NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE | Institute of Catastrophe Risk Management

Evaluation of Natural Catastrophe Impact on the Pearl River Delta (PRD) Region – Earthquake Hazard

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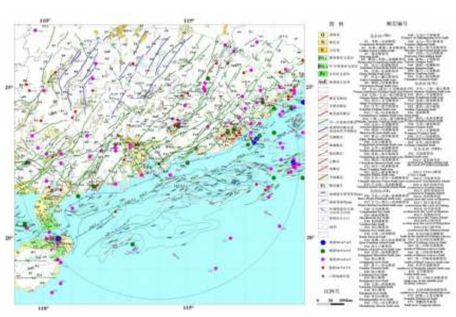
Why the Focus on PRD?

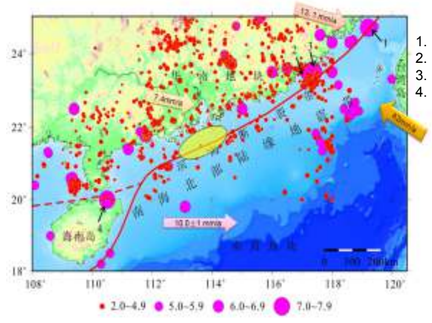
- PRD region has the largest growth of real assets & urban centers in China, which exacerbated the catastrophe risks.
- It comprises major urbanized areas of Guangzhou, Shenzhen, Hong Kong. Macau, etc and is home to 100 million inhabitants. The region is one of China's main economic centers, generating 11% of China's GDP.
- It has high density exposure (human and economic), while being one of the most exposed to Nat Cat impact of floods, storm surges, and to a lesser extent earthquakes.
- Climate change effects will potentially impact further the PRD region.

Mapping Earthquake Hazard of the PRD Region

Regional Seismology of the PRD Region

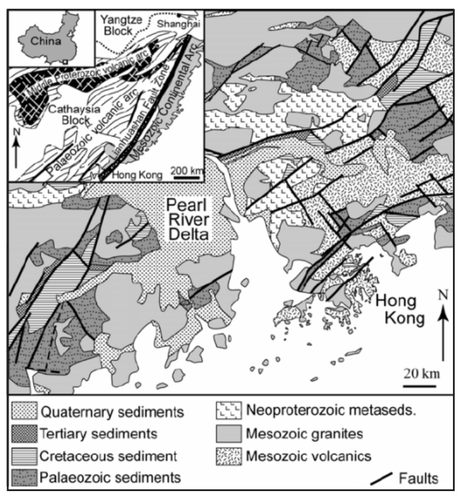


Tectonic structure of the PRD region
Source: GEERRI 2010

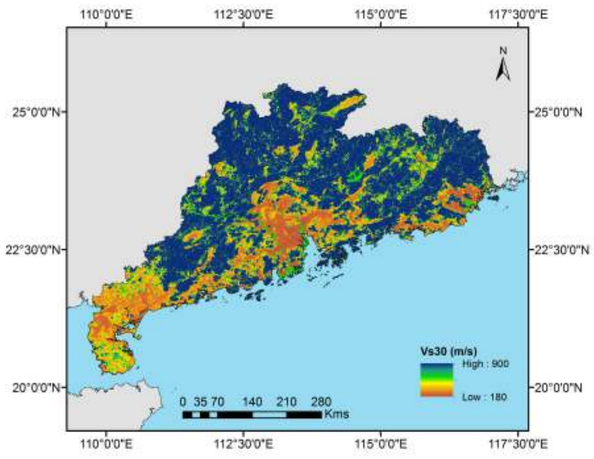


Seismic activity in northern margin of South China Sea

Geological Information of the PRD Region

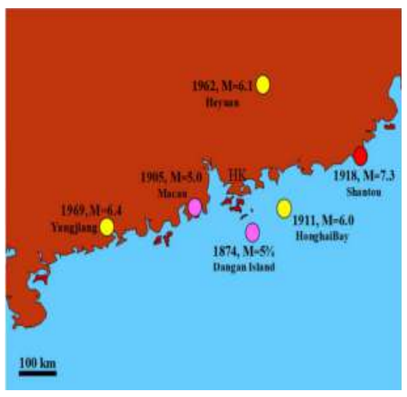


Geological Map of the PRD region
Source: Shaw et al. 2010

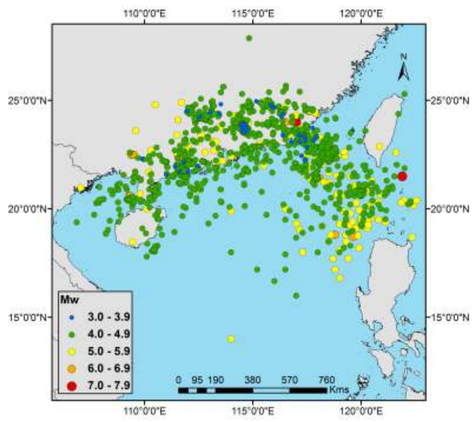


Site Condition: Vs30 map of Guangdong Province obtained from USGS

Historical Earthquake Events Catalogue



Major historical earthquakes in PRD region (1067 to 2011)
Source: HK GEO information note 2015



Historical earthquake events collected in the study area

Earthquake Hazard Evaluation

- **OpenQuake-based framework for seismic hazard and risk analyses**

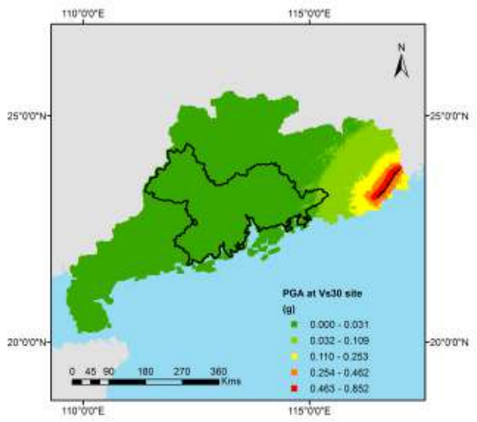
Source parameters used in OpenQuake for the 1918 Shantou Earthquake

M_w	Depth (km)	Strike (°)	Dip (°)
7.3	10	44	60
Epicenter (lat)	**Epicenter (long)**	**Upper Depth (km)**	**Lower Depth (km)**
23.613	116.828	2.0	17

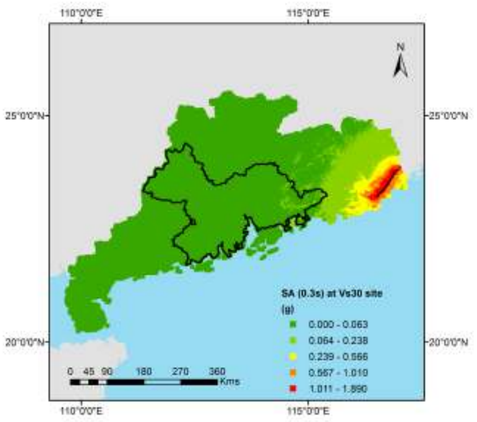
The Worst-case Earthquake Scenario: 1918 Shantou Earthquake (Mw 7.3)

Epicenter of the 1918 Shantou Earthquake

Damaged buildings during the 1918 Shantou Earthquake



Generated surface PGA map considering the 1918 Shantou Earthquake (Mw=7.3)



Generated surface Sa(0.3s) map considering the 1918 Shantou Earthquake (Mw=7.3)

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