Difference between explosive and non-explosive eruption in microlite size distribution

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Microlite crystal size distribution (MCSD) of volcanic rocks provides the new method to understand the transition between eruption styles: explosive and non-explosive. In this study, we compile MCSD data in volcanic rocks (pumice, scoria and lava) from various explosive and non-explosive eruptions. As a result we fond that the MCSDs can be classified into two different types (exponential and power law) corresponding to the eruption style. The exponential distributions are commonly observed in pumices and scoriae from explosive eruptions. On the other hand, the power law distributions are frequently observed in volcanic rocks from non-explosive eruptions. This correlation between a type in MCSD and the eruption style suggest that the microlite nucleation and growth processes and the dynamics of magma ascent in conduit are quite different between the explosive and non-explosive eruptions. We present MCSD from various volcanoes and discuss the origin of the correlation between type of MCSD and eruption style.