A first hazard analysis of the Harrat Ash Shamah volcanic field, Syria-Jordan Borderline

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The northernmost part of the Saudi Cenozoic Volcanic Fields, the 100,000 km2 Harrat Ash Shamah has hosted some of the most recent volcanic eruptions along the Syria-Jordan borderline. With rapid growth of the cities in this region, exposure to any potential renewed volcanism increased considerably. We present here a first-order probabilistic hazard analysis related to new vent formation and subsequent lava flow from Harrat Ash Shamah. The 733 visible eruption vent sites were utilized to develop a probability density function for new eruption sites using Gaussian kernel smoothing. This revealed a NNW striking zone of high spatial hazard surrounding the cities Amman and Irbid in Jordan. The temporal eruption recurrence rate is estimated to be approximately one vent per 3500 years, but the temporal record of the field is so poorly constrained that the lower and upper bounds for the recurrence interval are 17,700 yrs and 70 yrs, respectively. A Poisson temporal model is employed within the scope of this study. In order to treat the uncertainties associated with the spatio-temporal models as well as size of the area affected by the lava flow, the logic tree approach is adopted. For the Syria-Jordan borderline, the spatial variation of volcanic hazard is computed as well as uncertainty associated with these estimates.