UNIVERSITY OF CAMBRIDGE
INSTITUTE FOR SUSTAINABILITY LEADERSHIP

Disaster Risk Financing & Insurance Program
SUPPORTED BY WORLD BANK GROUP

CENTRE FOR GLOBAL DISASTER PROTECTION

GFDRR
Global Facility for Disaster Reduction and Recovery

UKaid
from the British people

The changing impact of disasters on physical and social resilience: global context

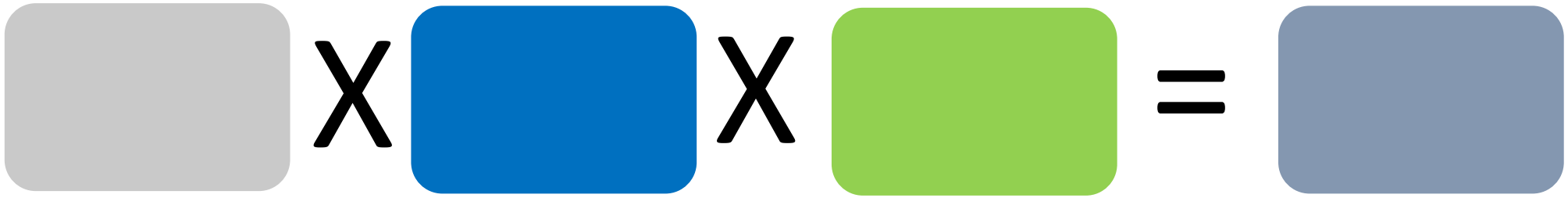
Robert Muir-Wood

Abstract

- To manage *disaster risk* we have to understand its components: the *hazard* (the damaging agent), the building, crop or people *exposure* and the *vulnerability* of that exposure to the hazard.
- The common natural hazards: earthquake, cyclone, flood and drought have their specific geography, severity and probability. Some perils are intensifying with climate change. Building exposure grows with urbanization and population. While we know how to build to withstand or avoid the hazards, all too often these lessons are not applied.
- The keys to *resilience* are in anticipating, preparing and building back better after disasters.

The Risk Equation

The risk ‘equation’

