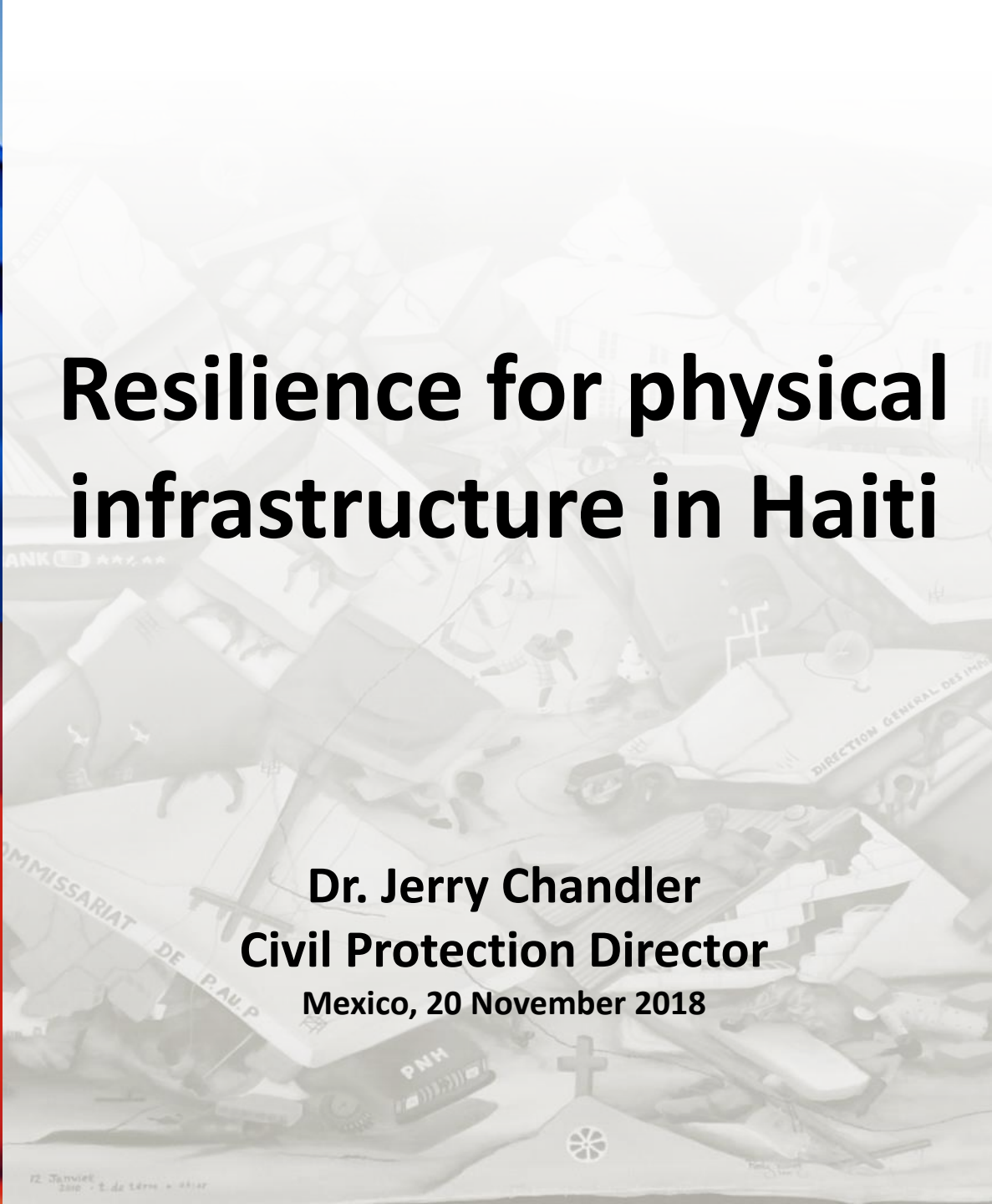




# Resilience for physical infrastructure in Haiti

**Dr. Jerry Chandler**  
**Civil Protection Director**

Mexico, 20 November 2018



# OUTLINE

- Vulnerability of Haiti
- Aggravating factors of Haiti's vulnerability
- Efforts to promote resilience in urban communities and strengthen infrastructure

