

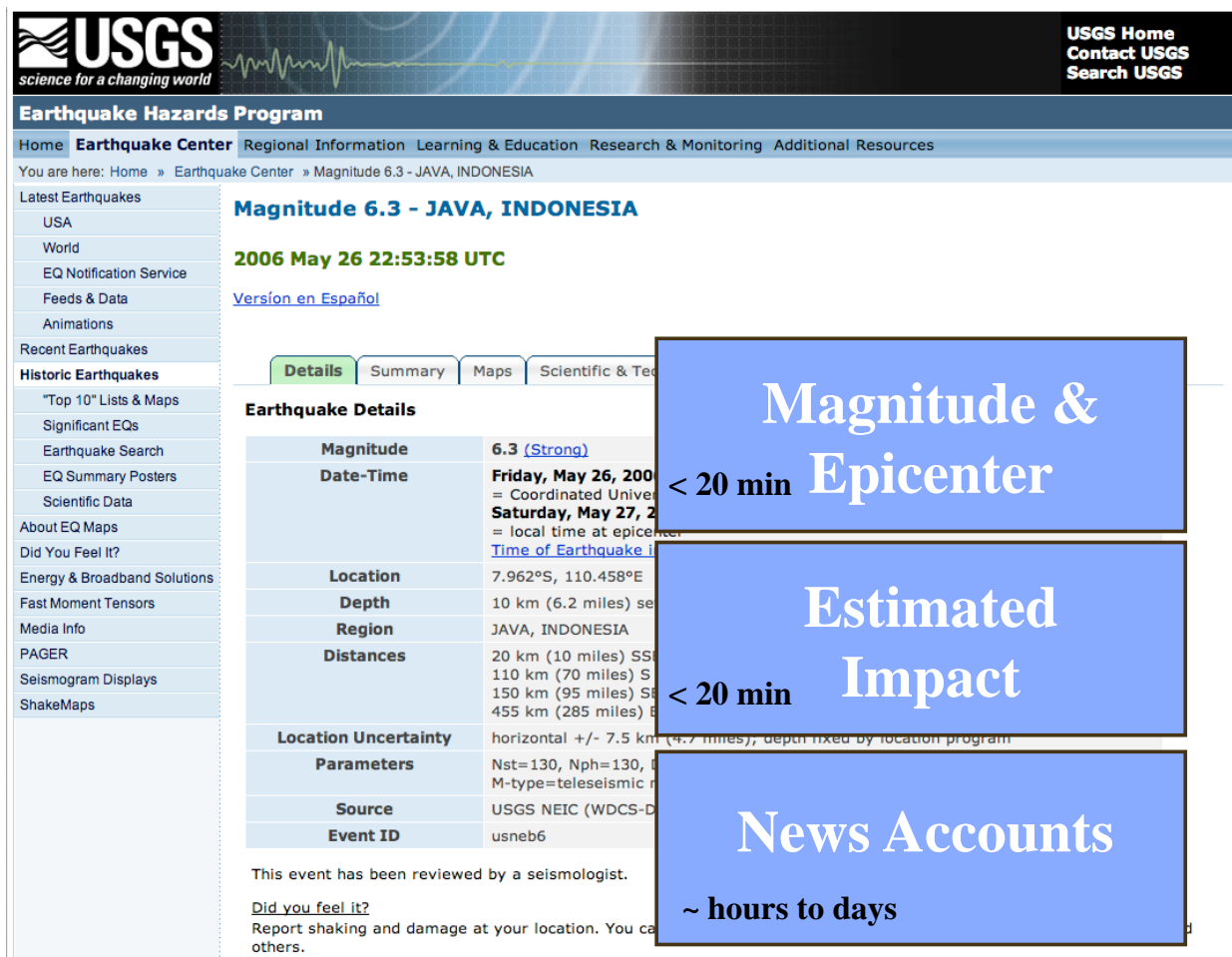
Science and Technology for Disaster Risk Management

Inter-Agency Partnerships between
USAID/OFDA, USGS, and NOAA

Geo-Hazards

- Includes – Earthquakes, Volcanoes
- Primary Inter-Agency Partner is the United States Geological Survey (USGS)
- Well-established International Partnerships among scientific community
- Provides Information Products used by the DRM community.