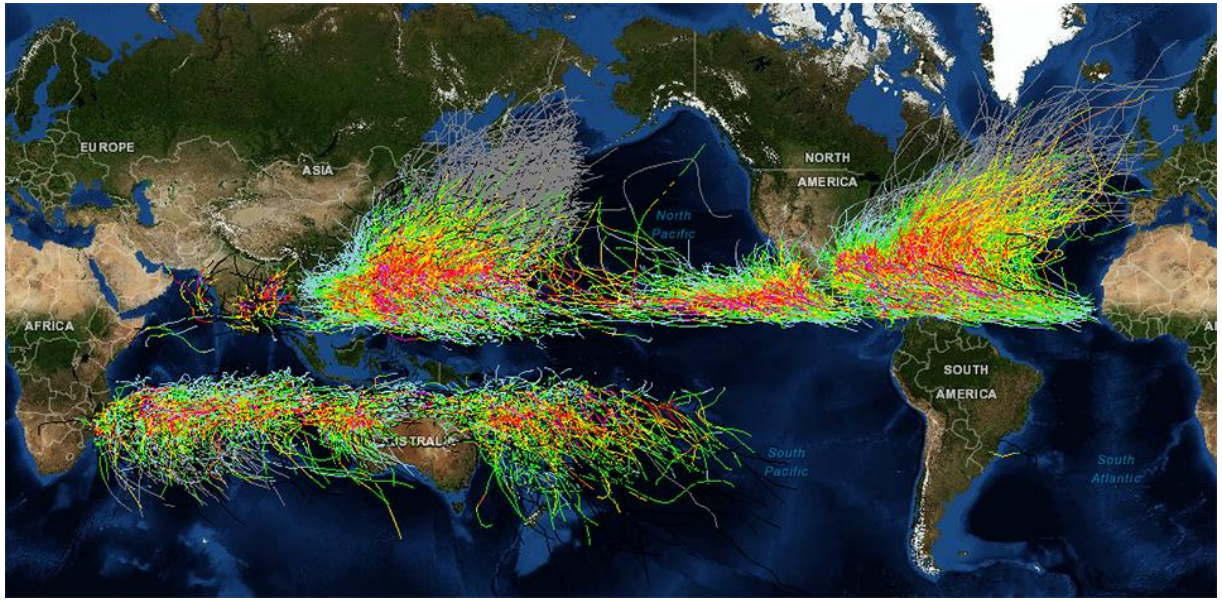


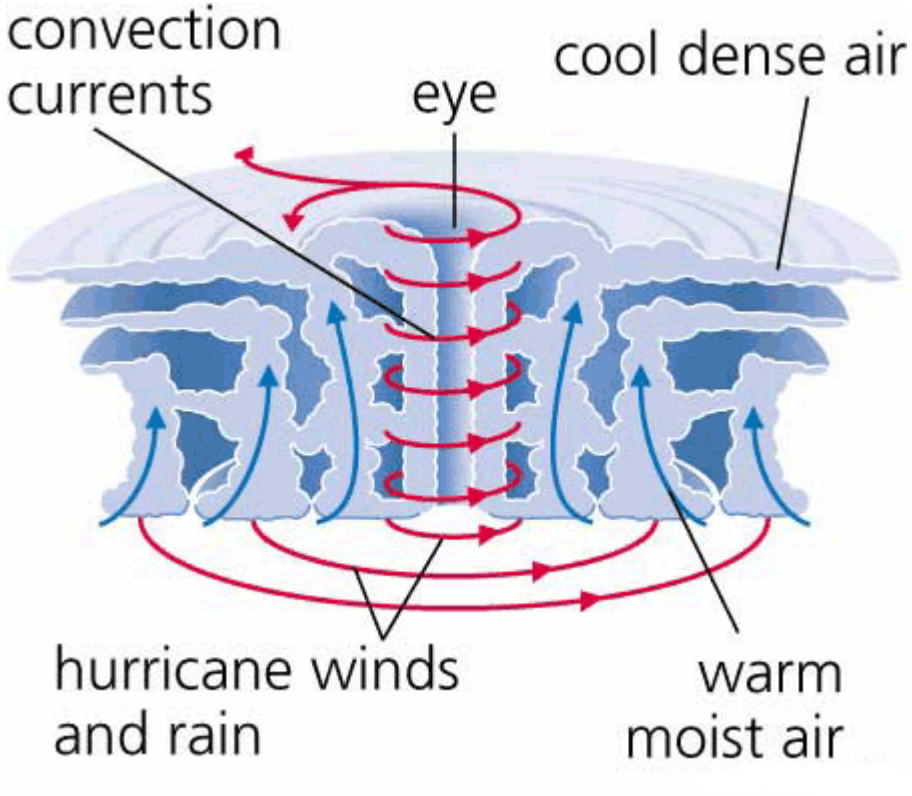
hazard **exposure** **vulnerability** **Loss risk**

Hazards: severity and geography

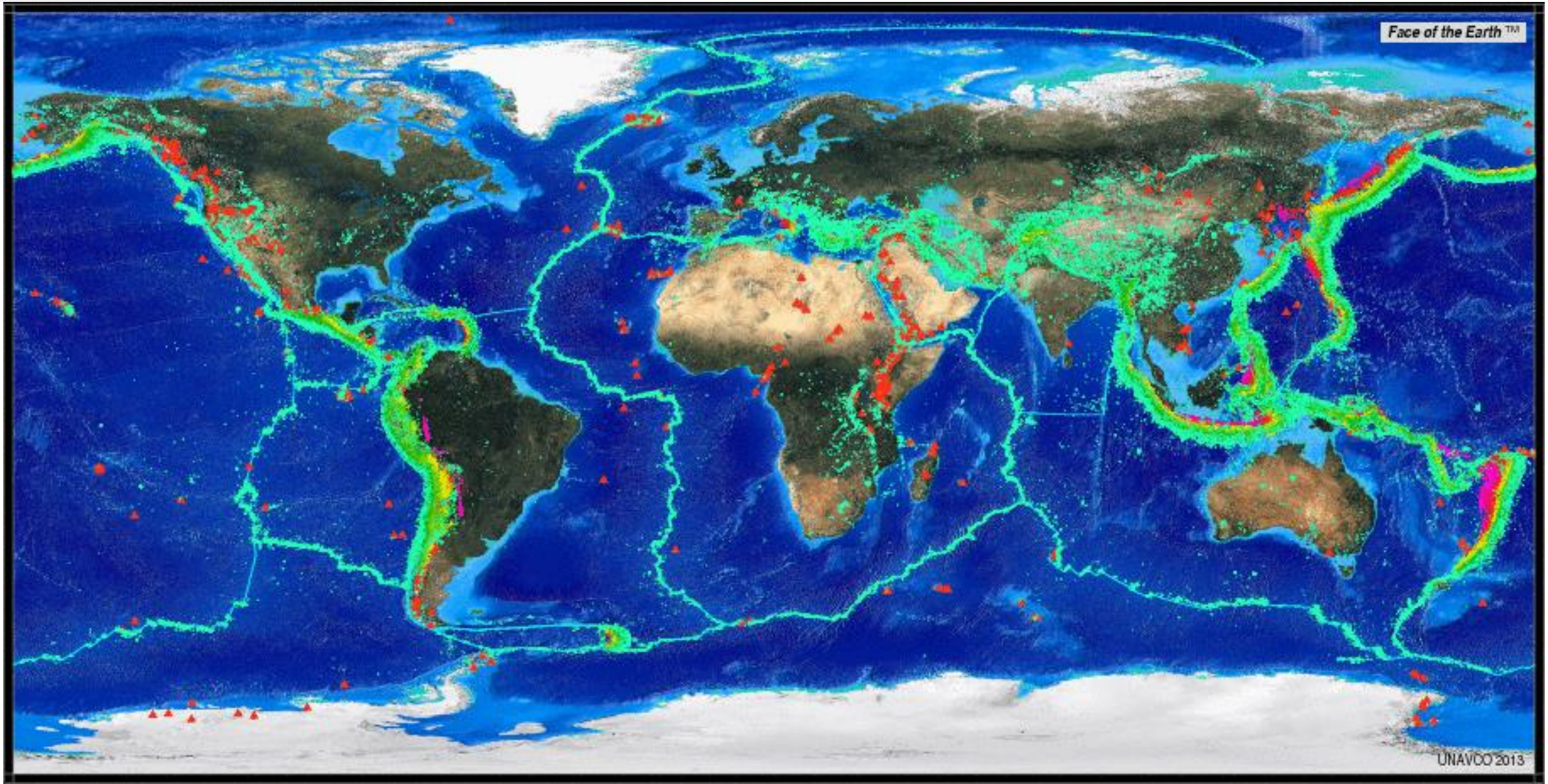
Tropical Cyclone

- Local names = Hurricane, Typhoon, Cyclone
- Tropical - form over water >27C but not within 8-10 degrees of the Equator
- Principally coastal impacts as cyclones decay over land





