Earth Sciences/Geotechnical Discipline Breakout

Co-leaders

Sean Gulick and Scott Olson

Participants

Eric Calais, Cecilia McHugh,

Roger Bilham

Summary Discussion

- Need to connect research into the earthquake and tectonics with the experiment underway to rebuild Haiti
- Scientist role in aiding with educational capacity building
- Scientist role in future hazard assessment

Summary Discussion

• Goals: Defining Earthquake Sources (Locations of faults, creeping behavior or not, slow earthquakes or not, recurrence interval, fault segmentation), projecting earthquake effects (fills, basins, topographic effects, tsunami), understanding coastal physical and chemical processes and their mitigating or exacerbating effects, determine land usage effects on hazards (landslides, tsunami, etc)

• Regional- targeted GPS coverage (roads and shoreline), seismometer network with geotechnical site characterization, subsurface images of faults onshore and offshore, paleoseismology onshore and offshore, tide gauges (NOAA?), crustal structure,Hispaniola remote sensing supersite

• Regional to Local- Higher density campaign style deployments of GPS and seismometers, rupture/creep meters, Port au Prince basin characteristics, surface geology and shear wave velocity, high-resolution topography and bathymetry, dynamic behavior of calcareous sand fills, high resolution basin stratigraphy, surface change studies (satellite), EPGF segments, Muertos Trough and Muertos Trough connection with EPGF, Septentrional Fault

Summary Discussion

• Broad Theme (Applied): Earthquake hazard (multi-hazard?) assessment for Hispaniola

• Broad Theme (Theory): Examining earthquake sequences and recurrence

• Examine and justify preparedness through scenario building by multidisciplinary teams; do this at different time scales- 1 y, 5 y, 20 y, etc

• Exploit short term earthquake awareness to educate public to best practices (help fight corruption?)- need research into how to do this and how to influence human behavior before during and after an earthquake

Civil/Environmental

Co-leaders: Norma Alcantar and Ozlem Ergun

Participants: Jane Harrison, Stephanie Lansing, Franco Montalto, Amenold Pierre

Summary Discussion

•Integrated Infrastructure - Evaluation of different management strategies and ecosystem services under limited resources

- Built infrastructure
  - Water
  - Energy
  - Waste management
  - Transportation
- Green infrastructure (example: reforestation)
- Social infrastructure
  - Health
  - Education

Summary Discussion

•Cascading effects of Infrastructure Development and Environmental Decisions / Development of design criteria

- Resiliency
- Recovery (economic, social)
- Time scales (short vs. long term effects)
- Multiple-players (new sustainability metrics with respect to equity, selfish goals, sustainability)
- Centralization vs. decentralization
- Uncertainty
- Multiple-ways to get to the same equilibrium point
- Optimization vs effectiveness
- Capacity building – implementation plan within the local community

Summary Discussion

•Sample Research Questions:

- How do infrastructural decisions impact local community based economies?
- How can we integrate infrastructural decisions to foster economic development?
- Recognizing interactions between social, economic, environmental and technical systems, what are appropriate integrated infrastructure decisions?
- How can we define sustainability as an engineering decision/design criteria?

Information Technology

Co-leaders

John Yen (Penn State), **Chen Li** (UC Irvine)

Participants

John Bevington (ImageCat), Johan Bollen (Indiana U.), Harvey Rhody (RIT), Kevin Simmons (NSF)

1. Adaptive Real-time Analytics of Needs

- Long-term recovery (physical & psychological)
- Study information needs:
  - Residents, decision makers, and first responders
  - E.g., many of NGO's didn't have enough information
  - E.g., a dashboard for users to post their needs
  - Needs: real time, adaptive
- Study what is available and possible:
  - Existing IT infrastructure (network, power, tower) of the area

2. Large-Scale Distributed Sensing

- **Crowd sourcing** using mobile technologies (e.g., using Twitter)
- **Example 1**: know the population density of a city. If users can use their mobile phones to submit information about their nearby people, the information can be aggregated to answer the query.
- **Example 2**: estimate the damage of a building. If users can submit images about a building, the information can be utilized to do the assessment.
- Challenges:
    - Reliability, accuracy, sampling?
    - Payment model for them to collect data (social science problem?)

