Executive-Editor

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Biography

09/2011----Present: Assistant Professor 08/2006— 08/2011: Assistant Professor, Department of Geology, University of Puerto Rico at Mayaguez, PR. (Tenured on July 1, 2011) 07/2004—07/2006: Research Associate, Applied Geophysical Science Laboratories, College of Arts and Sciences, North Carolina A&T State University, NC. 01/2004—06/2004: Visiting Research Scholar, Multidisciplinary Center for Earthquake Engineering Research (MCEER), University of New York at Buffalo, NY. 06/2001—12/2003: Postdoctoral Scholar, Institute of Geophysics, Department of Geosciences, University of Munich, Germany.

Research Interest

- Coastal hazards (e.g., faulting, subsidence, wetland loss) in the Gulf Coast area
- Caribbean neotectonics
- GPS seismology, strong earthquake ground motion
- Applications of GPS and LIDAR technologies in natural hazards studies Geological hazard risk analysis and mitigation
- Field and structural monitoring and instrumentation
- Numerical modeling---Numerical 3D simulation (e.g., Parallel Super-Computer Numerical Simulation, MPI and Finite Difference Method)

GeoHazards

Geohazards take an increasing toll of lives, disrupt livelihoods and cost more more money each year

Natural and Human-Induced Extreme Events

GEOHAZARDS

- Volcanoes
- Earthquakes and Tsunamis
- Landslides/Mudslides

CLIMATIC HAZARDS

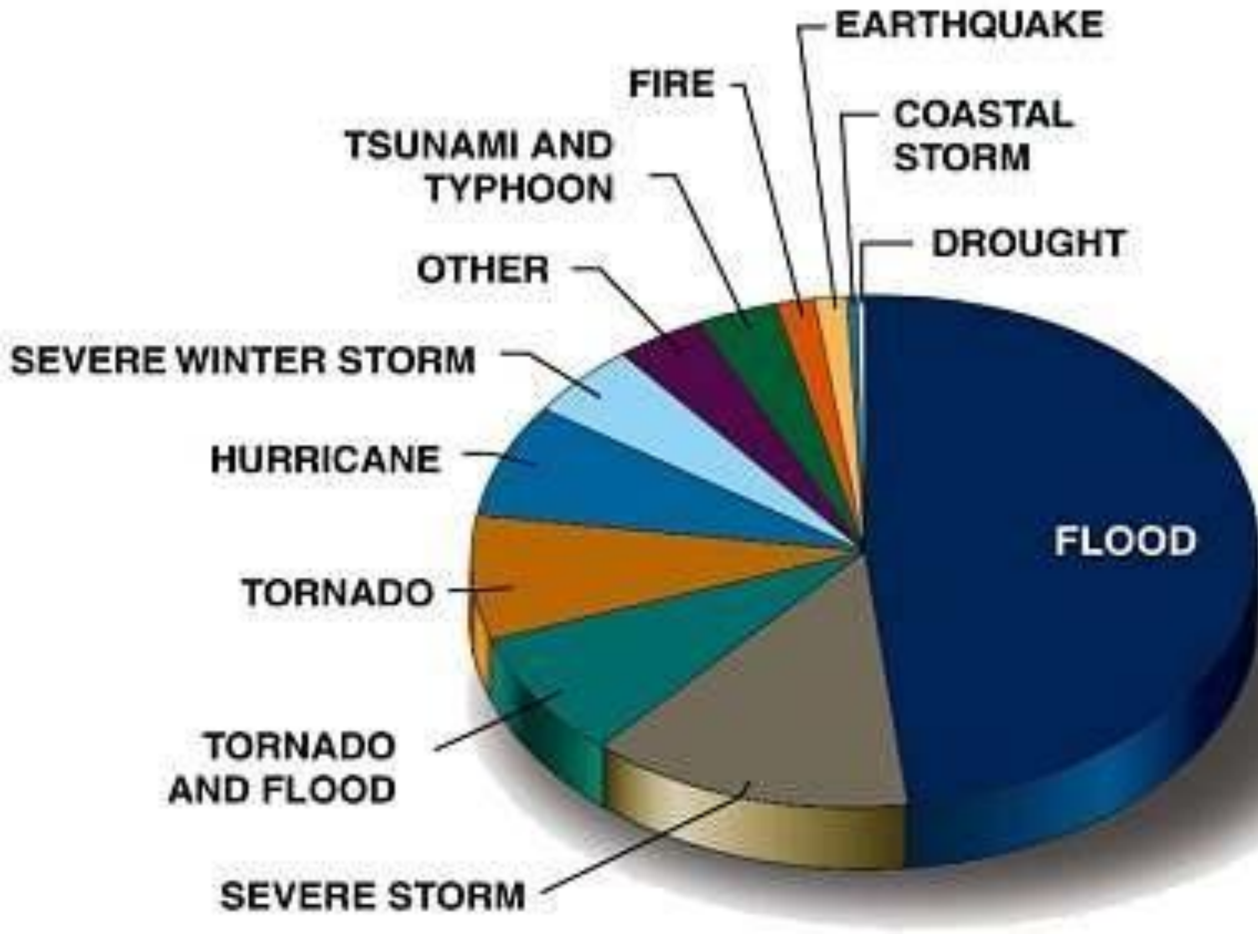
- Floods
- Drought
- Hurricanes/Cyclones