# SEISMIC RISK

Figure 1 : Diagram of tectonic plates and main fault lines

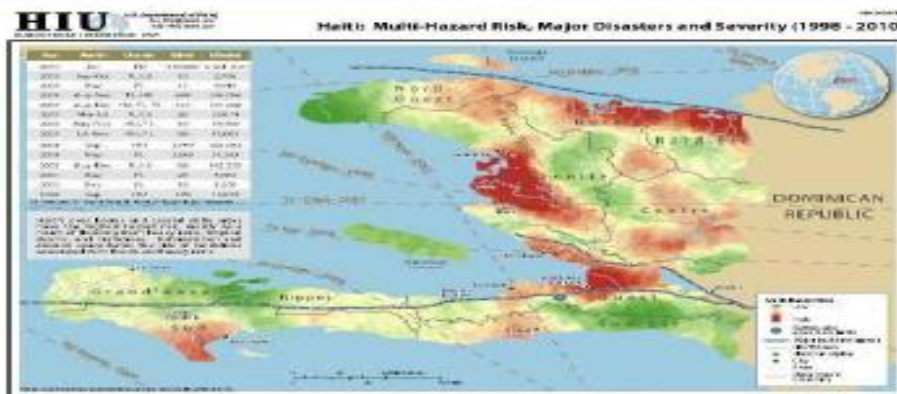


Source: *Institute de Physique du Globe de Paris (IPGP)*  
<http://www.iqgq.fr/pages/040114.php> / <http://www.iqgq.fr/pictures/lib/3218.iqg>

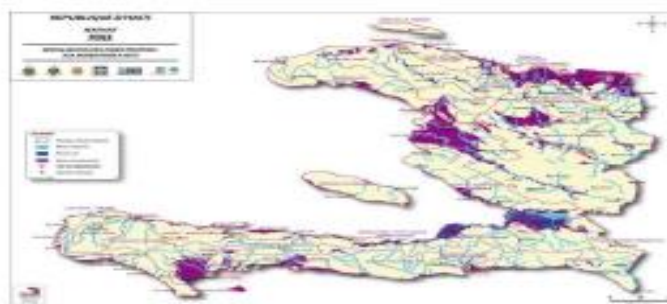
- The first fault line along the North coast which runs from East to West and extends into the Cibao valley in the Dominican Republic
- The second fault line crosses the peninsula of Southern Haiti from West to East, crossing Port-au-Prince via Enriquillo valley in Dominican Republic.

# CLIMATIC RISK

- **Aléas hydrométéorologiques et climatiques : sécheresse, fortes pluies, inondations, cyclones... précipitations moyennes et zones climatiques**



- Cyclones et inondations en Haïti (1998-2010).



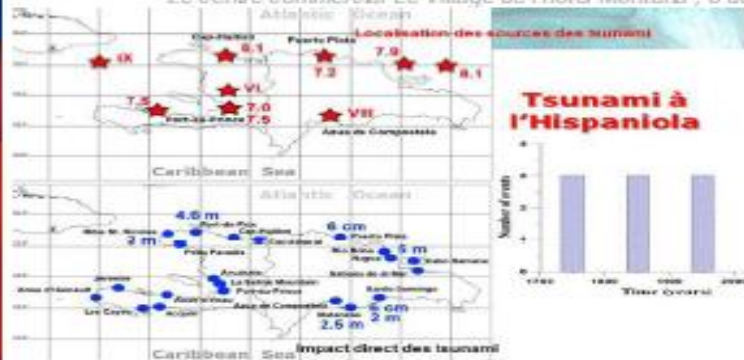
- Carte préliminaire de la menace d'inondations fluviales en Haïti.

# EXTERNAL GEODYNAMIC RISKS

- **Risques géodynamiques externes : rupture de pente**
- Risques côtiers : tsunامي ; effets des tempêtes; marées de tempête ; inondations côtières; érosion côtière**



*Le centre commercial Le Village de l'Hotel Montana ; 6 décembre 2009; et 16 février 2010*



*Delta de la côte sud-est de Port-au-Prince, envahie par le développement urbain.*

*Séismes tsunamigènes sur l'île d'Hispaniola*

# VULNERABILITY: CITY OF PORT-DE-PAIX

## Ville de Port-de-Paix



# VULNERABILITY CITY CAP-HAITIEN

## Ville du Cap-Haïtien



# VULNERABILITY: “JALOUSIE”

## Quartier de Jalousie à Pétion-Ville





# AGGRAVATING FACTORS OF HAITI'S VULNERABILITY



- EXPOSURE
- DEGRADATION OF THE PHYSICAL ENVIRONMENT
- DENSITY OF THE POPULATION (Particularly in urban areas)
- DEMOGRAPHY
- POVERTY
- SOCIO ECONOMIC INEQUALITY

# CONSEQUENCES OF THE VULNERABILITY

- In 2004, Hurricane Jeanne killed 3,000 people, mostly in Gonaives
- In 2008, four consecutive storms killed hundreds more across the country.
- In January 2010 a 7.2 earthquake killed over 200,000 people
- In 2016, Hurricane Matthew smashed through southern Haiti, killing hundreds and leaving 200,000 homeless.