Earthquake geography



Classes of floods

Pluvial

Fluvial

Storm Surge

Damburst

Drought

Groundwater

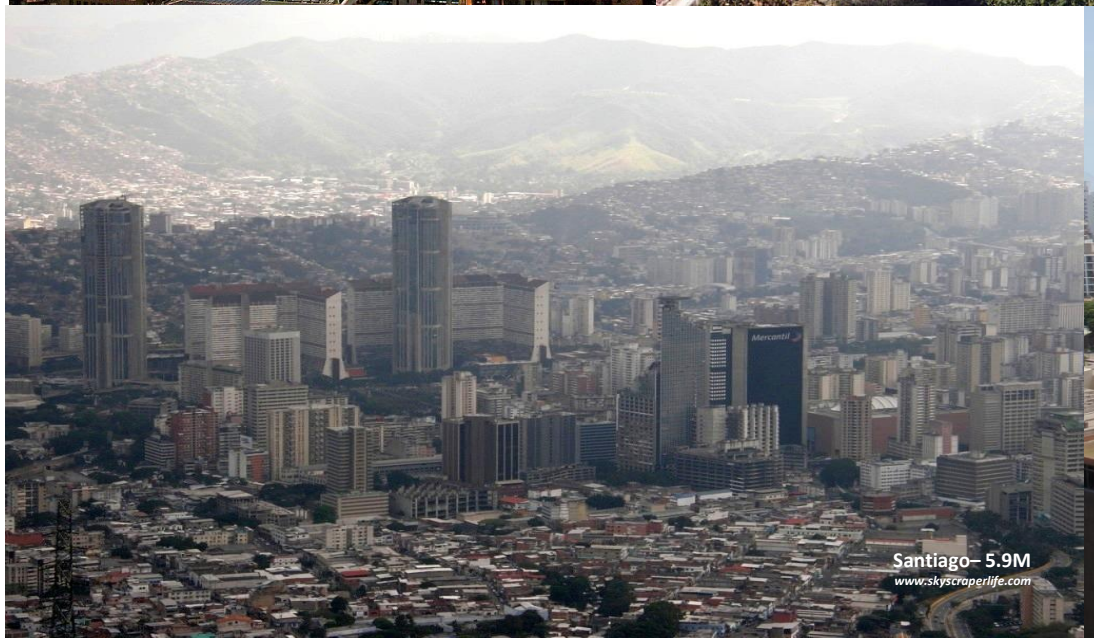
Rivers/Lakes

Heatwave

Wildfire

Exposure

The megacities of South America



Each major city has its barrios…

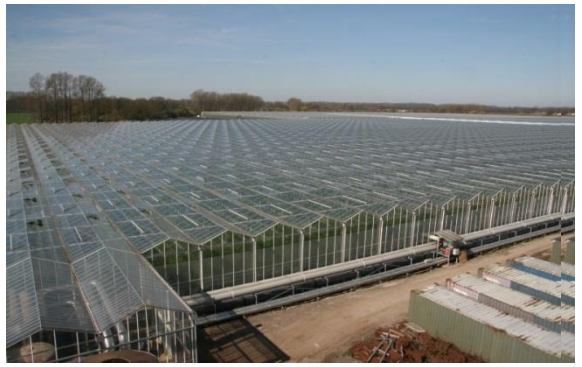
Agriculture exposure categories

Crops

Plantations

Livestock

