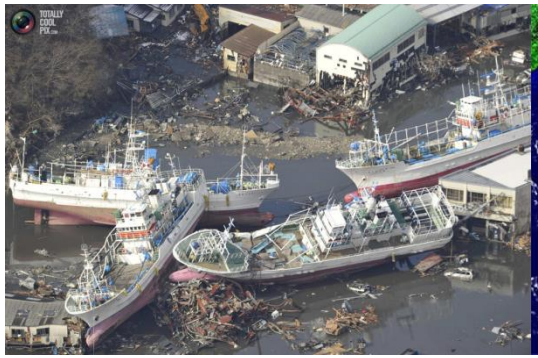


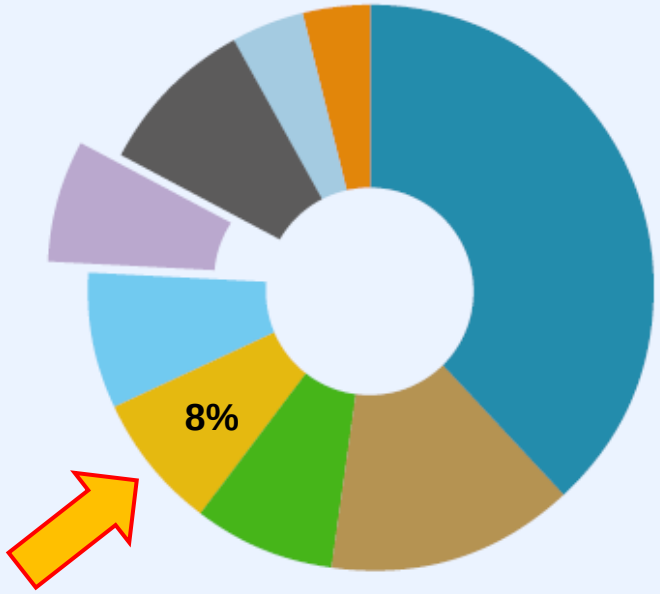
Natural Catastrophes and Marine & Energy
A Reinsurer's view

Paul Hertelendy
Chief Underwriting Officer Specialty Lines
SCOR Global P&C

Hong Kong, 23 September, 2014

Why do insurance companies fail?

Fig. 68: Why did insurance companies fail?



A failure in Risk Management

- Deficient loss reserves/Inadequate Pricing
- Rapid growth
- Alleged fraud
- Catastrophe losses
- Affiliate impairment
- Investment problems
- Miscellaneous
- Significant change in business
- Reinsurance failure

Source: A.M. Best: 1969-2008 Impairment Review, Special Report, April 6, 2009.

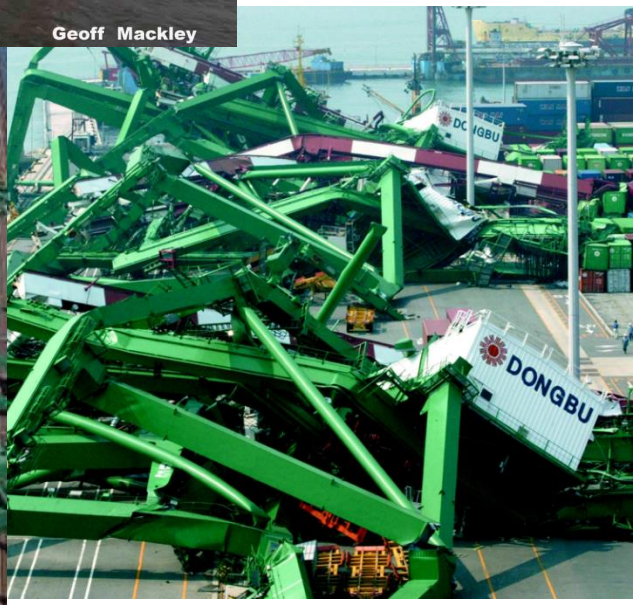
Deficient loss reserves, inadequate pricing, and rapid growth are the leading triggers. Investment and catastrophe losses play a much smaller role. This pie chart represents the impairment of the US Property and Casualty industry from 1969 to 2008.

