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Assessment of post-seismic landslide susceptibility using an index representative of seismic cracks

Mio Kasai¹ and Shui Yamaguchi²

¹Research Faculty of Agriculture, Hokkaido University, Sapporo, Japan

²Graduate School of Agriculture, Hokkaido University, Sapporo, Japan

In an area experienced a strong earthquake, the formation of clusters of seismic cracks is considered related to susceptibility to post-seismic slides. However, the relationship between crack distribution and the occurrence of post-seismic slides has rarely been evaluated. This study developed an index representing the spatial density of seismic cracks (dense crack index: DCI) for the area where post-seismic slides were identified after the 2016 Kumamoto earthquake (Mw 7.0). The susceptibility of post-seismic slides was then assessed using models that incorporated the weight of evidence (WoE) and random forest (RF) methods, with the DCI as a conditioning factor. Both the models confirmed the importance of the DCI, although the improvement in model performance as indicated by area under the curve values was marginal or negligible by including the index. This was largely because the combination of features that indicated where open cracks were likely to occur, or ridgelines where seismic waves were prone to be amplified, could compensate for the absence of the index. The contribution of the DCI could be improved if more accurate LiDAR data were used in the analysis.