Quantify ash aggregation associated to the 26 April 1979 Saint Vincent de la Soufrière eruption

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The 26 April 1979 an eruption occurred at Saint Vincent de la Soufrière volcano, West Indies, generating an extended tephra fallout deposit from the slope of the volcano toward the South of the island. This event was observed and studied by Brazier et al. (1982). This study provided a few tens of field observations that allowed an estimation of the tephra loading map and other observations on volcanological parameters such as eruptive column height, duration and erupted volume. They also provided information related to aggregation that was significant during the eruption. Here, the field observations and the meteorological fields are used in order to reconstruct the tephra dispersal by using the Fall3D model. The main goal is to better quantify the total mass of fine ash that aggregated during the eruption providing important information and constraints on aggregation processes. The preliminary results show that field observations are well captured using the simplified aggregation parameterization proposed by Cornell et al. (1983) whereas accretionary lapilli can be described adding a second aggregate class (with a diameter of 2 mm, a density of 2000 kg/m3 and a sphericity of 1) representing only a few percentage of the total amount of tephra. Such percentage was estimated by an empirical approach best fitting field observation. The simulation that best fit the field observations gives an estimation of the column height of about 12.5 km above the vent, a mass eruption rate of 6.0d+6 kg/s and a total mass of 2.2d+9 kg erupted. To go further we will use these results within the 1-D cross-section averaged eruption column model named FPLUME-1.0 based on the Buoyant Plume Theory (BPT) that considers aggregation processes within the plume.