PAGER (Prompt Assessment of Global Earthquakes for Response)



USGS
science for a changing world

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Earthquake Hazards Program

Home **Earthquake Center** Regional Information Learning & Education Research & Monitoring Additional Resources

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Magnitude 6.3 - JAVA, INDONESIA

2006 May 26 22:53:58 UTC

[Versión en Español](#)

Earthquake Details

Magnitude	6.3 (Strong)
Date-Time	Friday, May 26, 2006 22:53:58 UTC = Coordinated Universal Time Saturday, May 27, 2006 04:53:58 AM = local time at epicenter Time of Earthquake in your location
Location	7.962°S, 110.458°E
Depth	10 km (6.2 miles) seismicity
Region	JAVA, INDONESIA
Distances	20 km (10 miles) SSW of Krakatau 110 km (70 miles) S of Krakatau 150 km (95 miles) S of Krakatau 455 km (285 miles) E of Krakatau
Location Uncertainty	horizontal +/- 7.5 km (4.7 miles); depth fixed by location program
Parameters	Nst=130, Nph=130, D=130, M-type=teleseismic
Source	USGS NEIC (WDCS-D)
Event ID	usneb6

This event has been reviewed by a seismologist.

[Did you feel it?](#)
Report shaking and damage at your location. You can also report shaking and damage at the location of others.

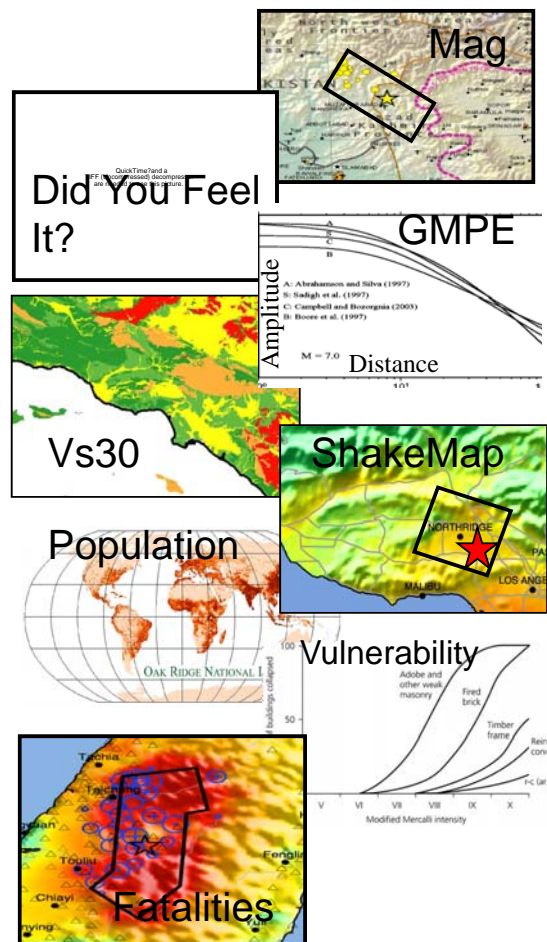
Magnitude & Epicenter
< 20 min

Estimated Impact
< 20 min

News Accounts
~ hours to days

PAGER Ingredients

- Earthquake Information (location, magnitude & rupture dimensions)
- Shaking Observations & Intensities
- Ground Motion Prediction Equations
- Site Conditions (Site Amplification)
- ShakeMap Shaking Estimates
- Population database
- Region-specific vulnerabilities
- Past earthquake database for calibration



Event Information

PAGER Version: 2
NEAR COAST OF CENTRAL PERU
GMT: 2007-08-15 23:40:56
MAG: 8.0
LAT: 13.36
LON: 76.52
DEP: 30 km
ID: 2007gbcv

Estimated Population Exposure

Intensity: Population
MMI8: 449,000
MMI7: 1,297,000
MMI6: 7,875,000
MMI5: 2,285,000*
MMI4: 527,000*

Time and Location

Impact

* - MMI level extends beyond map boundary, actual population exposure may be larger.

