

U.S. National Science & Technology Council Subcommittee on Disaster Reduction

- SDR is an element of the President's National Science & Technology Council charged with establishing clear national goals for Federal science and technology investments in disaster reduction.
- Promotes interagency cooperation for natural and technological hazards and disaster planning.
- Facilitates interagency approaches to identification and assessment of risk, and to disaster reduction.
- Advises the Administration about relevant resources and the work of SDR member agencies.
- Serves as the US national platform for UN International Strategy for Disaster Reduction



Grand Challenges for Disaster Reduction

Grand Challenges for Disaster Reduction

National Science and Technology Council
Committee on Environment and Natural Resources



A Report of the
Subcommittee on Disaster Reduction

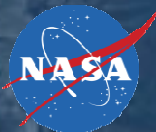
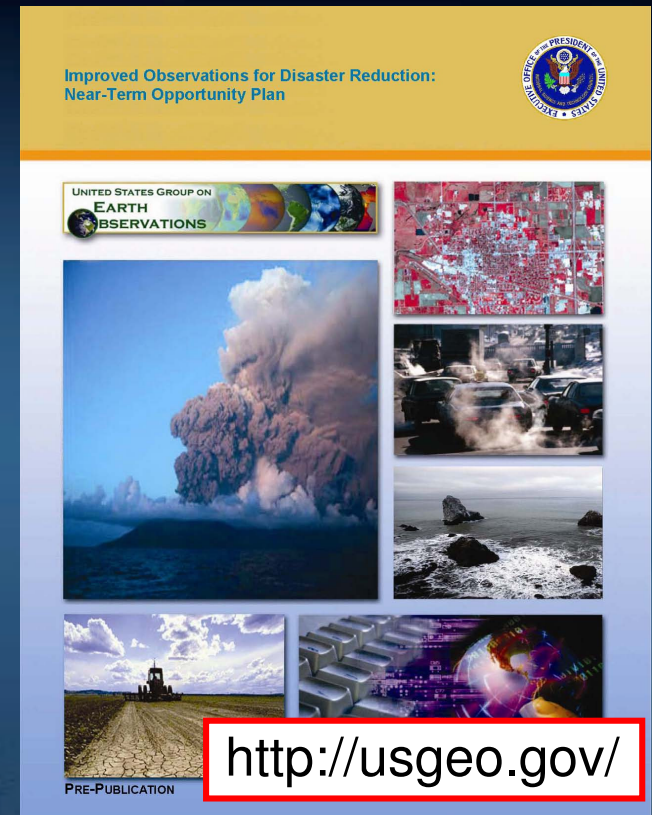
June 2005



1. Provide hazard and disaster information where and when it is needed.
2. Understand the natural processes that produce hazards.
3. Develop hazard mitigation strategies and technologies.
4. Recognize and reduce vulnerability of interdependent critical infrastructure.
5. Assess disaster resilience using standard methods.
6. Promote risk-wise behavior.

Improved Observations for Disaster Reduction: Joint USGEO/SDR Near-Term Opportunity Plan

Building on the tremendous progress that has been made in warning capabilities for meteorological hazards due to investments in network modernization and improved system integration, the IEOS *Strategic Plan* identified a Near-Term Opportunity to make similar progress in the geologic hazards, including earthquakes, volcanic eruptions, tsunamis and coastal inundation hazards, landslides and subsidence.





