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A prototype flash flood and debris flow early warning system for areas recently burned by wildfire in southern California

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Flash floods and debris flows are common following wildfires in southern California. On Christmas Day 2003, sixteen people were swept to their deaths by debris flows generated from basins burned the previous fall. In an effort to reduce loss of life by floods and debris flows, the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) and the United States Geological Survey (USGS) established a prototype flash flood and debris flow early warning system for recently burned areas in an eight-county area of southern California. This prototype project builds on the NWS Flash Flood Monitoring and Prediction (FFMP) system and USGS rainfall intensity-duration thresholds. These thresholds are defined for debris flows and flash floods that occur in response to the first few storms to impact a recently burned area, and following a year of vegetative recovery. The FFMP was modified to identify when both flash floods and debris flows are likely to occur based on comparisons between precipitation (including radar estimates, in situ measurements, and short-term forecasts) and the rainfall intensity-duration thresholds developed specifically for burned areas. The FFMP provides a cost-effective and efficient approach to implement a warning system on a 24-hour, 7-day-a-week basis. Advisory outlooks, watches, and warnings are disseminated to emergency management personnel through NOAA's Advanced Weather Information Processing System (AWIPS). In addition to operating the prototype system, an area within the southern California

study area is dedicated to intense instrumentation and research to develop new geologic, hydrologic, and hydrometeorologic methods for precipitation and debris-flow forecasting, measurement, and analysis techniques. Although the potential exists for enhancing and expanding the warning system to provide spatially and temporally explicit information on debris-flow hazards, significant financial resources and scientific advancements are necessary to realize this potential.