INDUSTRIAL/OTHER HAZARDS

- Oil Spills
- Nuclear Accidents
- Meteor Impacts

Phuket, Thailand: Before and after the 2004 tsunami

Cost Breakdown of Disasters



Natural and Human-Induced Extreme Events

•Extreme events, whether natural or human-induced, can cause significant environmental change, not to mention their devastating impacts on peoples' lives

• In 2005, there was an 18% rise in disasters that killed 91 900 people

•There were 360 natural disasters in 2005 compared to 305 in 2004: the number of floods increased by 57% in 2005 and droughts by about 47%

•The 2004 Indian Ocean tsunami accounted for 92%, and the 2005 South Asian earthquake, for 81% of the deaths in each respective year

Earthquakes and Tsunamis

According to long-term records (since about 1900), we can expect about 18 major earthquakes (7.0 - 7.9 on the Richter scale) and one great earthquake (8.0 or above) in any given year

The number of earthquakes and tsunamis resulting in fatalities has increased approximately in proportion to global populations

- The growth of giant urban cities near regions of known seismic hazard is a new experiment for life on the Earth

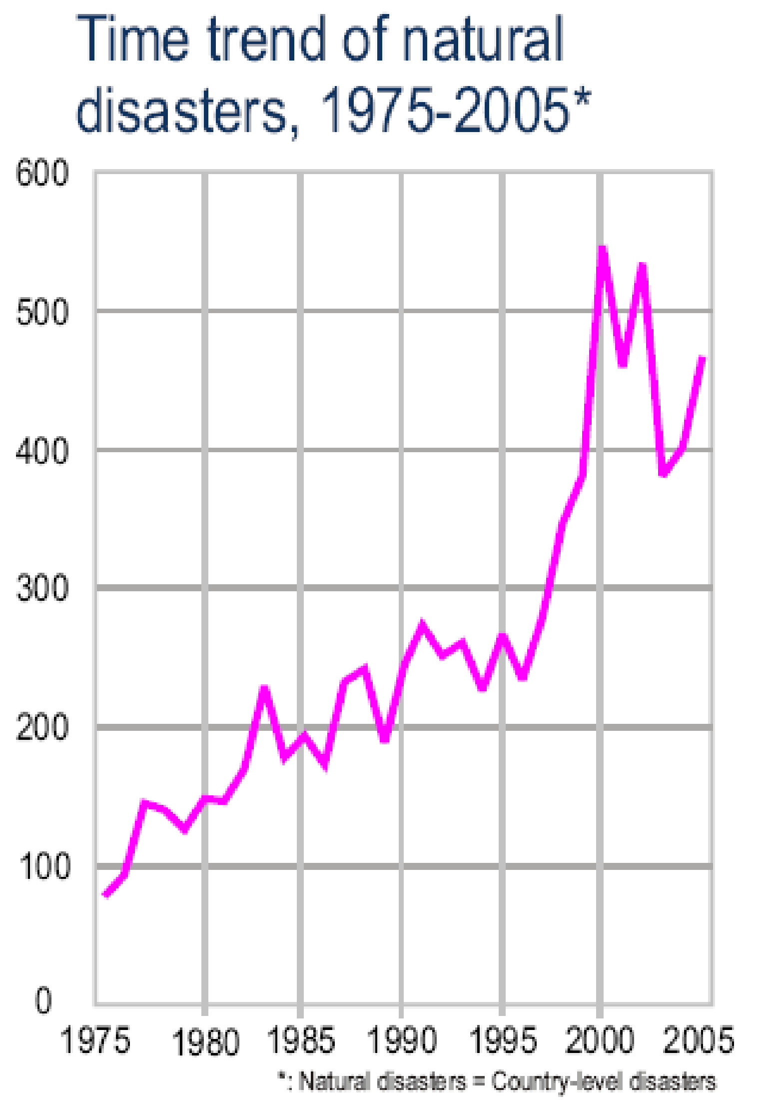
- Tsunamis are a threat to life and property for all coastal residents