BLOG

PHOTOS & VIDEO

BRIEFING ROOM

ISSUES

the ADMINISTRATION

the WHITE HOUSE

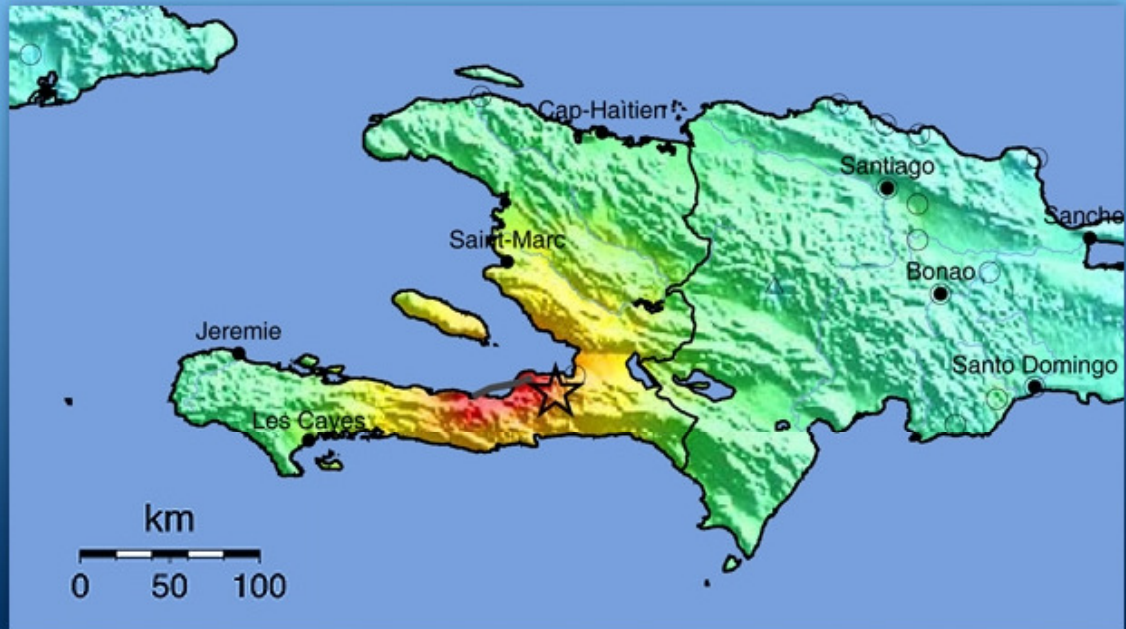
our GOVERNMENT

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

- 1
- 2
- 3
- 4



Map courtesy of USGS

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

← BACK | NEXT →

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Search WhiteHouse.gov Search

PHOTO of the DAY



THE BLOG

FEATURED LEGISLATION

Enriquillo fault is deeply etched into the landscape



Source: JPL Shuttle Radar Topography Mission

on GEO Haiti event supersite <http://supersites.unavco.org/haiti.php>

Situational awareness available in 20 minutes

Prompt Assessment of Global Earthquakes for Response



M 7.0, HAITI REGION

Origin Time: Tue 2010-01-12 21:53:10 UTC
Location: 18.46°N 72.53°W Depth: 13 km



PAGER Version 8

Created: 1 day, 20 hours after earthquake

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	--*	--*	5,887k*	7,261k	1,049k	571k	314k	2,246k	332k
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	None	None	Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy



M 8.8, OFFSHORE MAULE, CHILE

Origin Time: Sat 2010-02-27 06:34:14 UTC
Location: 35.85°S 72.72°W Depth: 35 km



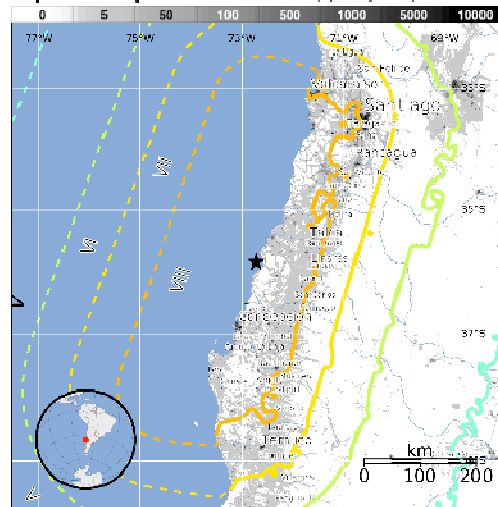
PAGER Version 6

Created: 3 hours, 10 minutes after earthquake

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	--*	--*	454k*	1,667k*	527k*	7,576k*	5,124k*	0	0
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	None	Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

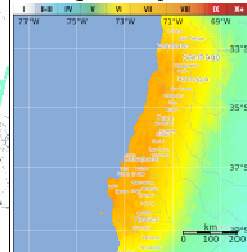
Population Exposure



Selected City Exposure

MMI City	Population
VIII Arauco	25k
VIII Lota	50k
VIII Constitución	38k
VIII Concepcion	215k
VIII Canete	20k
VII Maipilla	63k
VII Talca	197k
VII Barchagua	213k
VII Temuco	238k
VII Santiago	4,837k
VI Valparaiso	282k

