



Natural risks and climate-related disasters

Geoffroy Enjolras
Professor of Finance
Grenoble IAE, University Grenoble-Alpes

geoffroy.enjolras@iae-grenoble.fr

Outline

- Typology of natural risks
- Climate-related disasters
- Overview in 2016
- Influence of climate change on risks
- Concluding remarks

Natural risks

- 1. Direct risks resulting from the occurrence of a natural hazard
 - Main hazards
 - Meteorological events: *Storms*
 - Hydrological events: *Floods*
 - Climatological events: *Drought, Wildfires*
 - Types: *Housing, Transportation*
 - Origin: *Known, including for catastrophes*
 - Data: *Important set of events and associated losses*
 - Insurability: *Possible*

Natural risks

- 2. Indirect risks resulting from subsequent events
 - Types: *Financial losses, Farm losses, Political risk, Mortality*
 - Examples
 - Disruptions in supply chains
 - Lack of resources
 - Political, economic and social shocks
 - Exposition of insurers' portfolios and commitments
 - Origin: *Cannot be foreseeable nor predictable*
 - Data: *No historical data or not interpretable*
 - Insurability: *Impossible or tricky*

Natural disasters

- Main stakes

- Correlation of losses

- Many victims, facilities and activities
 - No pooling (for insurers)

According to Aon (2017):

