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Ash erupted during normal activity at Stromboli (Aeolian Islands, Italy) raises questions on how the feeding system works

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Normal activity at Stromboli consists of continuous, non-explosive degassing, punctuated by mild explosions at a frequency of about 13 events/h. Each burst, lasting for a few seconds, throws to heights of 100–300 m incandescent scoriae, ash and blocks made of high-porphyritic (HP) degassed magma. During a multidisciplinary experiments on September 2008, ash samples emitted from 18 distinct explosions were collected with the aim of investigating magmatic and volcanic processes occurring in the conduits during the normal Strombolian activity on the basis of ash characterization. The selected samples are representative of the activity of two different craters (SW and NE) during three distinct days. After sieving, about 30 juvenile fragments (from the 0.5-1 mm size interval) were randomly hand-picked from each sample, and then mounted on double-adhesive tape on a glass slide. Single clasts were examined and photographed at the Scanning Electron Microscope (SEM) for identification of clast types, external morphology description and identification of secondary minerals. The same clasts were embedded in epoxy, sectioned and polished for textural and compositional analysis of the groundmass. Preliminary results indicate that Pele's hairs and fluidal, glassy fragments represent the majority (>50 vol%) of the juvenile material together with dense clasts (<30 vol%) in all the analysed samples, while crystals and lithic clasts are less than 20 vol%. Within the juvenile fraction a minor but significant amount of highly vesicular fragments (< 3 vol%) shows glass composition typical of deep-seated, volatile-rich, low-porphyritic (LP) magma. Until now the emission of the LP magma, as highly vesicular pumice, was associated exclusively with high energy explosions (paroxysms) (Bertagnini et al. 1999, Schiavi et al. 2009). The comparison of the morphological and textural features of these LP ash fragments let exclude that they are clasts recycled after the last paroxysm (15 March 2007). This new finding has important implications on how the feeding system of the volcano works and raises two main questions: i) is this an occasional occurrence or is a normal feature of the persistent activity? and ii) how volatile-rich parcels of deep magma rise through a crystal-rich body without significant mixing ?