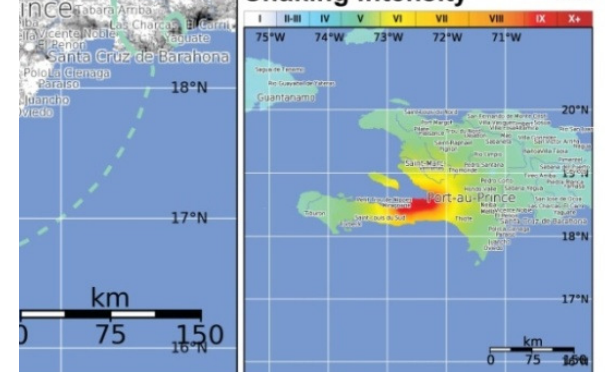
Shaking Intensity



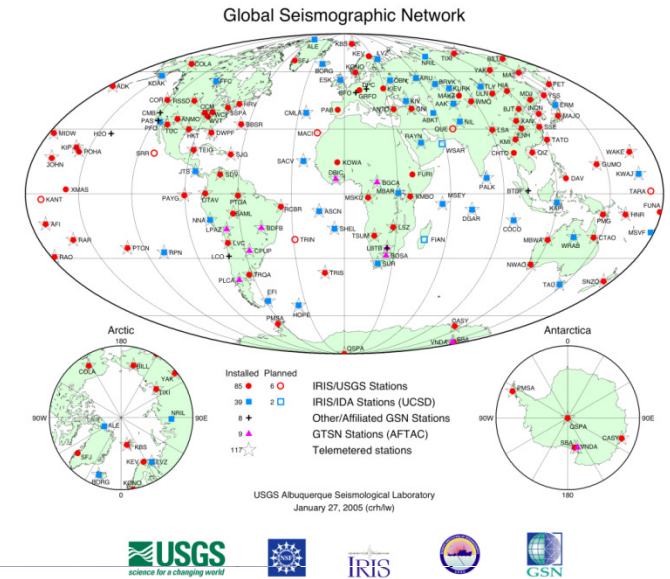
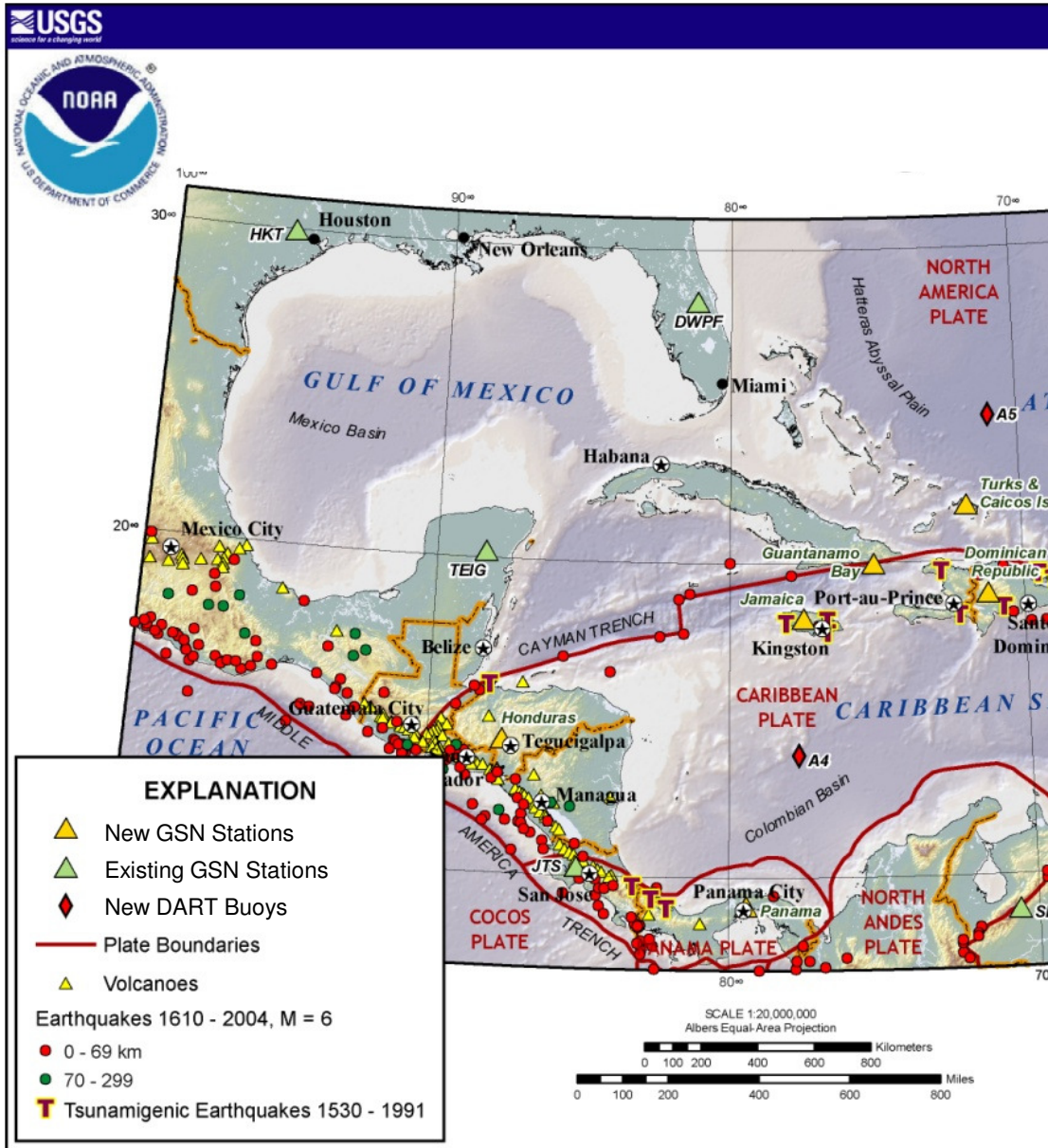
Selected City Exposure