For a description of the attached alerts content see:

<http://earthquake.usgs.gov/eqcenter/pager/images/backPAGER.pdf>

For web-pages with expanded content see:

<http://earthquake.usgs.gov/>



Earthquake Shaking **Red Alert**

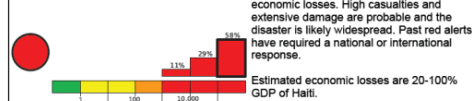


M 7.0, HAITI REGION

Origin Time: Tue 2010-01-12 21:53:10 UTC (16:53:10 local)
Location: 18.45°N 72.57°W Depth: 13 km

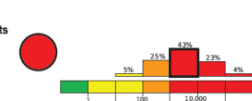
Created: 36 weeks, 2 days after earthquake

Estimated Fatalities



Red alert for shaking-related fatalities and economic losses. High casualties and extensive damage are probable and the disaster is likely widespread. Past red alerts have required a national or international response.

Estimated Economic Losses



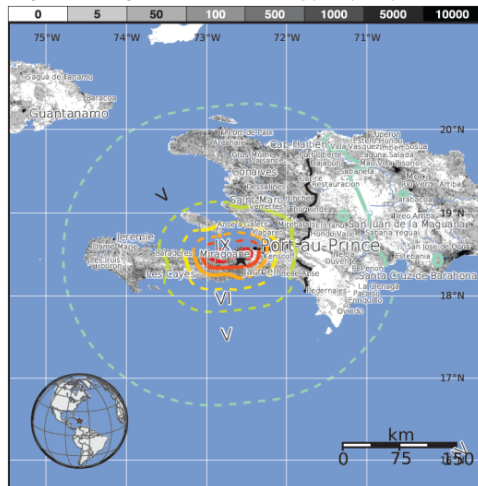
Estimated economic losses are 20-100% GDP of Haiti.

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	- - *	50k*	7,468k*	6,361k	926k	598k	2,030k	908k	118k
ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Population Exposure



Structures: Overall, the population in this region resides in structures that are highly vulnerable to earthquake shaking, though some resistant structures exist. The predominant vulnerable building types are concrete/cinder block masonry and mud wall construction.

Historical Earthquakes (with MMI levels):

Date	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
2003-05-22	246	6.4	VI (25k)	1
1984-06-24	355	5.2	V (440k)	5
1984-06-24	342	6.7	VI (326k)	5

Recent earthquakes in this area have caused secondary hazards such as landslides that might have contributed to losses.

Selected City Exposure

from GeoNames.org

MMI City	Population
X Petit Goave	118k
X Gressier	26k
X Grand Goave	49k
IX Leogane	134k
VIII Carrefour	442k
VIII Miragoane	89k
VIII Port-au-Prince	1,235k
VIII Delmas 73	383k
V Verrettes	49k
IV Santo Domingo	2,202k

bold cities appear on map (k = x1000)

Event ID: us2010rja6



M 7.0, HAITI REGION

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Earthquake Shaking **Red Alert**

