



Space-weighted function imaging of Mount St Helens volcano

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Mount St Helens (MSH) is a stratovolcano of the Cascadia volcanic arc, and is one of the most active in the United States. The present morphology is mainly due to the destructive eruption of 18 May 1980, triggered by a five-magnitude earthquake that caused the collapse of a vast sector of the northern part of the volcano. Recent research found a correlation between the geological features on the surface and the seismic imaging using passive seismicity. In particular, the debris flow related to the 1980's eruption is well defined as a high-attenuation area in seismic images.

In this study, we use space-weighted functions to obtain a new coda wave attenuation image of the volcano. At first, we calculated the values of Q_s and Q_i (scattering loss and intrinsic absorption quality factors, respectively) of the area, through the Multi Lapse Time Windows Analysis. The results showed a scattering predominance in the area, and were used as input for the multi-dimensional and time-dependent imaging of the Mount St Helens area. The new analysis increases lateral illumination, compared to the standard Q_c imaging, bringing to a better understanding of the volcanic structures, their relationship with active tectonics and geomorphology.