma to extremely intensive Thermohydraulic Explosions. Most aspects of magma-water interaction can be studied on a cm to dm scale and thus in the laboratory. Many of these experiments have been carried out using remelted volcanic rocks as magma simulat. This way, the products of experiments are comparable to natural pyroclasts for scaling. Some important results of experimental studies were:

- a) explosion intensity is mainly coupled to the quality of the water-melt premix and can be expressed by the initial interfacial area.
- b) thermohydraulic explosions can occur if a critical initial interfacial area is formed and low energy seismic signals are present.
- c) thermohydraulic explosions are geometrically limited, thus the bandwidths of kinetic energy release is rather narrow.
- d) all types of phreatomagmatic activities can be distinguished from each other by particle analysis.
- e) quantification of the deposits of phreatomagmatic eruptions in combination with particle analysis and experimental scaling allows back-calculation of eruption energy.