MMI City	Population
X Grand Goave	5k
IX Port-au-Prince	1,235k
IX Carrefour	442k
IX Petionville	108k
IX Delmas 73	383k
IX Croix des Bouquets	9k
VI Miragoane	6k
V Verrettes	49k
III Santo Domingo	2,202k
III Guantanamo	273k

Shaking Intensity

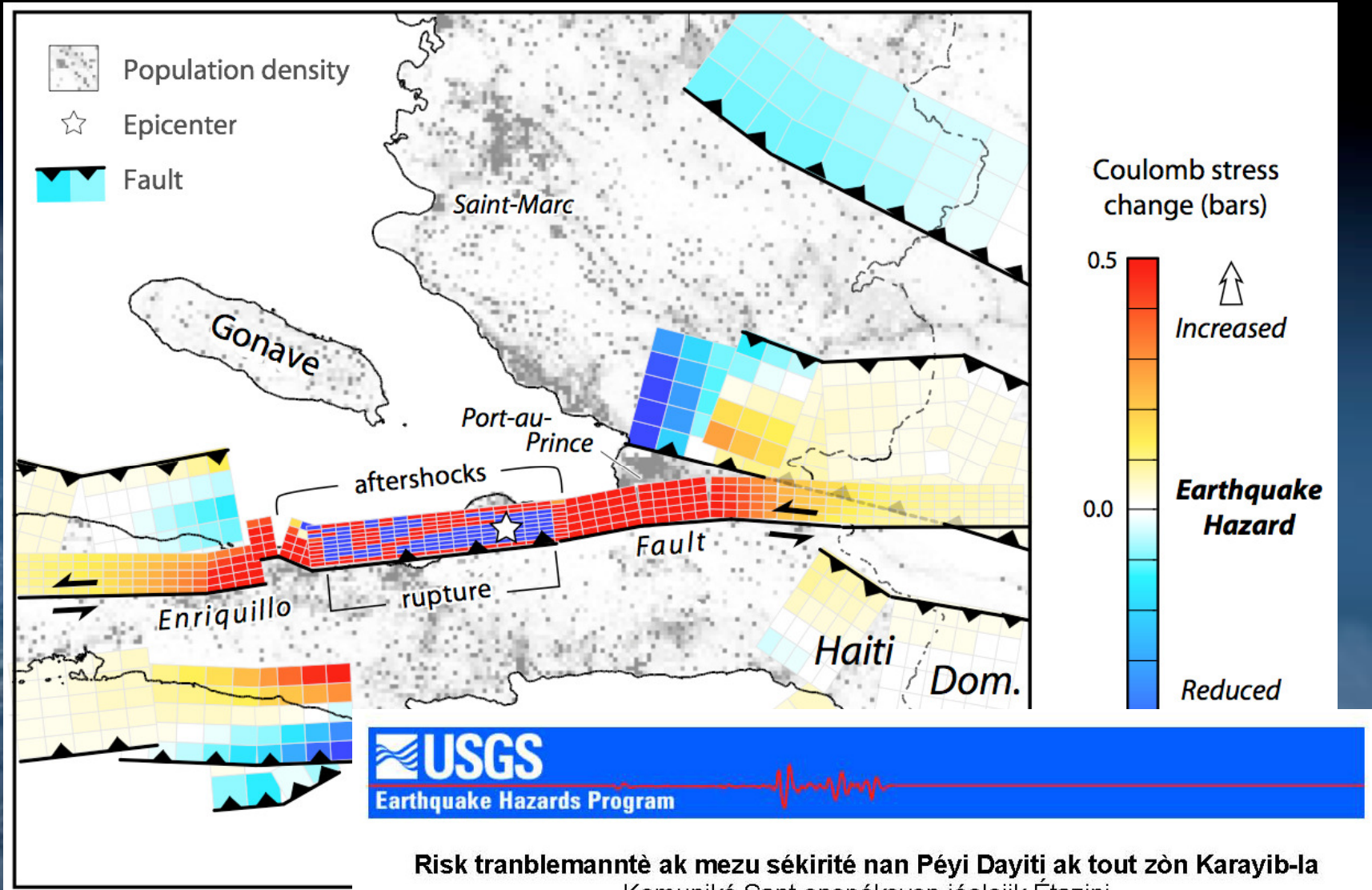


NOAA-USGS Post-Sumatra tsunami warning initiative



3 August 2005 1230 MDT

Stress increase on Enriquillo and adjoining faults



Risk tranblemanntè ak mezu sékirité nan Péyi Dayiti ak tout zòn Karayib-la
 Komuniké Sant enspéksyon jéolojik Étazini
 28 janvyé 2010

Échèl Richtè, sé yon manyè pou mezuré puisans yon tranblemanntè.
 Yon lòt mo pou di **puisans** yon tranblemanntè, sé **mayitud**.
 Yon lòt mo pou di tranblemanntè, sé **séyis**, ou byen **kataklis** tou, ki pi jénéral.





NOAA Remote Sensing

- 3298 images delivered
- 692 sq miles covered
- 921 miles of flight lines
- 670 GB NOAA data uploaded to USGS