Glasshouse



Aquaculture

Poultry

Agri-Infrastructure

Food

Vulnerability

Vulnerability to damage & loss

Flood

Drought

Earthquake

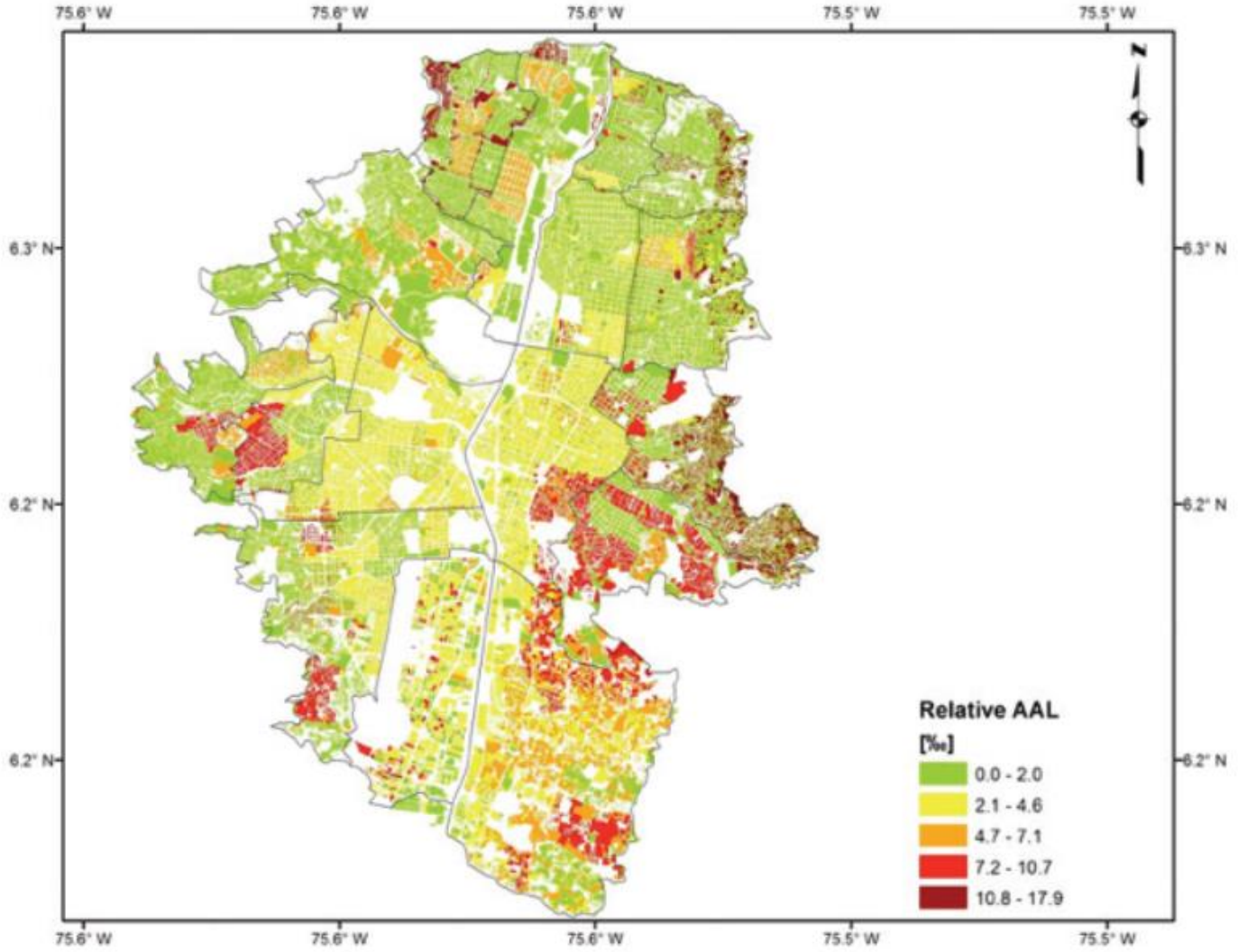
Wind

Risk

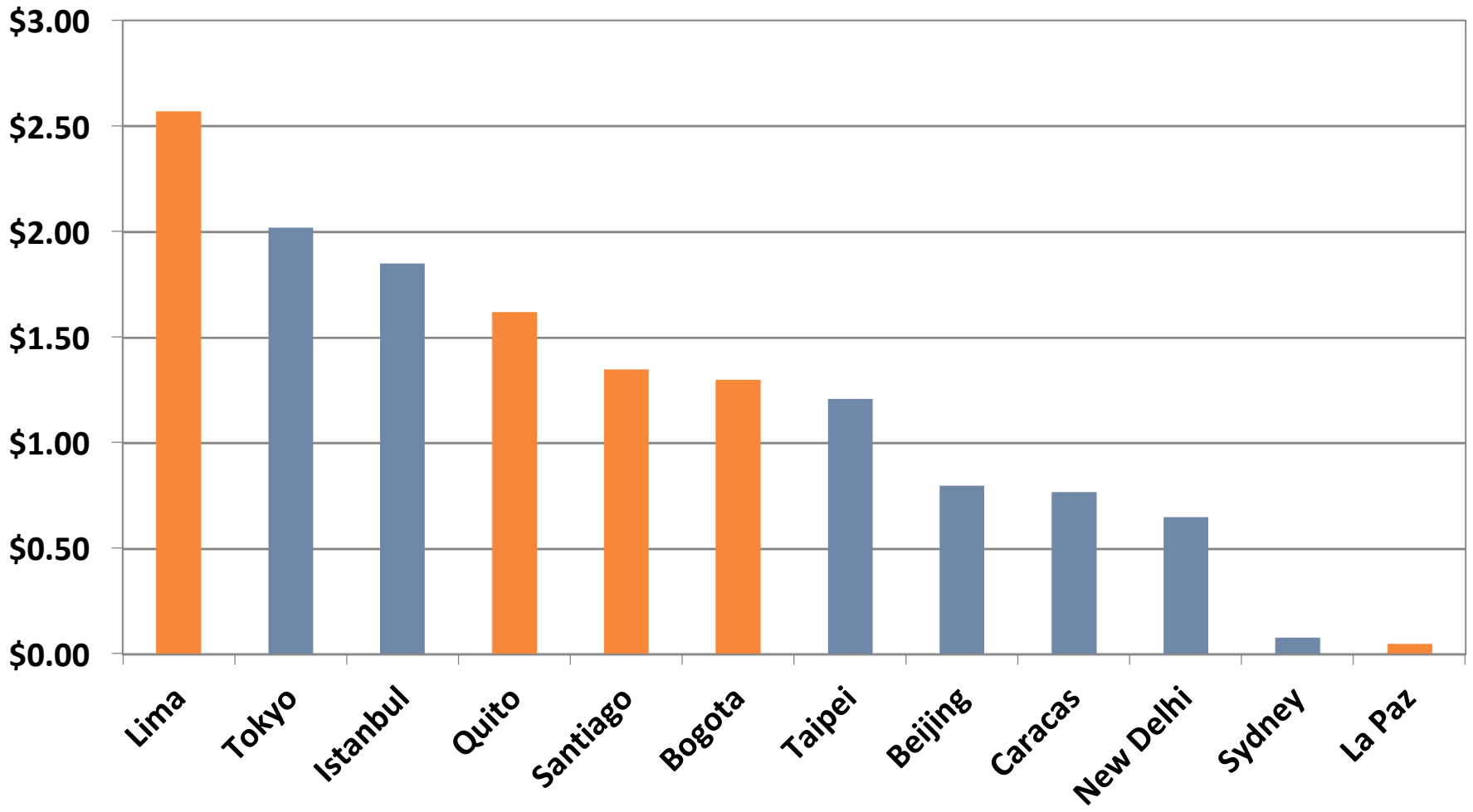

Tehran

FIGURE 2. Earthquake relative AAL map for Medellín, Colombia

Source: Mario A. Salgado-Gálvez, Daniela Zuloaga-Romero, Gabriel