Economic Loss: \$50 M

Insured Loss: \$25 M

Fatalities: 10

Injured: 50

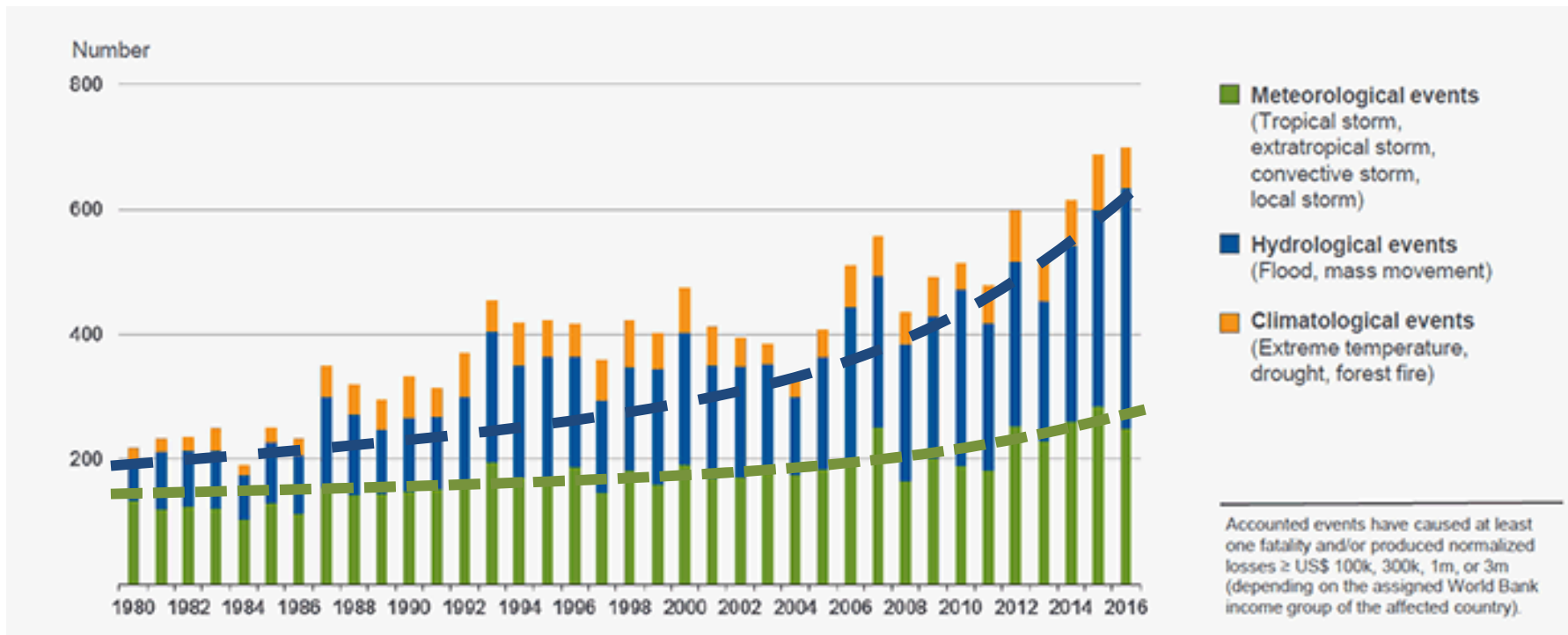
Structures damaged: 2,000

- Magnitude of losses

- Insurance/Reinsurance companies overwhelmed
 - Key role of the government
 - Coordination of emergency aid and humanitarian help
 - Initiator of the insurance market
 - Insurer of last resort

Weather-related disasters

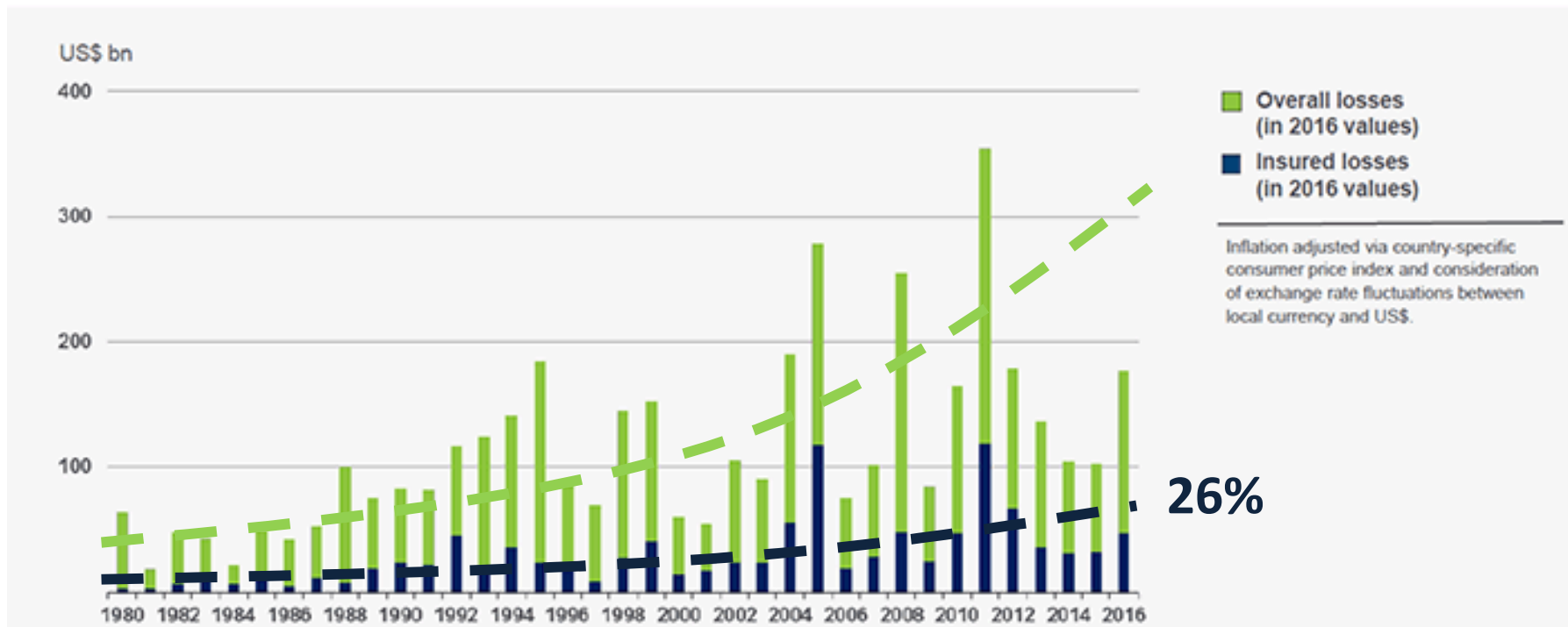
Trend 1980-2016



Source: Munich Re (2017), AON (2017)