- 9.66TB NOAA data downloaded from USGS (as of Jan 26)
- Private entities downloading NOAA data, value adding it, and making it available to the public:
 - Google, ESRI, Leica Geosystems (ERDAS)



Imagery Over-flights January 17-26, 2010 superimposed on the USGS Shake Map and Google Earth



Observing Hispaniola Fault Zone Mechanics with UAVSAR

As a repeat-pass L-band InSAR, the UAVSAR was designed to provide the rapid access, short revisit interval, high resolution and variable viewing geometry to optimize observation of post-seismic deformation and landslide hazards.

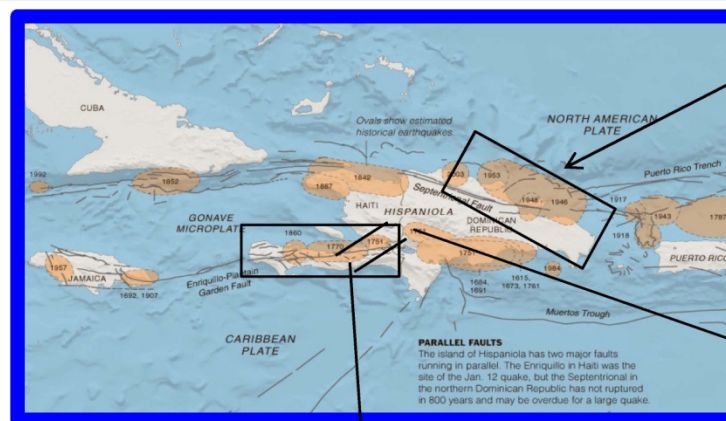
The 2010 Central America Deployment (Jan. 25 – Feb. 14) is being augmented to fly the two major active fault systems in Hispaniola, (1) the Enriquillo-Plantain Garden Fault responsible for the damage in Port-au-Prince, and (2) the Septentrional Fault Zone to the north also capable of major earthquakes.