# EFFORTS TO PROMOTE RESILIENCE (Housing, Public & Private buildings)



- Establishment of mandatory earthquake standards for all public buildings and major infrastructure, including hospitals and schools,
- Inspection of building construction, from the architectural design stage to the implementation/construction phase.
- Prohibition of anarchic construction that does not adhere to technical standards.

# EFFORTS TO PROMOTE RESILIENCE

- Education of the population with respect to natural hazards:
- Inclusion of natural hazards in school curricula. Introduce a course on natural hazards and risk management at the university level. –
- Provide the construction industry (in particular craftsmen) and city councils with the basic regulations on safe construction.

# EFFORTS TO PROMOTE RESILIENCE

- Establishment of hydrometeorological, seismological and geodesic monitoring integrated networks
- Mapping of the geotechnical characteristics of soil and subsoil in major urban zones and detailed seismic microzoning.
- Training (at the Master's and Doctoral levels) in natural hazard and risk management.
- Better informed decision making on natural hazards Management.

# EFFORTS TO PROMOTE RESILIENCE

- Preparation and Implementation of a building code
- Prohibition construction in zones most exposed to natural hazards.
- Strengthening the capacity of the office of Public Works Laboratory which is officialy in charge of geotechnical studies before building construction.

# COLLECTIVE EFFORTS FOR RESILIENCE

- MINISTRY OF INTERIOR ( Coordination with the Municipalities + Civil Protection)
- MINISTRY OF PLANNING ( Land Management & Urban Planning)
- MINISTRY OF INFRASTRUCTURE (Building codes.....)
- MINISTRY OF ENVIRONMENT
- With the support of International, regional Organizations, NGO, Private sector and the Civil Society

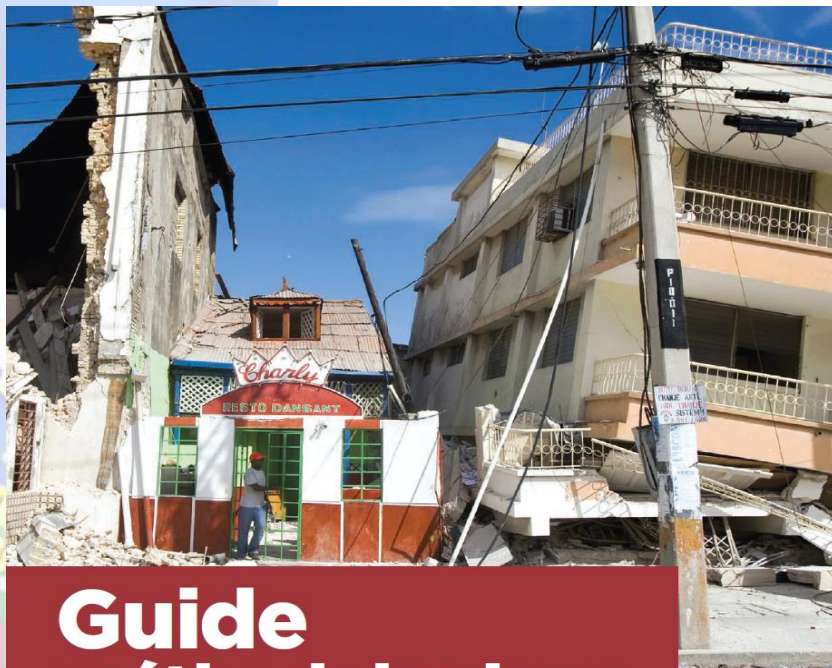
# EFFORTS FOR RESILIENCE

- **Construction Guide for Small Buildings in “Maconnerie Chainee”**
- **Practical Guide to Repairing Small Buildings in Haiti**
- **Parasismic and Paracyclonic Building Guide**
- **National Building Code of Haiti (CNBH 2012)**





# EFFORTS FOR RESILIENCE



## Guide méthodologique

Réduction des risques naturels en  
zone urbaine en Haïti

MIEUX PRENDRE EN COMPTE LE RISQUE NATUREL DANS L'URBANISATION ET L'AMÉNAGEMENT DU TERRITOIRE

Synthèse



## MANUAL OBJECTIVES:

- PREVENTION
- PROTECTION
- PLANNING
- COMMUNICATION
- TRAINING

# LIDAR : les Cayes en 3D



# CONCLUSION

- Despite all those efforts made by the government of Haiti with the support of partners, much more need to be done for RESILIENCE, such as:
- Strengthening the Disaster Management framework in Haiti
- Strengthening the capacity of the municipalities to ensure monitoring and enforcement in housing and building sector
- Integrating RESILIENCE in the Development planning process

THANK YOU



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