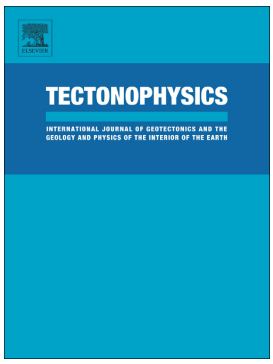

The influence of tectonic environment on dynamic earthquake triggering: A review and case study on Alaskan volcanoes

Stephanie G. Prejean, David P. Hill

PII: S0040-1951(18)30285-3
DOI: doi:10.1016/j.tecto.2018.08.007
Reference: TECTO 127910

To appear in: *Tectonophysics*

Received date: 7 June 2017
Revised date: 9 August 2018
Accepted date: 11 August 2018

Please cite this article as: Stephanie G. Prejean, David P. Hill , The influence of tectonic environment on dynamic earthquake triggering: A review and case study on Alaskan volcanoes. Tecto (2018), doi:10.1016/j.tecto.2018.08.007

The Influence of Tectonic Environment on Dynamic Earthquake Triggering: A Review and Case Study on Alaskan Volcanoes

Stephanie G. Prejean[1*] and David P. Hill[2]

1. USGS Volcano Science Center and USGS/USAID Volcano Disaster Assistance Program, Anchorage, Alaska, USA; sprejean@usgs.gov
2. USGS Volcano Science Center, Menlo Park, California, USA; hill@usgs.gov
* corresponding author

Abstract

The phenomenon of dynamic earthquake triggering, when seismic waves from an earthquake trigger seismicity at distant sites, has been recognized for over 25 years, yet knowledge of the global distribution of dynamic triggering remains far from complete. Because occurrences of dynamic triggering provide in-situ information of the stress-state of a responding site, a more complete global picture of susceptible crustal environments becomes an important component of seismic hazard evaluations. Here we 1) review evidence for tectonic regime dependence of dynamic triggering susceptibility in the shallow brittle crust, and 2) explore triggering susceptibility at Alaskan volcanoes. We search for significant increases in seismicity rates at 19 Alaskan volcanic areas between 2006 to 2013 within 3 days following regional and teleseismic earthquakes of magnitude 7 and greater. We find evidence for 12 triggered responses at 9 volcanoes, but no evidence for triggered responses following hundreds of other earthquakes. The most impressive response was that of Pavlof Volcano to the 2011 M_W 9.0 Tohoku-Oki earthquake. Our results suggest that triggered responses are difficult to predict, as they do not depend on background seismicity rates or amplitude of incident seismic waves from distant earthquakes. Taken together, observational and theoretical evidence suggests that dynamic triggering occurs in all tectonic environments. So far however, it appears to be more common in extensional and transtensional environments and regions with high pore-fluid pressure than in compressional and transpressional environments. Although some volcanic and geothermal areas may be primed for dynamic earthquake