Objectives Haiti UAVSAR flights are:

1. Enriquillo-Plantain Garden (EPG) Fault
 - Post-seismic deformation
 - Deformation field of after shocks or potential triggered earthquakes
 - Landslide hazards
2. Septentrional Fault Zone (2nd priority)
 - Baseline observations for possible future events

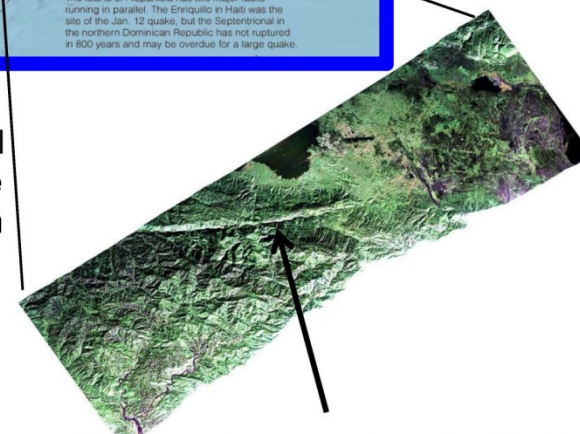
Flight Schedule:

Enriquillo-Plantain Garden Fault – 1/27, 2/3, 2/13
Septentrional Fault Zone – 2/14 (TBD)



Septentrional
Fault Zone

NASA's Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) flown on a Gulfstream-III captured this false-color composite image of the city of Port-au-Prince, Haiti, and the surrounding region on Jan. 27, 2010, using three channels of UAVSAR polarimetric data. Port-au-Prince is visible near the center of the image.



The large linear east-west valley in the mountains south of the city is the location of the major active fault zone responsible for the earthquake: the Enriquillo-Plantain Garden fault. Subsequent flights will enable deformation analysis.

National Science Foundation – Directorate for Geosciences Activities Supported to Study the January 12, 2010 Haiti Earthquake

RAPID Award to Dr. Eric Calais, Purdue University

- Research team from Purdue University, University of Texas, University of Arkansas, Haitian Bureau of Mines and Energy
- Mapping and precisely measuring the displacement on the fault
- Re-measuring existing network of 30 GPS benchmarks in Haiti and the Dominican Republic to determine co-seismic deformation
- Installing continuous GPS instruments in key locations to measure post-seismic deformation

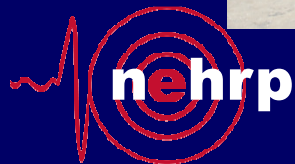
OpenTopography Portal (UC San Diego/San Diego Supercomputer Center)

- Joint support from EAR-Instrumentation and Facilities and Office of Cyberinfrastructure
- Hosts EarthScope and other imagery data (www.opentopography.org)
- With NSF concurrence, hosts airborne imagery collected over Haiti by the U.S. National Geospatial Intelligence Agency

Checking GPS receiver on the roof of Jacmel's police station.



Teaching about earthquakes to students at Mirebalais' high school.



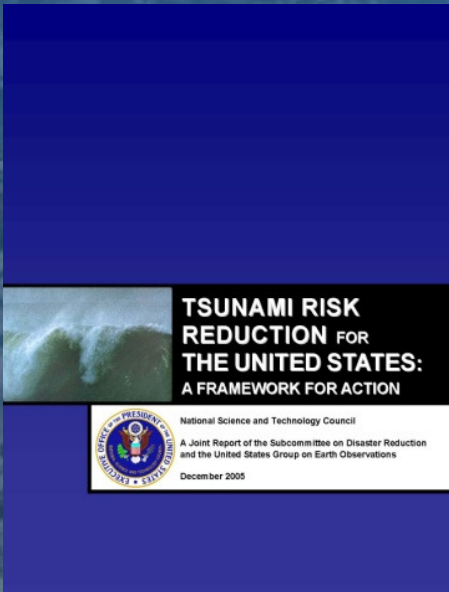
national **earthquake** hazards reduction program