A. Bernal, Miguel G. Mora, and Omar D. Cardona, "Fully Probabilistic Seismic Risk Assessment Considering Local Site Effects for the Portfolio of Buildings in Medellín, Colombia," Bulletin of Earthquake Engineering 12 (2014): 671–95.



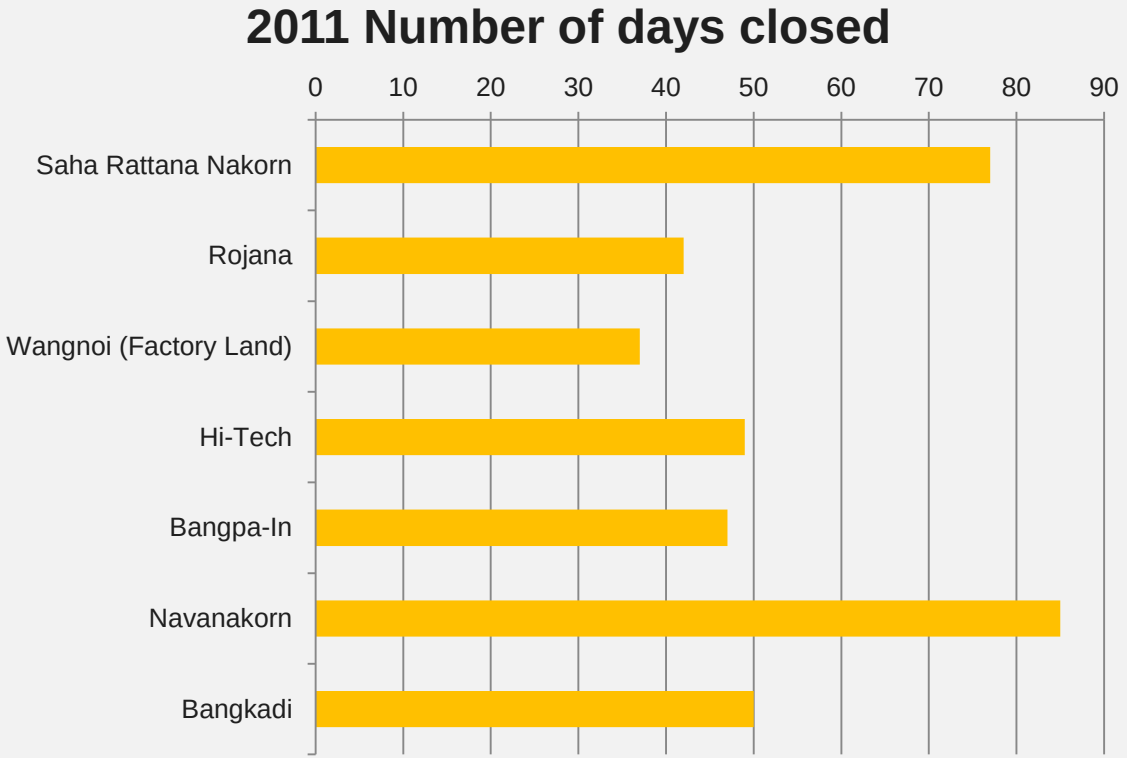
Economic Residential Loss Cost (AAL/$1000 exposure value) -- *Capital Cities*

