



The 1980 Mount St. Helens photo sequence analyzed by sub-pixel digital image correlation

Thomas R. Walter

GFZ Potsdam, 2.1, Potsdam, Germany (twalter@gfz-potsdam.de)

The so-called Rosenquist photo sequence, taken by photographer Gary Rosenquist during the 1980 Mount St Helens eruption, allowed investigation of the first seconds of the flank collapse and lateral blast at high detail. The same data set I now used, digitized and processed by modern processing methods. Herein I present first results of a digital image correlation technique commonly applied to study textured objects. The images, i.e. textured objects, are transformed into the frequency domain using a fast Fourier transform. Correlation functions are calculated in the frequency domain allow transformation parameters to be estimated. To achieve sub-pixel accuracy I employ correlation algorithms based on B-Splines gray value interpolation. The image correlation technique finally provides the displacement field for the first seconds of the Mount St Helens collapse. I show localizations of shear zones, development of fault planes and a more complex evolution of the structural architecture of the 1980 St Helens lateral slide.