SDR post-Sumatra reports

Science & Technology Lessons Learned from the Dec. 26, 2004 Indian Ocean Disaster

Tsunami Risk Reduction for the United States: A Framework for Action



SCIENCE AND TECHNOLOGY LESSONS LEARNED FROM THE DECEMBER 26, 2004 INDIAN OCEAN DISASTER INTERIM REPORT OF THE SUBCOMMITTEE ON DISASTER REDUCTION

The Charge

Following the Indian Ocean earthquake and tsunami, the Subcommittee on Disaster Reduction (SDR) was asked to identify the science and technology lessons learned from the disaster. Consistent with the SDR's mission to promote a disaster resilient America, the Subcommittee decided to portray the lessons learned in an all-hazards context and to emphasize the opportunities to leverage current efforts and understanding.

A Call for Action

Briefly, the science and technology lessons learned from the Indian Ocean tsunami of December 26, 2004 are:

1. **It can happen.** A tsunami of this size can devastate life, property, infrastructure, and economic balance for generations to come.
2. **It can happen here.** The tectonic setting off the northwest coast of North America is very similar to the conditions that gave rise to the Sumatran earthquake. For the past decade scientists in the United States have known of this dangerous situation. Now, government officials and others responsible for public safety and security must build on existing efforts to address the risks and improve public recognition of this threat.
3. **It can happen quickly.** Because of the proximity of the tsunami-generating earthquake zones off the coasts of the Pacific Northwest, Alaska, and the Caribbean, there will be fewer than twenty minutes in some cases to develop, broadcast, and respond to a warning.
4. **Disaster is not inevitable.** Tsunami risk assessments, mitigation practices, warning systems and procedures, public awareness, and warning response training must be developed and maintained for all coastal areas of the United States subject to the tsunami threat.

The Threat: What's at Stake?

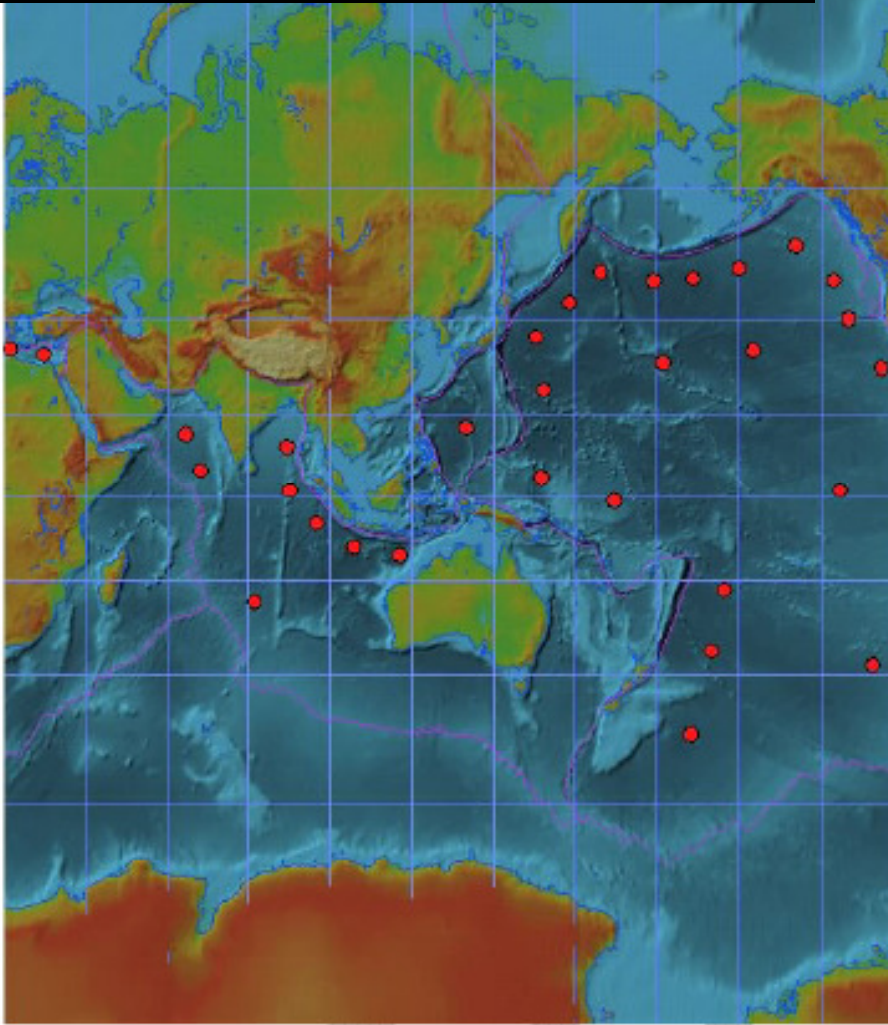
The December 26, 2004 event in the Indian Ocean was rare – a magnitude 9.0 earthquake with an undersea source that triggered a massive tsunami. Though the probability of this event was low, the impacts were high. According to reports by the United Nations, the tsunami resulted in approximately 200,000 dead and missing, and damages exceeding \$13 billion (U.S.). Even as the United States provides humanitarian aid and technical assistance to the affected areas, we also must learn from the event to ensure our own preparedness.