Most important Natural Hazards

- **Earthquake (shake and fire following)**
- **Windstorm**
  - Tropical Cyclones (Hurricanes, Typhoons)
  - Extratropical Cyclones (Winterstorm, Blizzards)
  - Tornados/Hailstorms
  - other (Chinook, Föhn, Mistral,…)
- **Flood**
  - River Floods
  - Flash Floods
  - Tsunami
  - Storm surges
  - Landslides/Mudslides
- **Volcanoes**
- **Wildfire**
- **Avalanches**
- **Drought**

Examples of Catastrophic Events in Marine

Sandy, 2012

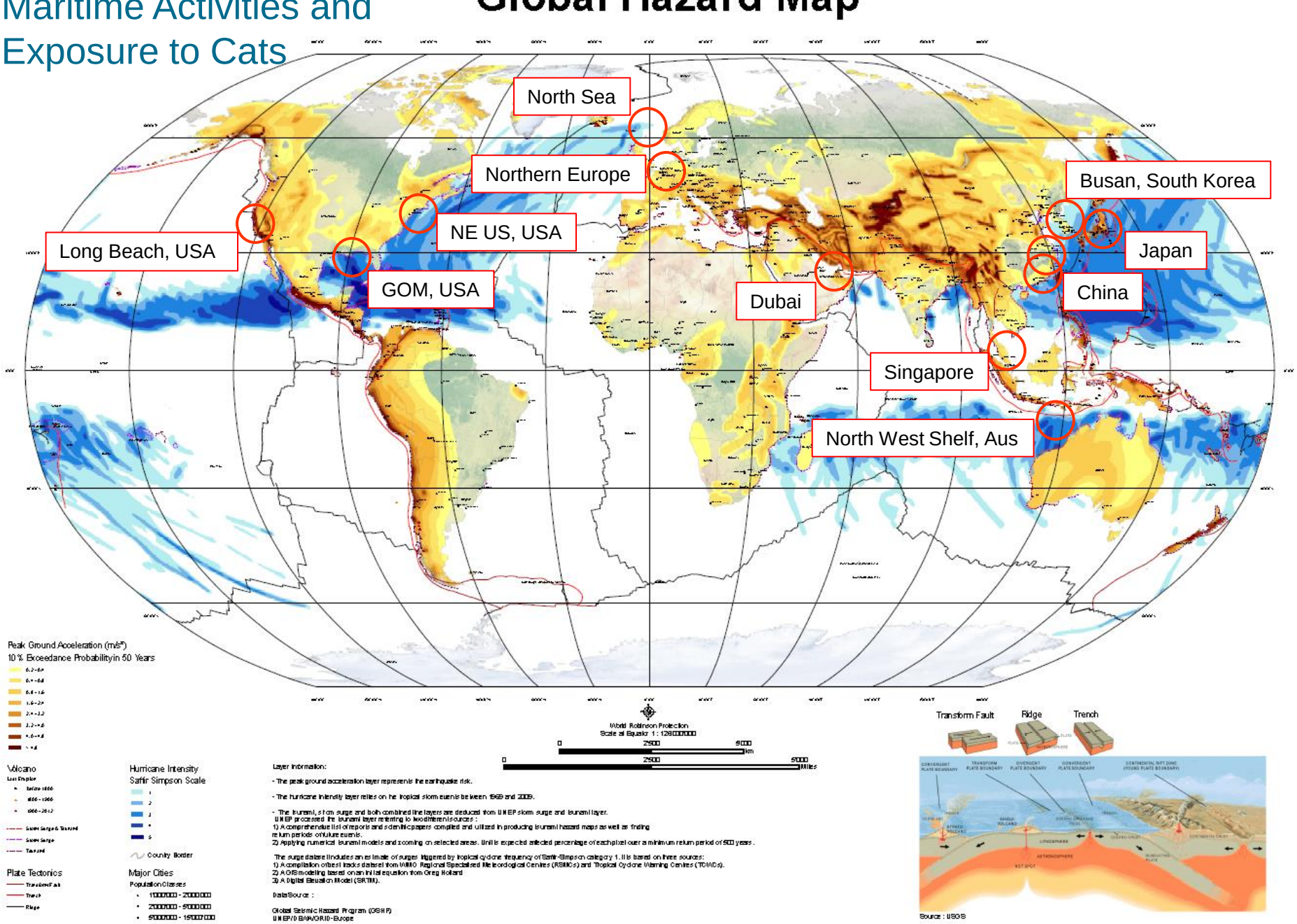


Typhoon Maemi, South Korea, 2003

