

Spatially Distributed Rainfall Prediction Based on Automated Kriging for Landslide Early Warning Systems

Authors : Ekrem Canli, Thomas Glade

Abstract : The precise prediction of rainfall in space and time is a key element to most landslide early warning systems. Unfortunately, the spatial variability of rainfall in many early warning applications is often disregarded. A common simplification is to use uniformly distributed rainfall to characterize aerial rainfall intensity. With spatially differentiated rainfall information, real-time comparison with rainfall thresholds or the implementation in process-based approaches might form the basis for improved landslide warnings. This study suggests an automated workflow from the hourly, web-based collection of rain gauge data to the generation of spatially differentiated rainfall predictions based on kriging. Because the application of kriging is usually a labor intensive task, a simplified and consequently automated variogram modeling procedure was applied to up-to-date rainfall data. The entire workflow was carried out purely with open source technology. Validation results, albeit promising, pointed out the challenges that are involved in pure distance based, automated geostatistical interpolation techniques for ever-changing environmental phenomena over short temporal and spatial extent.

Keywords : kriging, landslide early warning system, spatial rainfall prediction, variogram modelling, web scraping

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