Weather-related disasters

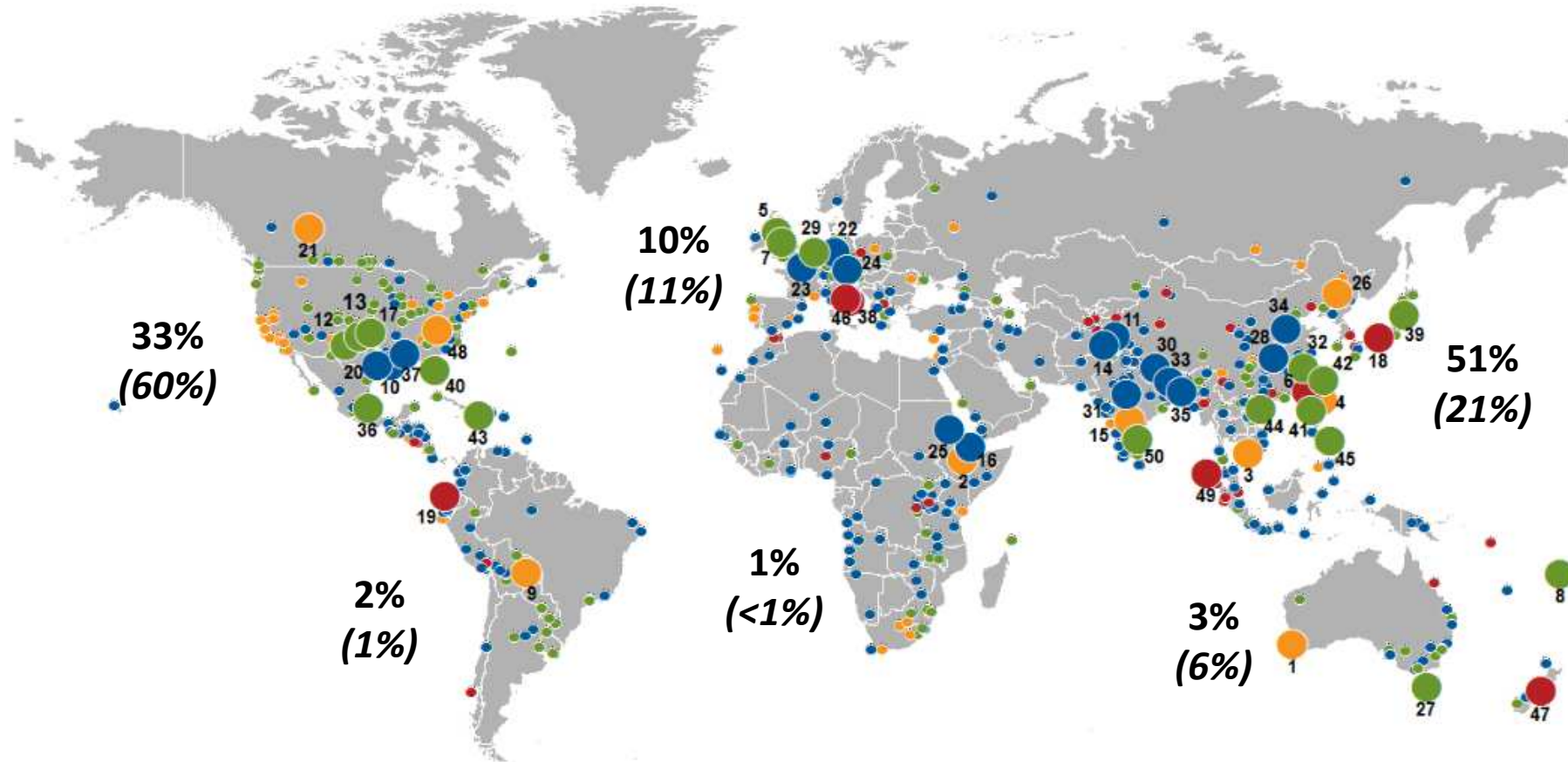
Losses 1980-2016



Source: Munich Re (2017), AON (2017)

