



Bubble size distributions and eruption intensity during Phase II of the April-May 2010 Eyjafjallajökull eruption, Iceland

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3-dimensional bubble size distributions in scoria from the relatively quiescent Phase II of the 2010 eruption at Eyjafjallajökull volcano, Iceland, were studied by X-ray microtomography to examine possible relationships between bubble size distributions (BSDs) and eruption intensity. We investigated samples from Phase II of the eruption to see if they contained any precursory indicator of enhanced explosive activity observed during Phase III. We first had to determine if the phreatomagmatic eruptions of Eyjafjallajökull affected bubble size distributions. Comparison between natural scoriae samples and laboratory experiments simulating phreatomagmatic conditions demonstrates no influence of magma-water interaction on BSDs in Phase II eruptive products, implying their control by magmatic processes. The BSDs of the natural scoria display power law exponents of ~ 0.8 , typical for normal Strombolian activity and lower than exponents (~ 1.5) for Vulcanian-type explosions and Plinian eruptions. Through comparison with previous data for Stromboli volcano, our results indicate that Phase II of the Eyjafjallajökull 2010 eruption was being constantly fed by the ascent of deep magma that was mixing with resident magma in a shallow region and that continued activity could be expected. However, the products show no peculiar feature that could herald renewed eruption intensity in the following Phase III of the eruption.