Most destructive known earthquakes in the World

Date	Location	Deaths	M	Comments
January 23, 1556	China, Shansi	830,000		
July 27, 1976	China, Tangshan	255,000 (official)	8	Estimated death toll as high as 655,000.
August 9, 1138	Syria, Aleppo	230,000		
May 22, 1927	China, near Xining	200,000	8.3	Large fractures.
December 22, 856	Iran, Damghan	200,000		
December 16, 1920	China, Gansu	200,000	8.6	Major fractures, landslides.
March 23, 893	Iran, Ardabil	150,000		
September 1, 1923	Japan, Kwanto	143,000	8.3	Great Tokyo fire.
October 5, 1948	USSR (Turkmenistan, Ashgabat)	110,000	7.3	
December 28, 1908	Italy, Messina	70,000 to 100,000	7.5	Deaths from earthquake and tsunami.
September, 1290	China, Chihli	100,000		
November, 1667	Caucasia, Shemakha	80,000		
November 18, 1727	Iran, Tabriz	77,000		
November 1, 1755	Portugal, Lisbon	70,000	8.7	Great tsunami.
December 25, 1932	China, Gansu	70,000	7.6	
May 31, 1970	Peru	66,000	7.8	Great rock slide, floods.
1268	Asia Minor, Silicia	60,000		
January 11, 1693	Italy, Sicily	60,000		
May 30, 1935	Pakistan, Quetta	30,000 to 60,000	7.5	Quetta almost completely destroyed.

Earthquakes with 1,000 or more deaths from 1998 to 2001

Date	Location	Latitude	Longitude	Deaths	M	Comments
Feb 04, 1998	Afghanistan-Tajikistan Border Region	37.1 N	70.1 E	2,323	6.1	818 injured, 8,094 houses destroyed, 6,725 livestock killed.
May 30, 1998	Afghanistan-Tajikistan Border	37.1 N	70.1 E	4,000	6.9	Many thousands injured and homeless.
Jul 17, 1998	Papua New Guinea, Near N. Coast	2.96 S	141.9 E	2,183	7.1	Thousands injured, about 9,500 homeless and about 500 missing as a result of a tsunami with maximum wave heights estimated at 10 meters.
Jan 25, 1999	Colombia	4.46 N	75.82 W	1,185	6.3	Over 700 missing and presumed killed, over 4,750 injured and about 250,000 homeless.
Aug 17, 1999	Turkey	40.7 N	30.0 E	17,118	7.4	At least 50,000 injured, thousands homeless. Damage estimate at 3 to 6.5 billion USD.
Sep 20,	Taiwan	23.7 N	121.0 E	2,297	7.6	Over 8,700 injured, over 600,000



UN International Strategy for Disaster Reduction (2006). 2005 Disasters in Numbers

15 Most Costly Years

Year	Total Losses ($ billions)	Fatalities
2005	100.4	399
1994	28.9	245
2004	27.2	337
1989	18.8	358
1998	18.3	672
1995	17.0	1,526
1993	16.6	216
1980	15.8	864
2001	14.8	445
1999	14.0	912
1996	12.8	533
1997	12.1	582
1979	11.4	316
2000	10.1	478
2003	10.0	422

Hazards & Vulnerabilty Research Institute (2006). 2005 U.S. Hazard Losses. University of South Carolina.

Kanto earthquake (Tokyo) 1.09.1923, M=8.2

Kobe earthquake (Japan) 16.01.1995, M=6.8

SPITAK EARTHQUAKE (ARMENIA) 7.12.1988, M=6.8

http://www.hleb.net/armenia/internet/index.html

Izmit earthquake (Turkey) 17.08.1999, M=7.8

SURFACE DISPLACEMENT FOR RADAR DATA

- Mantle convection theory, continent drift theory, as a base of horizontal and vertical movement of the earth surface.
- Earthquake mechanism theories: dilatancy theory, elastic rebound theory.
- Strong motion after the shock.

The model of ground displacement:
a - dilatancy model; b - elastic rebound theory.
1- stress, 2- cleavage stress.

Satellite and In-situ observations

Satellite observations	In-situ observations
Ground displacement before the shock	Tilt, strain, GPS, water level
Allweather surface temperature	Meteorological observations
Ion density and temperature in F-layer, 180-300 km	EM ground observations
Gas concentration	Gas concentration
Oxygen luminescence	Oxygen luminescence
Atmospheric temperature, pressure and humidity	Meteorological observations
Aerosol	Aerosol

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