Dynamic analysis of ash aggregates revealed through HS-HR imaging at Sakurajima volcano (Japan)

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Ash aggregation processes during explosive eruptions can effectively influence volcanic plume dispersal and ash sedimentation. Recently, dedicated experiments have been carried out and numerical models have been developed in order to produce reliable forecasting of the ash dispersals. However, including ash aggregation processes in numerical simulations is to date a problematic task for volcanologists, because of the lack of solid field-based datasets required to scale, validate and calibrate models. A field-based dynamical investigation of ash aggregates collected at Sakurajima (Japan) with a High-Speed, High- Resolution camera is here presented. Three main types of ash aggregates are recognized to occur into all the examined samples (Single Particles, Coated Particles, Cored Clusters). Using image analysis techniques, clusters were characterized in terms of average dimension, grain size and shape features of the aggregating ash, pointing out important differences between the different cluster types. Dynamical analysis of falling aggregates allowed a significant set of measurements of terminal velocity, bulk density, and size of a large number of observed falling aggregates to be collected. The resulting data reveal the strong influence of aggregation processes in controlling ash deposition processes at Sakurajima.