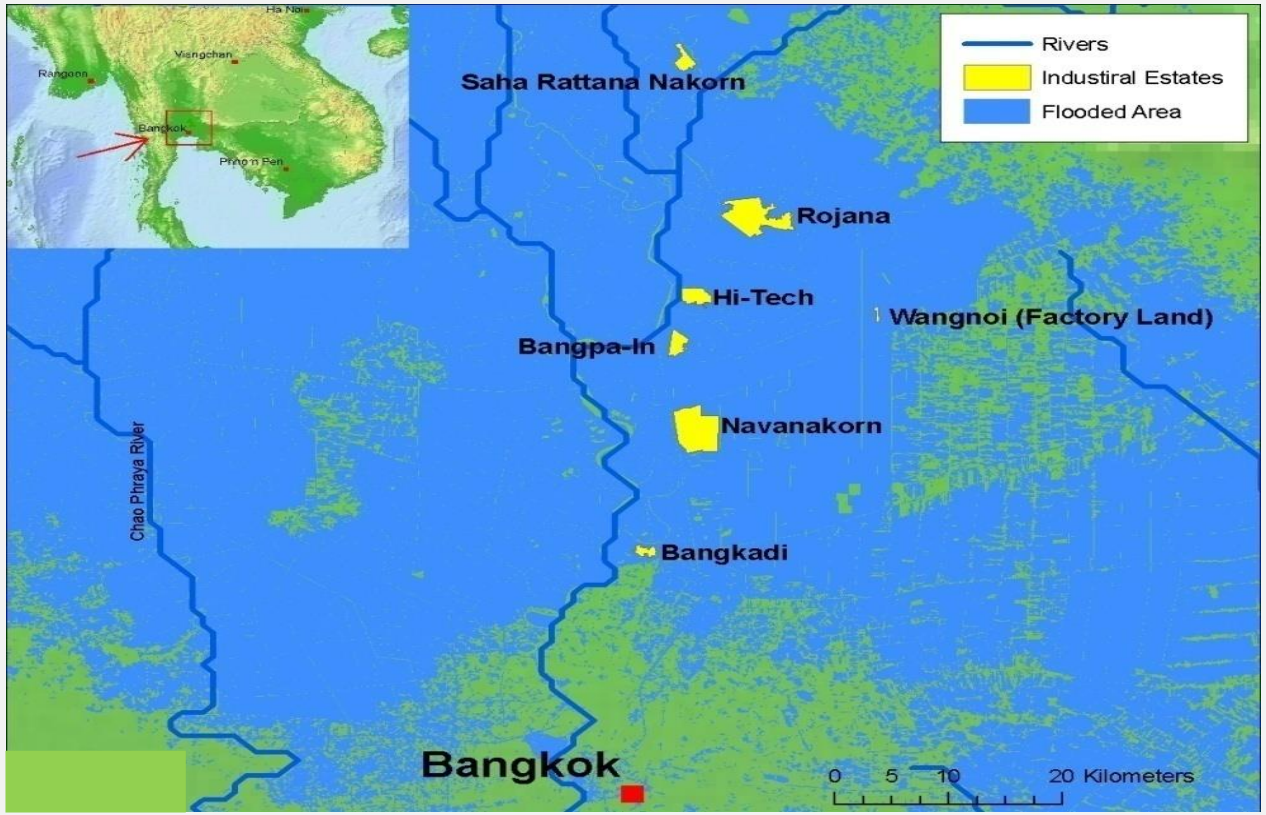


- What is the chance multiple Industrial Parks are affected by the same catastrophe?

