

# *Group A: Field Data Collection*

## **(Boots-on-the-Ground Perspectives)**

35 participants, majority geologists, some seismologists, and a few geodesists. Earthquake geologists are the ones doing most of the post-earthquake response, recognizing/confirming which faults ruptured, surveying the surface deformation, measuring co-seismic displacements (?) and preliminary damage in infrastructures, providing data to guide other geo-scientists

Contributors: Stephane Baize, Will Buckley, Conni De Masi, Austin Elliott, Paula Figueiredo, Alessio Testa and Group A participants

# *Breakout Group A: Field Data Collection*

Giuliana Alessio (INGV)

Jelime Aray Castellano (UNAM)

Raffaele Azzaro (INGV)

**Stéphane Baize (IRSN)**

Nicolas Barth (UC Riverside)

Simone Bello (Univ Chieti-Pescara)

Luke Blair (USGS)

Paolo Boncio (Univ Chieti-Pescara)

**William Buckley (SDSU)**

Carol Canora (UAM)

Rui Chen (CGS)

Patrick Chindandali (GS of Malawi)

Riccardo Civico (INGV)

Genevieve Coffey (GNS Science)

**Conni De Masi (NBMG)**

**Austin Elliott (USGS)**

**Paula Figueiredo (NCSU)**

Gareth Funning (UC Riverside)

Max Garvue (Virginia Tech)

Martha Gómez-Vasconcelos (UMSNH)

Suzanne Hecker (USGS)

Mark Hemphill-Haley (Humboldt State)

Matthew Herman (CSU Bakersfield)

Shao-Yi Huang (Academia Sinica)

Juan M. Insua-Arévalo (Madrid)

Miklos Kazmer (Eötvös)

Yann Klinger (CNRS)

Ozgur Kozaci (InfraTerra)

Romain Le Roux-Mallouf (EDF)

Rodrigo León-Loya (UNAM)

Christopher Menges (USGS)

Chukwuebuka Nweke (USC)

Jason Patton (CGS)

Belle Philibosian (USGS)

Maria-Teresa Ramirez (UNAM)

Christine Regalla (Northern Arizona)

Klaus Reicherter (RWTH Aachen)

Magali Riesner (Cerege/CNRS)

Pierre Romo (Private Sector)

Carla Rosa (CGS)

Kate Scharer (USGS)

**Alessio Testa (Univ Chieti-Pescara)**

Kate Thomas (CGS)

Stephen Thompson (LCI)

Charles Trexler (USGS)

Clara Yoon (USGS)

Judy Zachariasen (CGS)

Mindy Zuckerman (ASU)

*red text are discussion moderators*

# *Field Data Collection: What Works Well*

- **Trained** and **experienced** field geologists able to recognize large perspective and details of earthquake surface effects (e.g. Ridgecrest)
- Some **mapping softwares** (ex. ArcGIS Field Maps, ESRI), some w/ license (*not ideal*)
- **UAV** and **LiDAR** surveys for some cases (works well in unvegetated, and non-urban, and non-militarized areas)
- In SoCal, **several EQ's** provided opportunity for local responders to practice, experience situations and develop strategies
- SoCal has **many** EQ responders through USGS, CGS, SCEC and academia



Fig. 1. ArcGIS Field Maps logo.



Fig. 2. Geologists with the USGS, the California Geological Survey (CGS) and Naval Air Weapons Station China Lake (NAWS) responding to the Ridgecrest earthquake in July 2019 (from usgs.gov)

# Field Data Collection: What Needs Improvement

- **Standardization of GIS database** (ex. ESRI or QGIS) when transferring measurements, including field measurements vs. final products.
- Create “cheat sheets” with a **standard procedure** for measuring fault surface rupture and deformation features.
- Hold **Post-earthquake survey training** every ~2-3 years.
- Training for **Ethical/Survival guidelines** in a Post-EQ disaster setting
- Better **coordination** on how obtaining **InSAR**
- Create **archives** of **High-resolution DEM** AND **Optical Imagery** along major fault zones (similar to B4)
- Need for UAV & LiDAR **high vertical resolution**; small scarps/displacements may not be adequately surveyed.
- RTK requires a base station, and potentially cell coverage, which can be a problem in remote areas
- A **list of earthquake geologists** for given regions could be useful