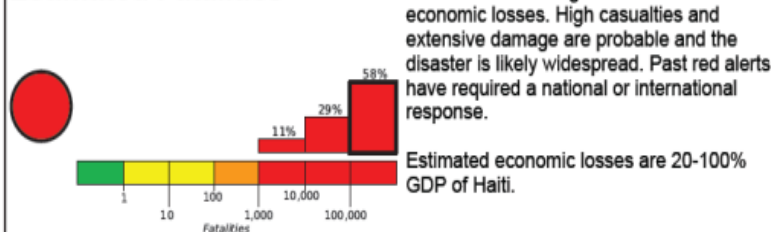


USAID
FROM THE AMERICAN PEOPLE

PAGER
Version 1

Created: 36 weeks, 2 days after earthquake

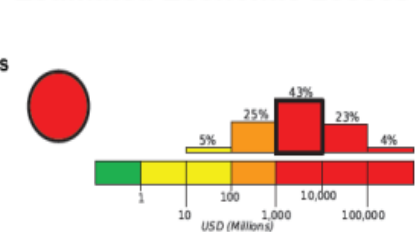
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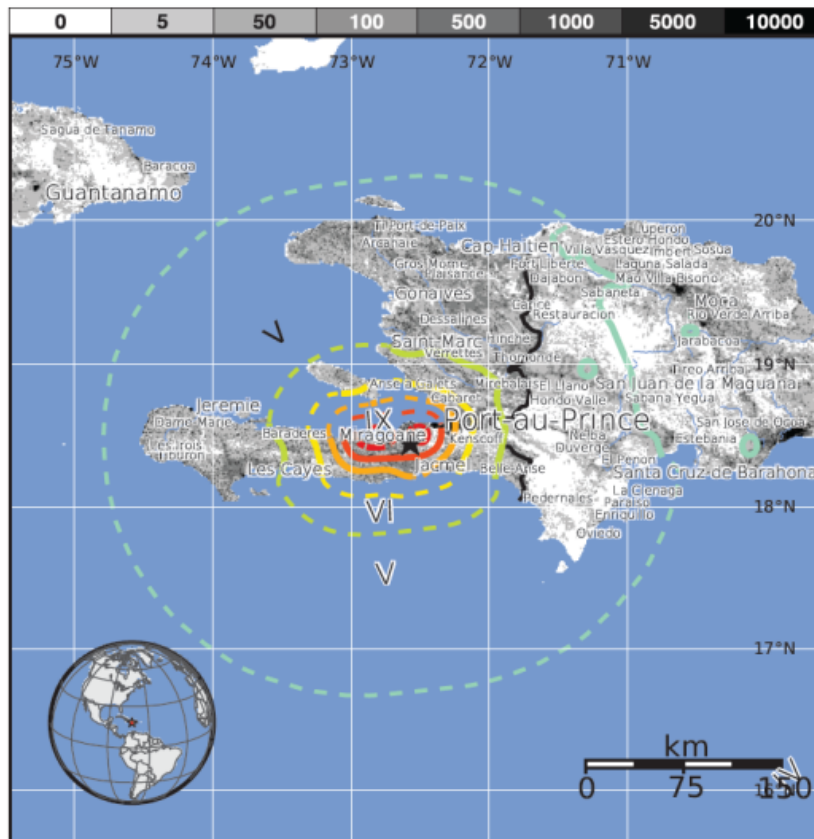
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*Estimated exposure only includes population within the map area.

Population Exposure

population per ~1 sq. km from Landsat



PAGER content is automatically generated, and does not consider secondary hazards in loss calculations. Limitations of input data, shaking estimates, and loss models may add uncertainty.
<http://earthquake.usgs.gov/pager>

Structures:

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(k = x1000)

Event ID: us2010rja6



VDAP (Volcano Disaster Assistance Program)

