



## **Bubble growth during subplinian events: the Greenish Pumice Eruption of Somma-Vesuvius (Italy).**

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The Greenish Pumice eruption (16020±130 yr BP) is one of the highest magnitude subplinian eruptions of Somma - Vesuvius . The fall deposits show an evident grain size stratification, and are interlayered with the deposits of minor pyroclastic density currents. The juvenile material shows a large textural variability (density, vesicularity and groundmass crystal content) both within each fall bed and along the vertical succession, varying from light pumice to dense scoria. The study of Bubble Size Distribution (BSD) of light and dense material gives some hints for the characterization of the magma ascent process in terms of lateral gradients of ascent velocity and modalities of syneruptive degassing and crystallization (equilibrium or not equilibrium; continuous or multistep). We propose a model in which the most evident difference between light pumice and dense scoria (in terms of density, crystal content, features of the BSD) can be explained as the result of horizontal gradients in the velocity of magma ascent along the conduit. Fast and near continuous exsolution, characterized by continuous bubble nucleation and growth in non-equilibrium conditions, dominated the inner, high velocity portion of the conduit. The time scale of magma ascent was possibly too short for crystallization kinetics, explaining the low groundmass crystallinity and the small size of microlites of light pumice. BSD features of dense scoria suggest that magma from the outer zone of the conduit followed discrete events of bubble nucleation in moderate, non-equilibrium conditions, characterized by a time scale feasible for microlites crystallization and passive, open-system degassing. The variability of BSD and crystal content between lapilli of similar density along the stratigraphic succession reflect the pulsatory behaviour of the eruption.