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Ramiform aggregates in ash-fall deposits of Late Quaternary rhyolitic eruptions from Acıgol Complex, central Anatolia, Turkey

Orkun Ersoy (1), Erdal Şen (1), Gökhan Atıcı (2), Erkan Aydar (1), İlkan Tatar (3), and H. Hamdi Çelik (3)

(1) Hacettepe University, Geological Engineering, Ankara, Turkey (oersoy@hacettepe.edu.tr), (2) General Directorate of MTA, Dumlupınar Bulvarı No:139 06800 Çankaya/ANKARA, (3) Hacettepe University, Department of Anatomy, Ankara, Turkey

Direct observations have shown that most fine-grained particles fall from volcanic plumes as aggregates (Gilbert and Lane, 1994). For instance, fine-ash particles up to 50 μm fell mainly as aggregates from Vulcanian explosions and co-pyroclastic flow plumes from dome collapses in the eruption of Soufriére Hills Volcano, Montserrat, during the 1995-1999 period (Bonadonna et al., 2002a). Aggregation is a major influence on tephra fallout and on the characteristics of the associated deposits causing premature fallout of fine particles as responsible for polymodal grain-size distributions (Carey and Sigurdsson, 1982; Brazier et al., 1983; Bonadonna et al., 2002a) and anomalous thicknesses of deposits (Carey and Sigurdsson, 1982; Hildreth and Drake, 1992; Bonadonna et al., 2002b). Careful investigation of different types of ash aggregates is important for interpretation of the origin of pyroclastic deposits which can be critically important in hazard assessments (Brown et al., 2010). Therefore, incorporation of ash aggregates into simulations and numerical modelling for hazard assessments are crucial. However, too little is known about the dynamics of aggregation (Gilbert and Lane, 1994; Bonadonna et al., 2002b) therefore detailed studies on ash aggregates may improve the results of modelling and enable interpretations to be made of atmospheric conditions within past eruption plumes (Gilbert and Lane, 1994).

We found a new type aggregate in ash-fall deposits of Late Quaternary rhyolitic explosions from Acigol Complex, Central Anatolia, Turkey. This type of aggregate has not been described previously. They resemble to the cylindrical aggregates which were reported by Scolamacchia et al. (2005) for the first time in the volcanological literature. However, our new type aggregates are in ramiform with branches interconnecting to a main tubular void on the long axis of the aggregates. The main voids have maximum diameter of 1 mm. The branches are tubular voids having diameters smaller than the main void on the long axis of the aggregate. These aggregates are found within 1-4 mm grain size intervals of deposits. The inner structures of aggregates were observed after X-ray tomography imaging. Probably the particles which were the initial nucleus for aggregation are twigs or plant stems. The existence of any carbonaceous material in the main void and grains-size distribution in aggregates will be presented after SEM and X-ray spectroscopy analysis.