Combining satellite, aerial, and field data to distinguish pyroclastic flow vs. block and ash flow deposits at Mount St. Helens and Shiveluch volcanoes.

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Variations in pyroclastic density current deposit morphology of different flow types provide insight into the late stage transportation and deposition processes. Near-real time field-based studies on pyroclastic deposits are rare due to the fact that they are time-consuming, costly, and very dangerous, all of which can be mitigated through quantitative approaches using remote sensing data. Morphological features of deposits at Shiveluch and Mount St. Helens volcanoes are qualitatively and quantitatively described using a combination of satellite, aerial, and field data to identify characteristics indicative of different eruption mechanisms (column collapse and dome collapse) and source materials (pumice and dense dome rock). Both eruption styles produce unsteady flows that form a range of morphologies including sheet-like deposits, channel and levees, transverse compression ridges, lateral ridges, lobate terminations, and retrogressive stacking of deposit pulses. The sequence of deposition is described with several phases recognized with a general trend in decreasing distance from vent/dome: 1) pulsatory sheet-like deposition; 2) development of distinct lobate deposits; 3) retrogressive stacking of deposits with channel and levee systems; 4) deposit remobilization. Some of these phases repeat throughout the eruption and not all are present in each deposit.The two deposit types are distinguished by distinctive lobe morphologies, such as elongate lobes with distinct, steeper lobe and cleft features (pyroclastic flow) vs. fanning deposits with tapering flow fronts containing numerous small toes (block and ash flow).This comparison of variations in deposit surfaces laterally, with distance from the vent/dome, and throughout the duration of the eruption gives new insight into the development of pyroclastic density current deposits in the final moments of deposition.These deposit surfaces are qualitatively and quantitatively described in outcrop-scale in the field and high-resolution aerial and satellite imagery, evaluating themorphologies for the purpose of characterizing deposits and interpreting late-stage flow behavior.

Include title (as brief as possible), author(s), affiliation(s), first author email and five key words. Main text must not exceed **300** words.

S3.2 **Volcanic mass flows: Observations, experiments, models, hazards.** Conveners: Sylvain Charbonnier, University of South Florida, USA, sylvain@usf.edu Eliza Calder, The University of Edinburgh, Scotland, eliza.calder@ed.ac.uk Lucia Capra, UNAM, México, lcapra69@gmail.com

Volcanic mass flows include pyroclastic density currents, lahars, debris avalanches and lava flows, all of which may have devastating consequences for local communities and the economy, transport and the natural environment. Interest in the hazards associated with the emplacement of volcanic mass flows is justified by both the complex physics they involve and by their dangerous nature. **Traditional field-based techniques** for studying these hazardous phenomenon are crucial to both improve our knowledge of their transport and deposition processes and **collect datasets of the sources, extents, lateral variations and impacts of their deposits**. Moreover, recent progress with analogue, analytical and numerical models has offered noteworthy insights into the fundamental dynamics of volcanic mass flows. The integration of results and constraints from field-derived data, laboratory experiments and numerical modeling is one of the main challenges for future research into the dynamics of volcanic flows. A combination of these different techniques is vital for an accurate characterization of areas prone to such flows and their associated hazard levels, thereby reducing their future impact and risk. We invite contributions from all those involved in field-based, experimental, theoretical, numerical and related hazard studies of volcanic flows. This session aims to draw together various contributions in order to highlight new approaches, methodologies and results.