Overview of VDAP

What: 29-year partnership between USAID/OFDA & USGS

Who: World's most experienced volcano crisis-response team

Why: Prevent volcanic crises from becoming disasters

How: By invitation only

Work in background with counterparts

Response and capacity building



<http://volcanoes.usgs.gov/vhp/vdap.php>



- 26 major crises in 29 years
- Infrastructure built in 12 countries

- 10's of thousands of lives saved
- 100's of \$ millions in property savings

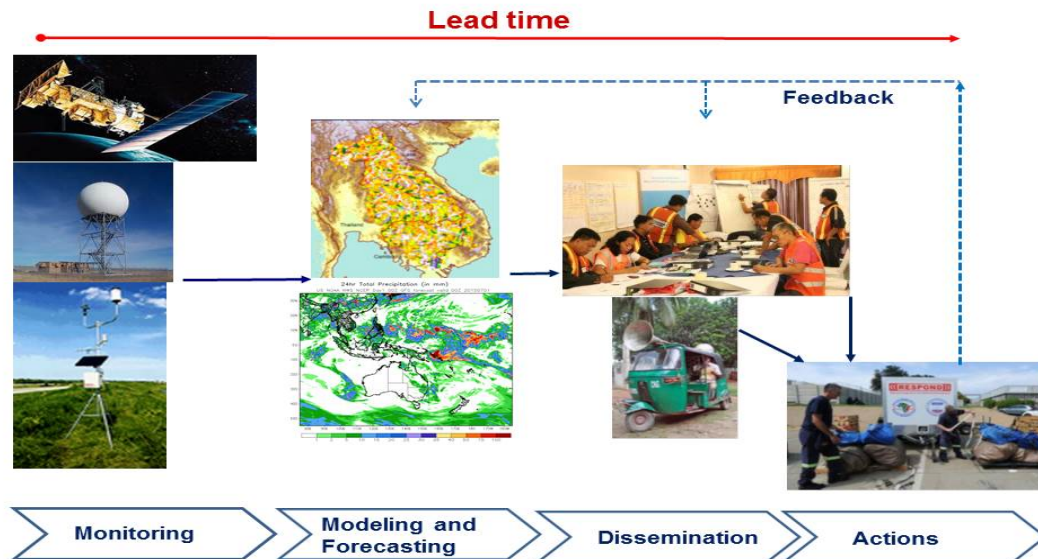
Web Resources

- Earthquakes <http://earthquake.usgs.gov/>
- Earthquake Preparedness
<http://www.fema.gov/hazard/earthquake/index.shtm>
- PAGER (gmayberry@usaid.gov)
<http://earthquake.usgs.gov/earthquakes/pager/>
- Volcano Disaster Assistance Program
<http://volcanoes.usgs.gov/vdap/>
- Landslides <http://landslides.usgs.gov/>

Hydro-Met Hazards

- Includes Floods, Flash Floods, Droughts, Cyclonic Storms
- DRR activities closely associated with CCA
- E2E Systems Framework guides program development
- National Oceanographic and Atmospheric Administration (NOAA) primary partner

End-to-End Early Warning Systems

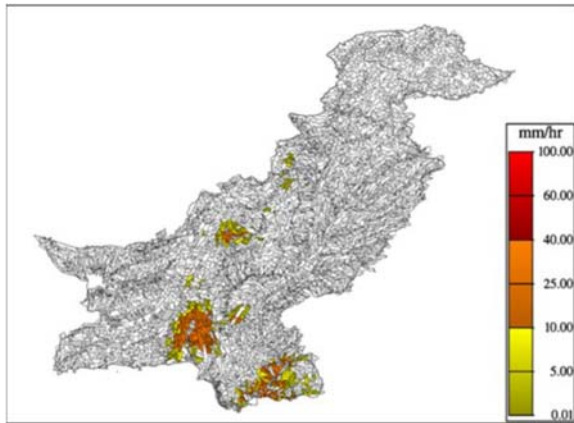


Micro-Manufacturing and Assembly



- Provides for Low-cost Weather and Hydrologic monitoring networks
- Components produced using 3-D printer
- Field tests in 2014 and expansion in 2015
- Technology transfer to NMHS

Flash-Flood Guidance System



- With WMO and NOAA, enhances capacity of NMHSs to issue timely Flash Flood warnings
- Builds on existing systems/capacities
- Provides ongoing Training and capacity building

Chatty Beetle



- USAID/OFDA-NOAA RANET program
- Ruggedized, Satellite-based Communications System
- For use by NHMS and DM services.
- Effective in very remote locations.

Conclusions

- Inter-agency partnerships allow USAID/OFDA access to cutting-edge Science and Technology
- EWS is one area of applied S&T
- Need to understand S&T to determine best Application to Disaster Risk Management
- Scientists need to understand DRM to determine best Applications as well.
- Need to Speak each others' languages.