•Flat (for production lines)
•Cheap
•Not previously built on
•Expandable site

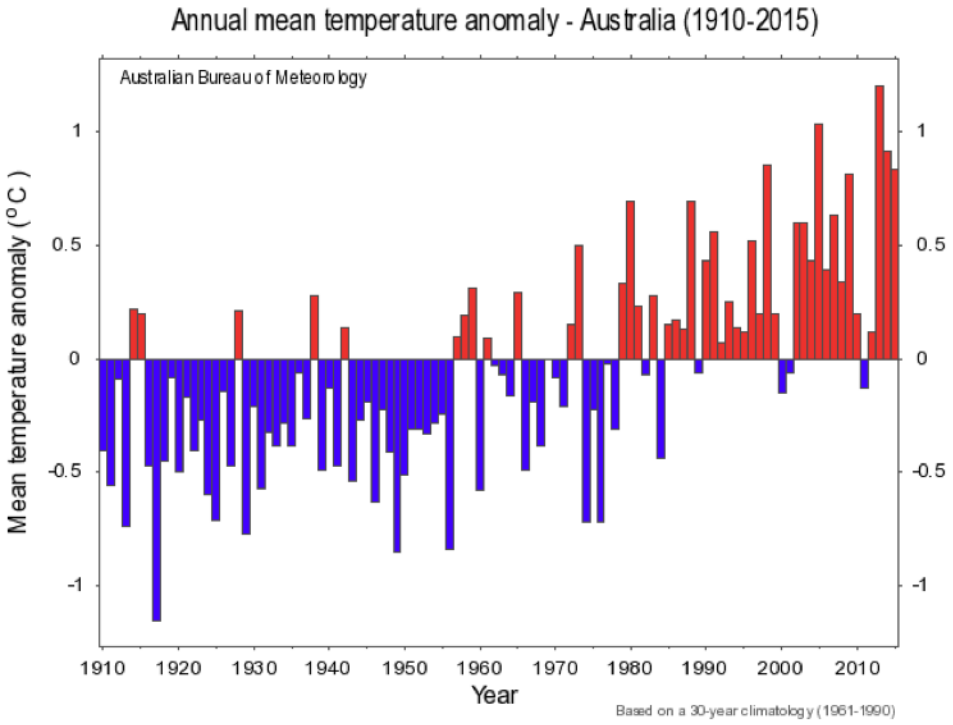
= Floodplain

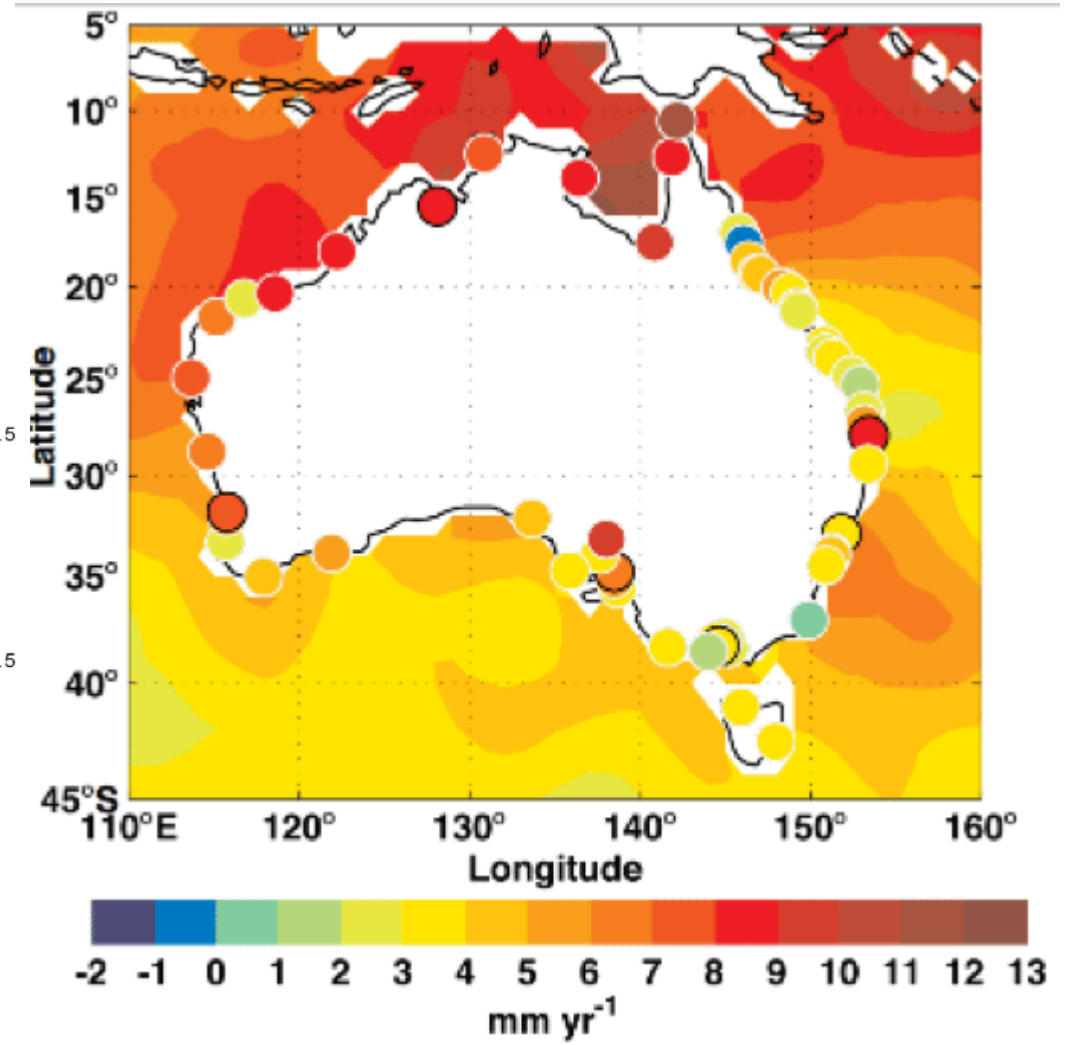




Change

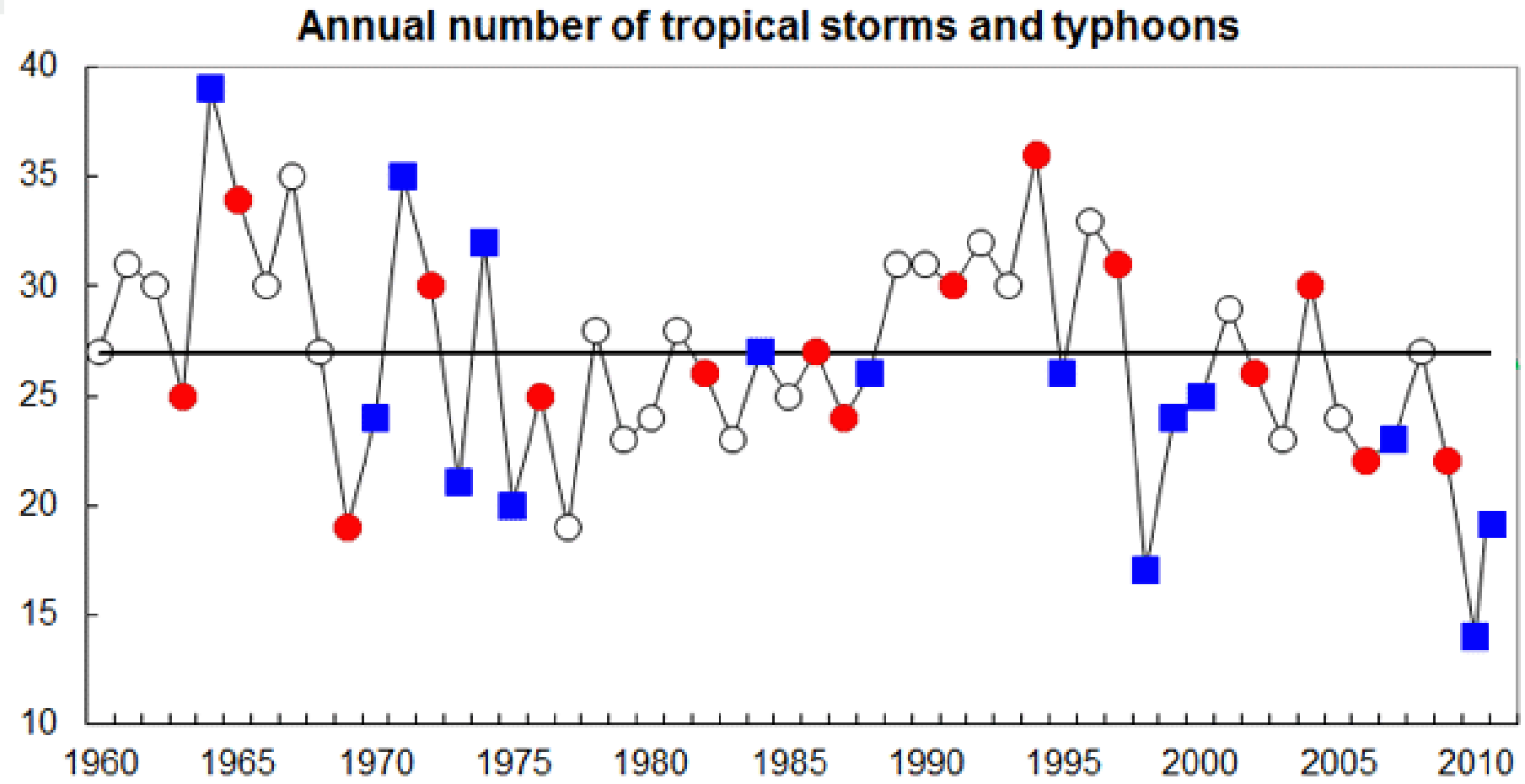
Changing climate



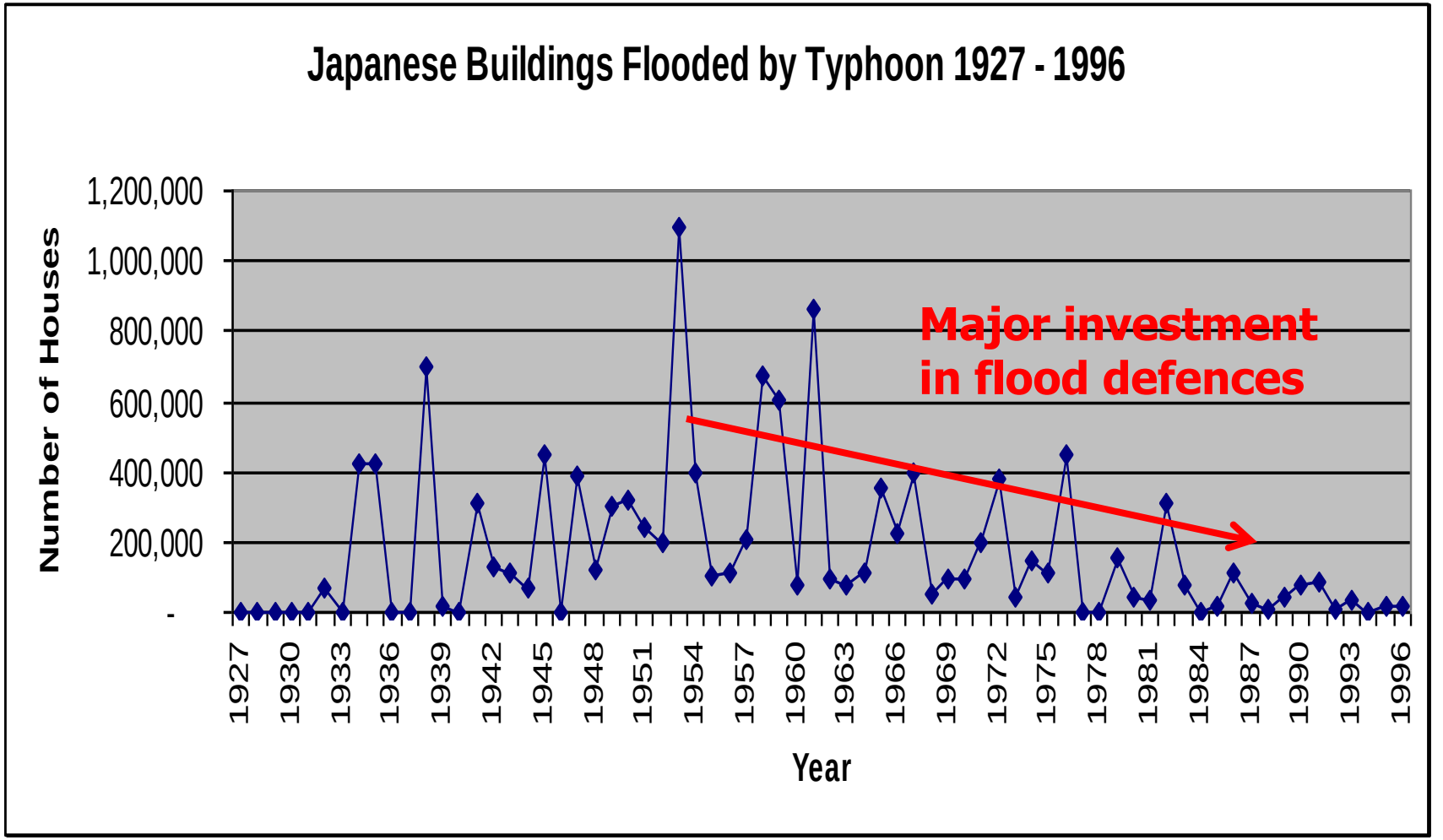


Sea level trends from 1993-2010

West Pacific typhoons



Trends can be reversed



Informal development in landslide zone
Port au Prince, Haiti Jan 2010

Drivers of Change:

- Changes in Climate
- Increases in Exposure at risk
- Urbanization

Resilience

Resilience

- Full anticipation of potential disasters (and their likelihood)
- Focus on building code compliance and zoning
- Infrastructure protections
- Foster strong & informed social networks

What happens to resilience when there has not been a disaster for a long time?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