Earthquakes generate ninety percent of all tsunamis, either directly or through seismically-triggered submarine landslides, and most tsunamis that have caused significant loss of life and property damage have been earthquake generated. The vast majority of tsunamis are caused by large earthquakes occurring around the Pacific Rim or "ring of fire," placing the U.S. West Coast, Alaska, Hawaii, and U.S. island territories at risk. Hawaii has been struck repeatedly, and coastal communities in Alaska experienced severe damage from tsunamis generated by the magnitude 9.2 subduction-zone 1964 Good Friday earthquake. The greatest tsunami risk to the United States is

For tsunamis, seismic is the start



All Hazard Alert Broadcast system installed at Ocean Shores, Washington.



The beach is the finish

Credit: Washington Emergency Management

More information

The screenshot shows the homepage of the Subcommittee on Disaster Reduction (SDR). At the top, there is a navigation menu with links for Home, About SDR, News, Links, For Scientists, and Contact Information. Below the menu is a large banner image depicting a disaster scene with firefighters and a large fire. The main content area features several articles:

- A DISASTER RESISTANT AMERICA:** Accompanied by an image of a coastal town. Text: "In accordance with the legislation, a coordinated Federal effort, in cooperation with other levels of government, academia, and the private sector, will improve the understanding of disasters and their impact, and develop and encourage implementation of cost-effective mitigation measures to reduce these impacts while promoting community resilience. — Executive Summary, White Paper Impact Reduction Implementation Plan"
- Grand Challenges for Disaster Reduction:** Accompanied by an image of a person in a hard hat. Text: "To develop a five-year strategy for disaster reduction through science and technology, the members of the SDR collaborated with scientists and engineers worldwide to identify a suite of Grand Challenges for disaster reduction. This document presents six Grand Challenges for disaster reduction and provides a framework for prioritizing the related Federal investments in science and technology. Addressing these Grand Challenges will improve America's capacity to prevent and recover from disasters, thus fulfilling our Nation's commitment to reducing the impacts of hazards and enhancing the safety and economic well-being of every individual and community. — Dr. John H. Marburger, III, Director of the Office of Science and Technology Policy and Science Advisor to the President"
- Tsunami risk reduction through the science centers:** Accompanied by an image of a tsunami. Text: "Tsunamis are low probability but high impact events, and the Indian Ocean tsunami of December 26, 2004 demonstrated international vulnerability. Over the past year investments in tsunami detection and warning have made individuals safer in their homes and places of work. Working with our national and international partners, we also produced the national plan for tsunami risk reduction to provide a framework for ongoing federal investment in activities that will continue to reduce risks to life and property. — Dr. John H. Marburger, III, Director, Office of Science and Technology Policy"

On the left side, there is a sidebar with sections for "SDR RECOGNIZES" (listing various awards and grants), "Reports" (listing various reports and documents), and "SDR Staff" (listing staff members and their contact information). At the bottom left, it says "Website developed by the NOAA National Environmental Science, Data, and Information Service".

www.sdr.gov

applegate@usgs.gov