Disasters in 2016

Location



1,060 natural hazard events, thereof

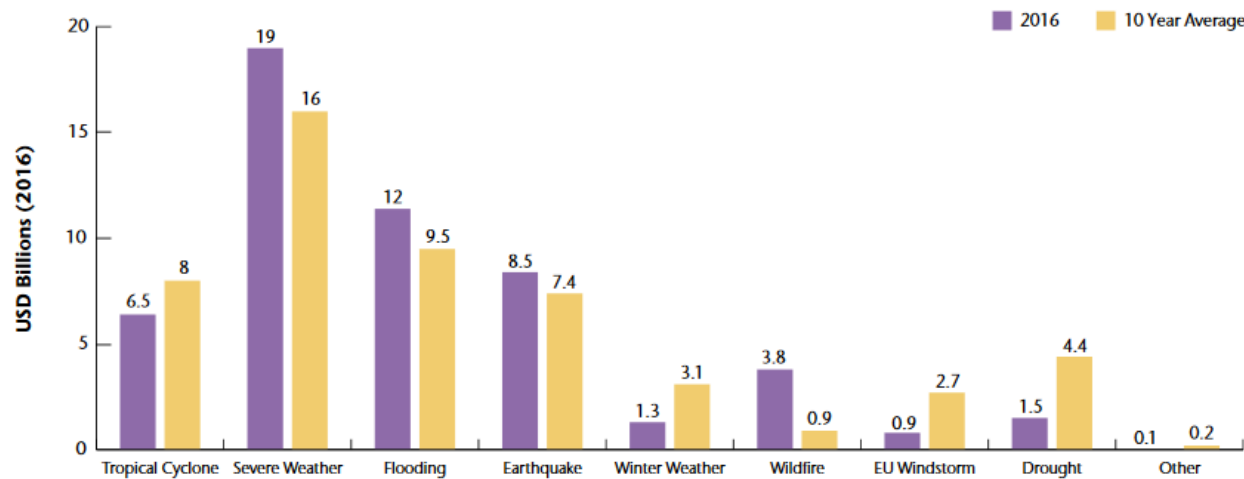
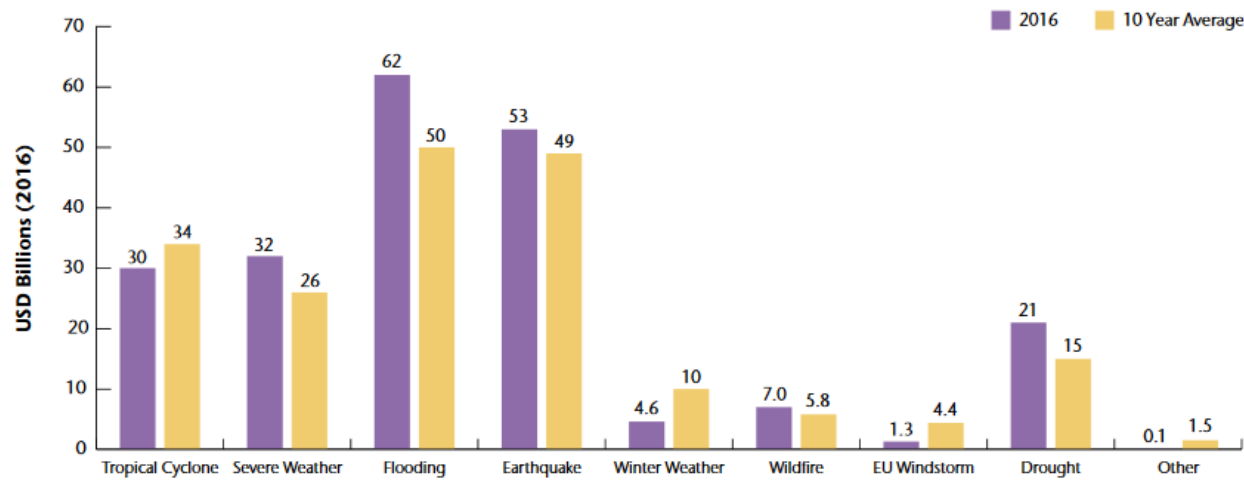
○ 50 major events

- Geophysical events: Earthquake, tsunami, volcanic activity
- Meteorological events: Tropical storm, extratropical storm, convective storm, local storm
- Hydrological events: Flooding, mass movement
- Climatological events: Extreme temperatures, drought, wildfire

Source: Munich Re (2017), AON (2017)