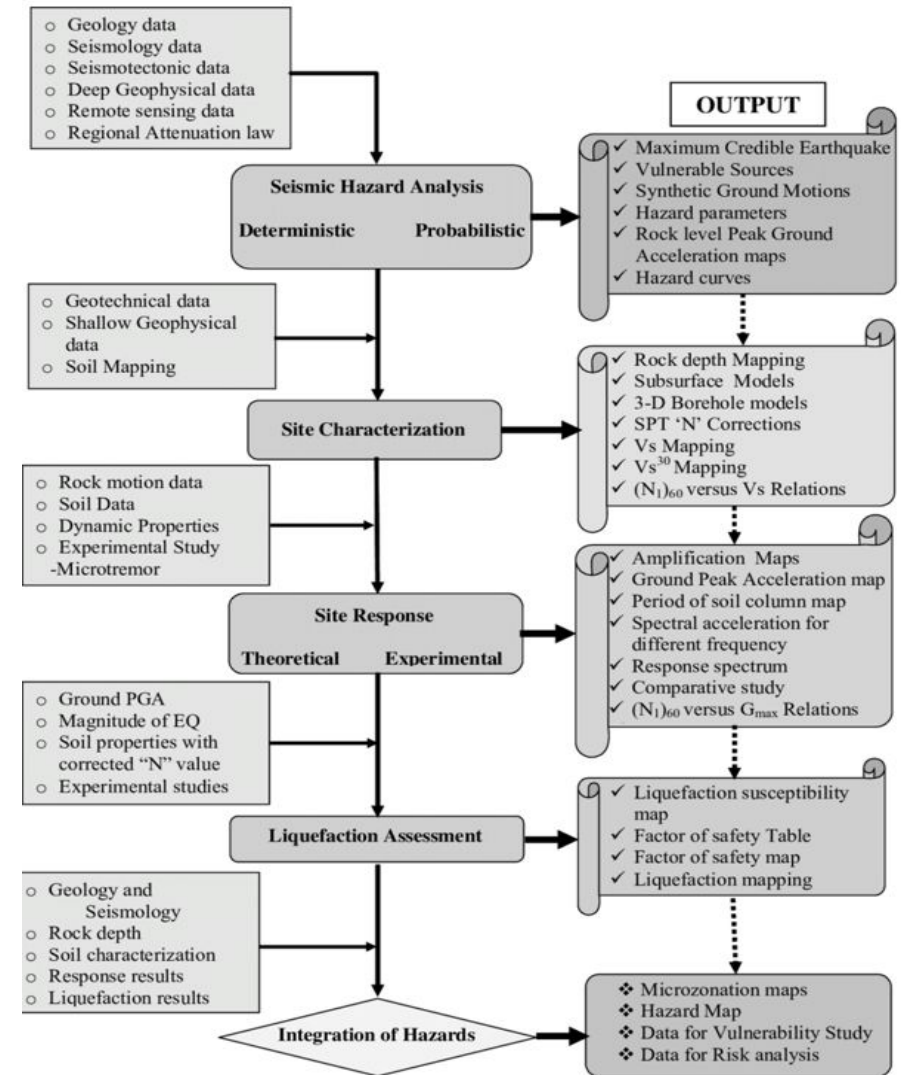


Fig. 3. Seismic hazard flow chart (Thallak & Panjamani, 2007)

# Field Data Collection: Short-Term and Long-Term Tasks

- **Short term**
  - Get **certifications** as needed for tasks like aerial surveys.
  - Some sort of **training for reconnaissance in urban areas**
  - Training in **mapping tools** (*open-source?*)
  - **Create Guidelines** for rapid recon
  - Make **standards** for field measurement **available**
- **Long term**
  - Maintain a **standard interval of training** exercises
  - Develop **databases for Post- EQ surveys**, later developed for different types (reverse, SS, normal, complex, blind)
  - Create **synergies Geology/ Geodesy/ Geophysics**
  - Create **international & national synergies** to cover lack of knowledge/data and facilitate future surveys



Fig. 4. Photo of an FAA Part 107 license, an essential tool for conducting aerial surveys with a UAV.