USE OF ACTIVE AND INACTIVE LANDSLIDE FOR SPATIAL LANDSLIDE HAZARD MODELING

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In spatial landslide hazard/risk modeling, when both active and inactive landslides have been observed in a study area, how to use both active and inactive landslides in modeling is an important and crucial problem. Most active landslides have been re-activated from the ŞoldŤ inactive landslides. In general, it is understood that the active landslides are landslides with a lower trigger threshold, whereas current inactive landslides need higher impact/trigger mechanism to be reactivated. It suggests that the topographical and geomorphological characteristics of active and inactive landslides are similar but the difference is the trigger threshold.

The study area near Bonn, Germany consists of 1,074,440 pixels with each pixel covering 10m x 10m (107.444 km2) and it contains 23 active and 45 inactive landslides. In an earlier study, it has been established that all Bonn landslides were triggered by earthquakes and the recent active landslides were reactivated by rainfall/soil moisture. In the study area, only bedrock geological map and three topographical properties, slope angles, aspect angles and elevations were currently available for geomorphological and topographical characterizations the landslides. We have analyzed the topographical and geomorphological characteristics of active and inactive landslides separately and the initial results will be presented in this contribution.

In addition, we have also constructed a landslide hazard prediction map using the scars of the 23 active landslides based on geomorphological and topographical characterizations of the landslides. The portions of the 45 inactive landslides overlapping with the areas calculated as hazardous by the active landslides were predicted to be reactivated with the similar trigger threshold as 23 active landslides. In order to provide a measurement of the uncertainty/reliability of the prediction, we have

carried out a cross-validation technique by splitting the 23 active landslides into two groups, Şmodeling groupŤ and Şvalidation group.Ť The statistics obtained from the cross-validation procedure provide the quantitative measures to estimate the uncertainty/reliability of the prediction. Using the measures of the uncertainty/reliability, the levels of the contribution of active and inactive landslides have provided to the spatial landslide hazard/risk modeling.