Update on USGS Earthquake Hazards Program

ACEHR Meeting

March 2010
Recent Earthquake Hazards Program funding history and FY11 proposed request

FY03 $47.6M  FY04 $47.4M  FY05 $50.9M  FY06 $50.6M  FY07 $51.2M  FY08 $53.7M  FY09 $55.8M  FY10 $56.0M  FY11 $56.9M

- Tsunami Supplemental (became part of base in FY06)
- Congressional adds for Multi-Hazards Initiative
- Arkansas earmark

FY10 House mark added $1M above request for “critically needed LIDAR and other seismological studies of areas with high earthquake risk and community danger.”
Taking the multi-hazard initiative on the road in FY11: Pacific Northwest and Alaska

- **Southern California Multi-Hazards Demonstration Project (+$1.7M)**
  - Earthquake Hazards Program for early warning and operational earthquake forecasting (+1M)
  - Mineral Resources, Ecosystem, and Geography programs for economic, environmental and ecosystem impact analysis (+$0.7M)

- **Pacific Northwest (+$0.9M)**
  - EHP for Netquake deployment and EM training on USGS products (+$0.4M)
  - Volcano Hazards Program for improved forecasting of volcanic events, implementing National Volcano Early Warning System (+$0.5M)

- **Alaska (+$1.1M)**
  - EHP for assessing tsunami-generating earthquake sources (+$0.4M)
  - High-threat volcano monitoring (+$0.7M)

- **Add volcano quake detection role to NEIC 24/7 operations (+$0.3M)**
Earthquake early warning – getting ahead of strong ground shaking

- USGS/CISN Phase I (2007-2009) cooperative agreement supported algorithm testing
- Phase II (2010-2012) supports prototype development and identifies test users
- ARRA funding used to reduce datalogger delays
- EEW requirements:
  --- rapid earthquake detection
  --- early magnitude estimation
  --- ground shaking prediction
  --- robust monitoring networks
  --- well-defined user community
Global Seismographic Network

**USGS Funding for GSN**
- **FY 2005:** $3.4 million
- **FY 2005 post-Sumatra supplemental:** +$4.1M
- **FY 2006:** $3.9M
- **FY 2007:** $3.9M
- **FY 2008:** $4.4M
- **FY 2009:** $5.5M + ARRA
- **FY 2010:** $5.8M
- **FY 2011:** $5.4M (request)
NEHRP Strategic Priorities

• Fully implement the Advanced National Seismic System.
• Improve techniques for evaluating and rehabilitating existing buildings.
• Further develop Performance-Based Seismic Design.
• Increase consideration of socioeconomic issues related to hazard mitigation implementation.
• Develop a national post-earthquake information management system.
• Develop advanced earthquake risk mitigation technologies and practices.
• Develop guidelines for earthquake-resilient lifeline components and systems.
• Develop and conduct earthquake scenarios for effective earthquake risk reduction and response and recovery planning.
• Facilitate improved earthquake mitigation at State and local levels.

USGS is using Recovery Act and multi-hazards funds to make progress in these two areas
Advanced National Seismic System (ANSS)

ANSS Backbone completion with support from NSF’s EarthScope

USGS National Earthquake Information Center, Golden, Colorado

ANSS Backbone completion with support from NSF’s EarthScope
USGS spending plan for Recovery Act (ARRA) funding

USGS Total: $140M

Earthquake Networks: $29.4M

ANSS Modernization: $19.2M
Help for Haiti

The President speaks on the urgent situation after the earthquake in Haiti and the government's response. Read his remarks and learn how to contribute to the relief effort.

Learn More

A New Foundation

The President's Plan for Health Insurance Reform
Cut through the rhetoric on health insurance reform. Read the essentials of the President's plan, and watch a video with highlights of his speech to Congress.

Learn More

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Photo of the Day

The Blog

Featured Legislation
Situational awareness available in 20 minutes

Prompt Assessment of Global Earthquakes for Response
NOAA-USGS Post-Sumatra tsunami warning initiative

EXPLANATION

- ▲ New GSN Stations
- ▲ Existing GSN Stations
- ◆ New DART Buoys

Plate Boundaries

Volcanoes

Earthquakes 1610 - 2004, M = 6

- ○ 0 - 69 km
- ▲ 70 - 299

T Tsunamigenic Earthquakes 1530 - 1991
Stress increase on Enriquillo and adjoining faults

Risk tranblemanntè ak mezú sékiritè nan Péyi Dayiti ak tout zòn Karayib-la
Komuniké Sant enspéksyon jéolojik Étazini
28 janvyè 2010

Échel Richtè, sè yon mannyè pou mezurè puisans yon tranblemanntè. Yon lòt mo pou di puisans yon tranblemanntè, sè mayitúd. Yon lòt mo pou di tranblemanntè, sè sóylis, ou byen kataklis tou, ki pi jénéral.
USAID/USGS Earthquake Disaster Assistance Team

- USGS & USAID Participating Agency Service Agreement, to support USAID Office of Foreign Disaster Assistance (OFDA).
- USGS may assist local geological agencies with conducting rapid earthquake-related assistance, and provide training, analysis, and advice.
- Available to assist with paleoseismology, ground rupture, tsunami studies, seismology, geological engineering, strong-motion instrumentation, geodesy, seismic hazard assessment, and outreach.
- Coordination with sister NEHRP agencies (FEMA, NIST, NSF), Earthquake Engineering Research Institute (EERI), and Incorporated Research Institutions for Seismology (IRIS), among others.
EDAT deployment

- Goals of Phase-1 suite of high-priority investigations and analyses:
  1) Obtain geological and seismological information needed to assess the short-term and longer-term seismic hazards facing Haiti.
  2) Deliver an initial suite of hazard maps to underpin a building code that will guide the rebuilding of habitation and infrastructure.

- Elements:
  - Geological investigations of coast, fault and landslides
  - Aftershock recording and site-response analysis
  - Seismic hazard maps for building codes
  - Improved aftershock and triggered earthquake forecasts
Uplifted coral reef investigations

Photos by Rich Briggs, USGS
Taking sample of coral for analysis
Coral slice to be shipped home for analysis
Seismic station deployment

- Port au Prince Urban Seismic Network
  - Temporary deployment of 8 triggered K2 strong-motion sensors for site-response analysis
- Near-fault aftershock detection (5 Reftek stations)

USGS seismologist Doug Given and Haitian colleagues from Bureau of Mines and Energy installing station at school

Photo from Sue Hough, USGS
Need for improved seismic hazard analysis

Output from Global Seismic Hazard Assessment Project (GSHAP)
Working products for improved seismic hazard analysis
Convened by
National Science and Technology Council
Subcommittee on Disaster Reduction

Co-sponsored by
U.S. Department of State
U.S. Agency for International Development
United Nations International Strategy for Disaster Reduction

Organized by the IRIS Consortium

With support from:
NASA
National Science Foundation
U.S. Geological Survey
Magnitude 8.8 OFFSHORE MAULE, CHILE
Saturday, February 27, 2010 at 06:34:17 UTC

Same Length Scale!

Finite fault models by Gavin Hayes, USGS
National Earthquake Information Center
Ringing the Earth like a bell

February 27, 2010 Chile Earthquake (M=8.8) Global Displacement Wavefield

Data from the IRIS-USGS Global Seismographic Network
Figure prepared by Richard Aster, New Mexico Tech

USGS

Global Seismographic Network

USGS Albuquerque Seismological Laboratory
January 27, 2008 (rcl/wa)
Situational awareness available in 20 minutes

Prompt

Assessment of

Global

Earthquakes for

Response
Any questions?

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