UJNR Panel on Wind and Seismic Effects

Panel Update

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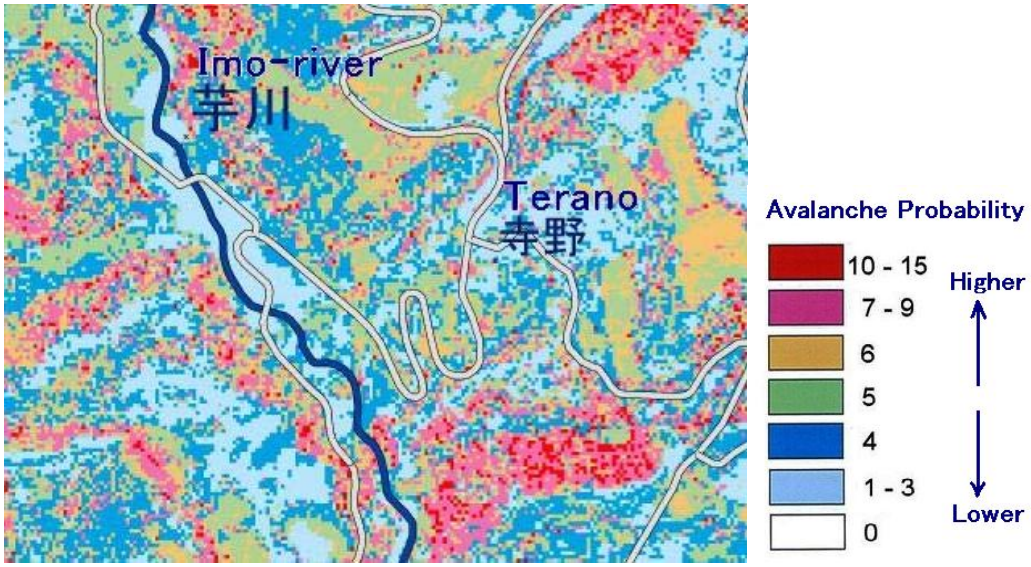
GEO-INFORMATION FOR SNOW AVALANCHE HAZARD FOR THE DAMAGED AREA BY THE MID NIIGATA-PREFECTURE EARTHQUAKES IN 2004

Japan's Geographical Survey Institute (GSI) produces the geo-information for snow avalanche hazards in the catchment area of the Imo-river, which was the principal damaged area by the Mid Niigata-prefecture Earthquakes in 2004. This information is composed of the grid map on the avalanche probability (see Figure below) and the landform classification map on the avalanche. The avalanche probability of each grid is classified from the total of scores from the surveyed data; (1) inclination angle of slope, (2) depth of snow-fall, (3) land-cover (woodland, grassland, bare land, etc.), and (4) typical avalanche-prone landform.



Grid Map of the Avalanche Probability

Inclination angel of slope is calculated from the digital elevation model that was surveyed by air-borne laser scanner (LiDAR). Depth of snow-fall is estimated from the surveyed data for the periods in December 2004 and February 2005. Land-cover is classified by the interpretation of aerial–photograph which was taken just after the earthquake. Typical avalanche-prone landform is also interrelated with the aerial-photos, a standard method of geomorphological investigation.

GSI provides such map information to all local governments in the area, for the improvement of the avalanche warning.

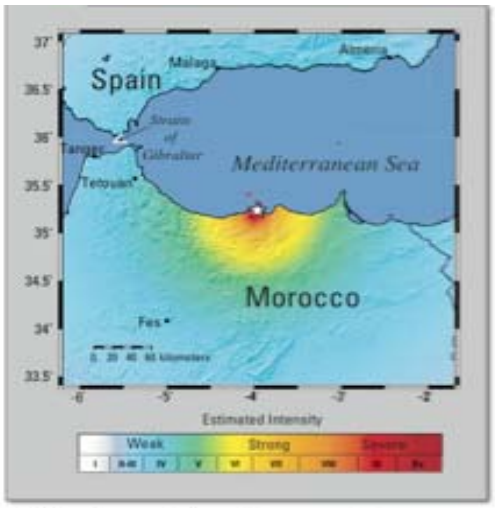
Contact: Dr. Masaharu TSUZAWA, Director, Geodetic Observation Center, Geographical Survey Institute (GSI), tsuzawa@gsi.go.jp

RESPONDING TO GLOBAL EARTHQUAKE HAZARDS: RAPIDLY ESTIMATING THE IMPACT OF AN EARTHQUAKE

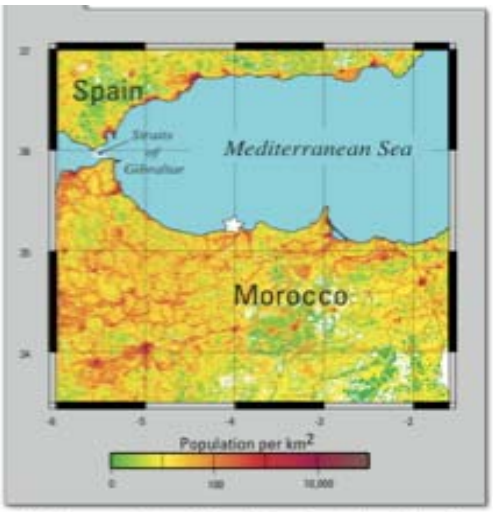
PAGER (Prompt Assessment of Global Earthquakes for Response) is an automated alarm system under development by the US Geological Survey (USGS) to rapidly and accurately assess the severity of damage caused by an earthquake, and to alert emergency responders, government agencies, and the media to the scope of the potential catastrophe. USGS' National Earthquake Information Center (NEIC) annually reports more than 30,000 earthquakes. Tragically, on average, 25 of the earthquakes cause significant damage, injuries, or deaths. USGS often detects these quakes well before eyewitness reports are available and must decide rapidly if Federal and international agencies should be alerted to a potentially damaging event. Currently, USGS relies primarily on the experience and intuition of the on-duty seismologists to estimate the impact of an event.

PAGER will provide important information to help emergency relief organizations, government agencies, and the media plan their response to earthquake disasters. PAGER will distribute alarms by pager, cell phone, and email including a concise estimate of the earthquakes impact. The alarms will provide an estimate of the number of people exposed to varying levels of shaking, a description of the region's vulnerability, and a measure of confidence in the systems impact assessment. Associated maps of shaking level, population density, and susceptibility to landslides will be posted on the Internet. This information will be available within minutes of the determination of the earthquake location and magnitude. Improvements to the USGS real-time detection system will decrease the response time to as little as 15 minutes. PAGER uses these earthquake magnitude and location to calculate estimates of ground shaking using the methodology and software developed for ShakeMap (http://earthquake.usgs.gov/shakemap). The number of people exposed to various levels of shaking is calculated by combining the maps of predicted ground shaking with Oak Ridge National Laboratory's Landscan2002 population database. Finally, PAGER generates an impact statement by considering the vulnerability of the exposed population and infrastructure, potential for earthquake-induced landslides, and, if available, damage reports from previous nearby historic earthquakes for comparison purposes and damage projection.

Contact: Dr. Paul Earle, Geophysicist, United States Geological Survey, National Earthquake Information Center, Golden, CO, pearle@usgs.gov



1. After the magnitude and hypocenter of an earthquake are determined, an estimate of the resulting ground shaking is obtained using ShakeMap methodology.



2. The population of the affected region is obtained from the Landscan2002 global population database developed at Oak Ridge National Laboratory.