

Extracting lava velocity and rheology from computer-vision analysis lava flow videos

Einat Lev¹

¹*Lamont-Doherty Earth Observatory, Columbia University, New York, NY, USA*

Keywords: *fluid dynamics; lava flows; image analysis; lava rheology; volcanoes*

Effusive lava flows present a considerable hazard to property and infrastructure. It is therefore important to understand the processes controlling lava flow advance and channelization, of which lava rheology is among the most important factors. Unfortunately, to this time, in-situ measurements of lava velocities are sparse in both time and location. To advance our understanding of lava flow emplacement, we utilize techniques adopted from computer vision and image processing and extract surface velocities of flowing lavas. We analyze image sequences obtained from every-day videos. Thanks to the high density of the velocity field, we are able to calculate cross-channel velocity profiles, and to invert for the first-order characteristics of lava rheology. In addition, the techniques we use can be also used for studying the motion of glaciers, landslides, and pyroclastic flows, even if the only available footage is not ideal.