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A hybrid hydrologically complemented warning model for shallow landslides induced by extreme rainfall in Korean Mountain

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This study uses a physically based approach to evaluate the factor of safety of the hillslope for different hydrological conditions, in Mt Umyeon, south of Seoul. The hydrological conditions were determined using intensity and duration of whole Korea of known landslide inventory data. Quantile regression statistical method was used to ascertain different probability warning levels on the basis of rainfall thresholds. Physically based models are easily interpreted and have high predictive capabilities but rely on spatially explicit and accurate parameterization, which is commonly not possible. Statistical probabilistic methods can include other causative factors which influence the slope stability such as forest, soil and geology, but rely on good landslide inventories of the site. In this study a hybrid approach has described that combines the physically-based landslide susceptibility for different hydrological conditions. A presence-only based maximum entropy model was used to hybrid and analyze relation of landslide with conditioning factors. About 80% of the landslides were listed among the unstable sites identified in the proposed model, thereby presenting its effectiveness and accuracy in determining unstable areas and areas that require evacuation. These cumulative rainfall thresholds provide a valuable reference to guide disaster prevention authorities in the issuance of warning levels with the ability to reduce losses and save lives.