EARTH SCIENTISTS HELPING ENHANCE RESILIENCE TO THE ENVIRONMENTAL AND ENVIRONMENTAL-HEALTH CONSEQUENCES OF DISASTERS

Geoffrey S. Plumlee[1]

[1] U.S. GEOLOGICAL SURVEY, DENVER, COLORADO, USA.

RESUMO: Disasters are well known to pose a variety of direct threats to human safety and health, such as injuries or fatalities caused by building collapse or fire. However, disasters can also release hazardous materials into the environment that may pose both short- and long-term environmental and environmental-health threats. The U.S. Geological Survey (USGS) has helped assess potentially hazardous materials produced by a number of natural and anthropogenic disasters, such as: pathogen-bearing dusts released by the 1994 Northridge California earthquake; dusts from the 2001 World Trade Center collapse; flood waters and flood sediments from 2005 hurricanes Katrina and Rita; ash and burned soils from 2007–2009 southern California wildfires; ash from numerous volcanic eruptions; and mud from the ongoing LUSI mud volcano eruption in East Java. These studies illustrate that earth scientists can play important roles in helping emergency responders and public health experts assess environmental and environmental-health hazards of disasters. For example, we can: measure environmental impacts relative to pre-disaster environmental baseline conditions; identify and fingerprint sources for hazardous materials released into the environment by disasters; understand characteristics of the hazardous materials that influence their toxicity to exposed humans and ecosystems; and monitor, map, and understand how these hazardous materials can change form and toxicity once released into the environment. The USGS has also taken a lead role in the development of multi-disciplinary scenarios to model plausible physical, economic, and other consequences of future natural disasters. Recent examples include the 2008 Great Southern California ShakeOut scenario that modeled a geologically plausible 7.8 magnitude earthquake along the southern San Andreas fault (http://urbanearth.gps.caltech.edu/scenario08/) and the ongoing ARkStorm scenario that is modeling the impacts of a meteorologically plausible weeks-long winter storm affecting the western coast of the United States (http://urbanearth.gps.caltech.edu/winter-storm/). USGS scientists are working with expert collaborators and stakeholders from diverse disciplines to estimate plausible environmental and environmental-health impacts of the ShakeOut and ARkStorm scenarios. Helping to understand the potential sources, types, environmental behavior, and health implications of hazardous materials predicted to result from these disaster scenarios will enhance planning for, mitigation of, and hence resilience to, environmental and health consequences of future disasters.