3. Complex Systems and Networks

- Structure and dynamics of heterogeneous multidimensional networks: Social networks, communication networks
  - Diffusion and contagion, sentiment tracking, stress indicator
  - Prediction, critical point, gap analysis
  - Study how to use distributed solutions to increase the reliability of the IT infrastructure (cloud computing?)

Social Sciences I

Co-leaders: Kevin Meehan and Mimi Sheller

Participants: James Kendra, Ann-Margaret Esnard, Guitele Rahill, Nazife Ganapati, Kathleen Tierney, Liesel Ritchie, Louis Marcelin, Jean Robert Altidor, Deborah Thomas

Summary Discussion

* Research should include and/or address community-based participatory research (CBPR) methods with prolonged engagement

• Governance (trust, alternative forms of governance, emergent processes and institutions); and what are barriers to public participation?

• Understanding of issues that prevent or enable multi-organizational and multi-institutional coordination (e.g., UN cluster system)

• Understanding the role of culture, religion, worldviews,

• Role of technology in recovery and use of technology in social networks (local, regional, national and international)

• Role and challenges of diaspora in participating in recovery efforts

• Need to better understand social inequalities within the IDP communities, differences across regions, and their consequences

• How do multilateral and bilateral institutions impact on local organizational efficacy, accountability, and rule of law

Summary Discussion

• More understanding of local Haitian formal and informal community-based organizations, agencies, and groups involved in recovery and what their relation is to the international agencies. What are the synergies and dissonances between those levels?

• Need to understand different types of social capital (bonding, bridging, linking) in recovery process

• Giving serious consideration to how “we” are going about disaster response and recovery: what is working and not working?

• How to engage Haitians in disaster-preparedness activities; how to embed reduction of vulnerability or greater resilience (improved health, education, land-use planning) into risk management strategies

• Need better understanding of timescales: short term response vs. long-term thinking for sustainable recovery

• Social justice

Title of Breakout Session

Social Science II

Co-leaders

Jose Holguin-Veras, RPI

Louise Comfort, Pittsburgh

Participants

Tricia Wachtendorf, University of Delaware, Alka Sapat, Florida Atlantic Justin Yates, Texas A&M Jun Zhuang, SUNY Buffalo

Summary Discussion

Theme: How to build capacity in an environment that does not have basic sets of skills, of organizational, institutional capacity

1. Assistance: how to use resources, how to deliver resources in a context without basic organizational capacity for public institutions
2. Resilience: how to build resilience and long-term sustainability

Theme: Systems approach: subsystems and subsubsystems

1. How to best use of these components as part of a comprehensive disaster preparedness, response, and recovery strategy
2. Multi-level analysis of networks; multiple levels of disconnects
   a. How to build capacity with local goods; international aid disrupts local capacity
   b. Health: local capacity was destroyed by international aid
   c. Competition among networks

Summary Discussion

Theme: Information systems; what are the feedforward and feedback processes that drive the learning processes of the society

1. What uses of information technology can be developed to build capacity within a disaster preparedness, response, and recovery system?
2. How can information systems be used to link international, national, and local networks of action?

Theme: Alternative data collection methods and approaches: use of participatory action research.

STRUCTURES

Co-leaders

Robert Fleischman

Ayhan Irfanoglu

Participants

Reginald DesRoches, Marc Eberhard, Barry Goodno, Anna Lang,

Khalid Mosalam, Alexandros Taflanidis

Summary Discussion

• Development of methods to identify, assess, and retrofit large inventories of vulnerable structures

For engineered and non-engineered structures,

- Development of variations in design and construction of traditional structural systems that are economically and culturally appropriate, sustainable, and unlikely to collapse during earthquake or storms
- Development of new structural systems that are economically and culturally appropriate, sustainable, and unlikely to collapse during earthquake or storms
- Effective strategies for education and dissemination of information on proper design and construction

Summary Discussion

- Identification and hardening of essential facilities, infrastructure, and interdependent networks in a fragile society; impact of nonstructural performance
- Characterization of local materials; effect of local material properties on seismic performance; used in a sustainable manner; practical in-situ material quality assessment
- Use of new/alternative materials, including rubble as aggregate
- Instrumentation and monitoring