Disasters in 2016

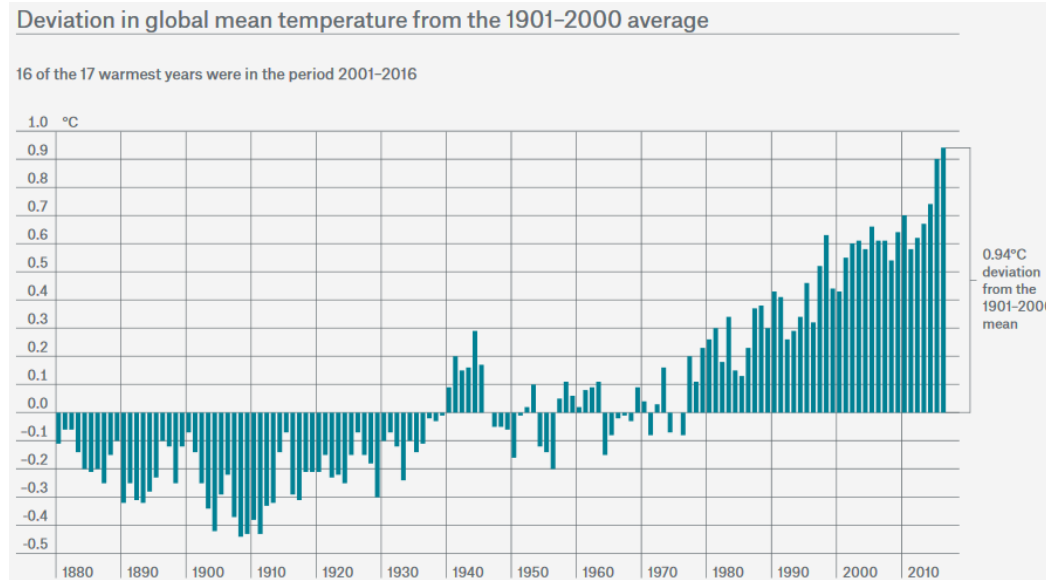
Global/Insured economic losses by peril



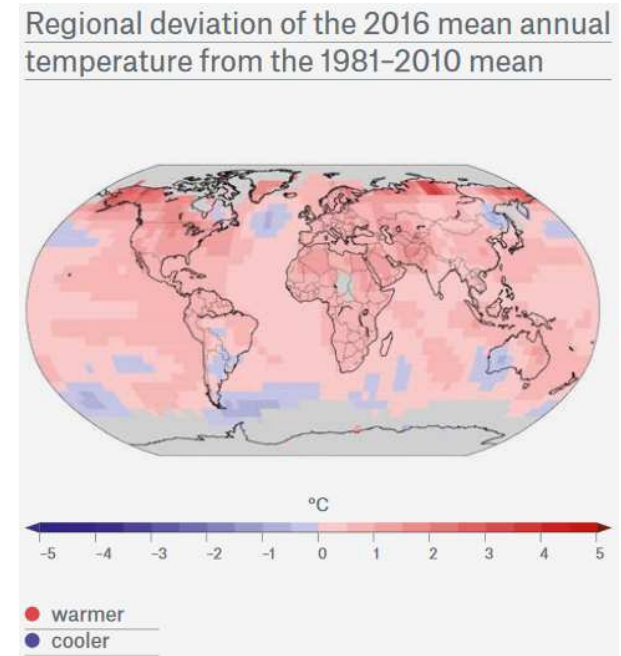
Source: AON (2017)

Climate change

- Main drivers
 - Natural processes: *Solar activities, Volcanism*
 - Intensification of anthropic activities, which are greenhouse gas emitters
- Consequences
 - Accelerated shift of climatic parameters: *Temperatures, Rainfall, Wind*



Source: Munich Re (2017)



In a nutshell

- Increased exposition (AON, 2016)
 - 85%: Economic growth and migration towards urban and coastal areas, which are the most at-risk
 - 15%: Weather itself
- The influence of man at stake
 - Example of rising water
- Developing countries are the most concerned
- Increased and more volatile damages
- Which insurance coverage?



Thank you for your attention!

geoffroy.enjolras@iae-grenoble.fr