Examples of Catastrophic Events in Marine

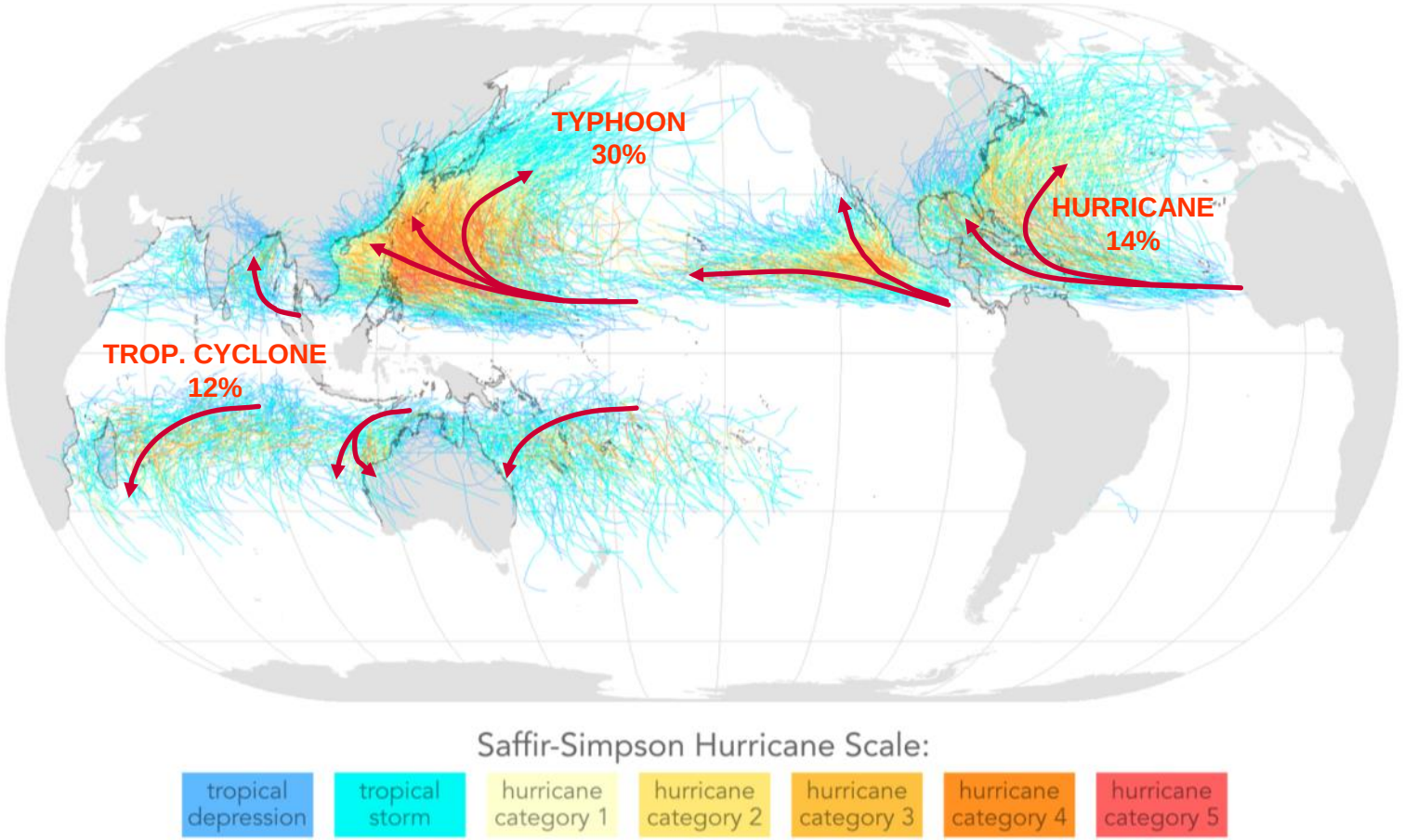
Tohoku EQ and Tsunami, 2011

Maritime Activities and Exposure to Cats

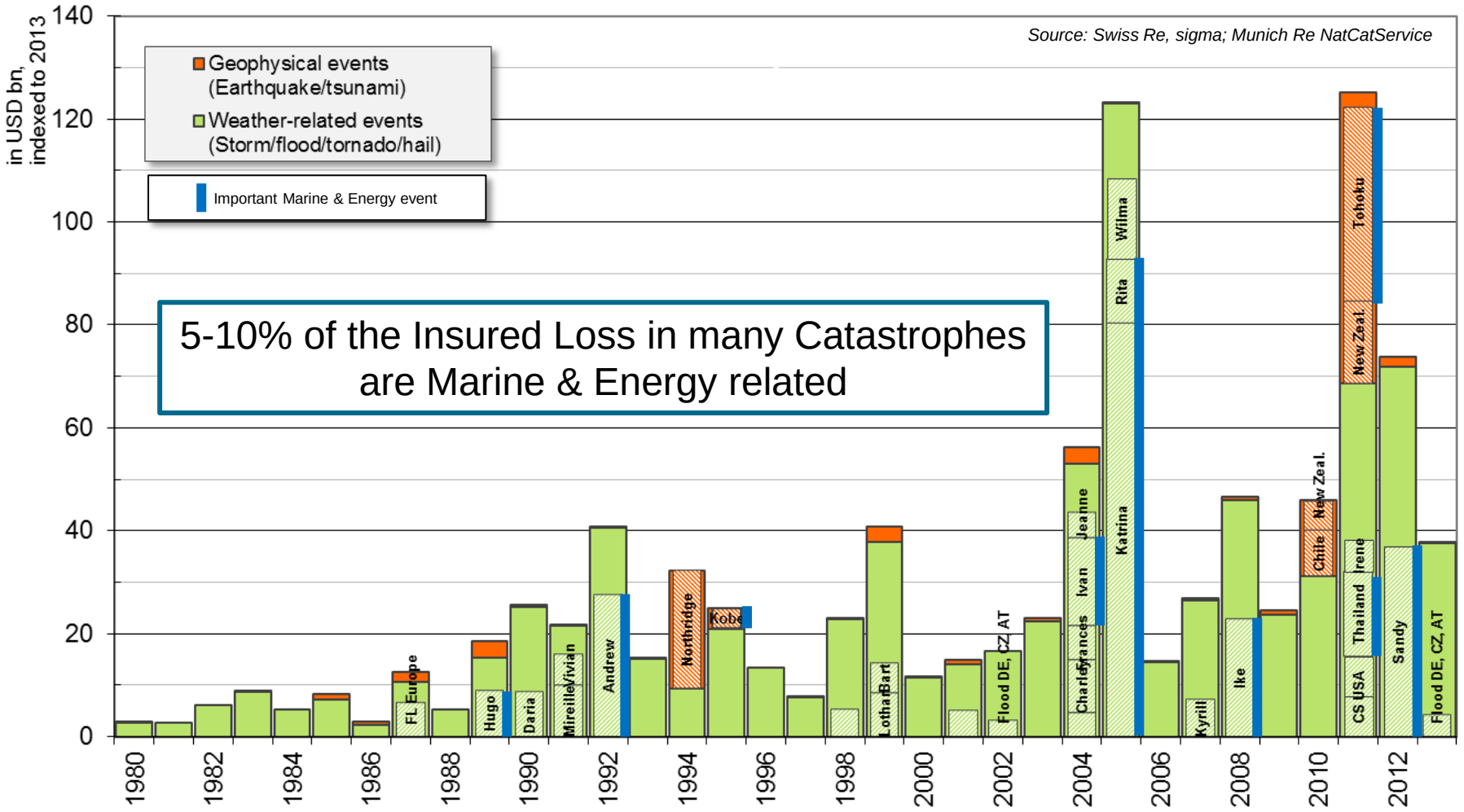


Tropical Cyclone Hazard:
Distribution and naming convention

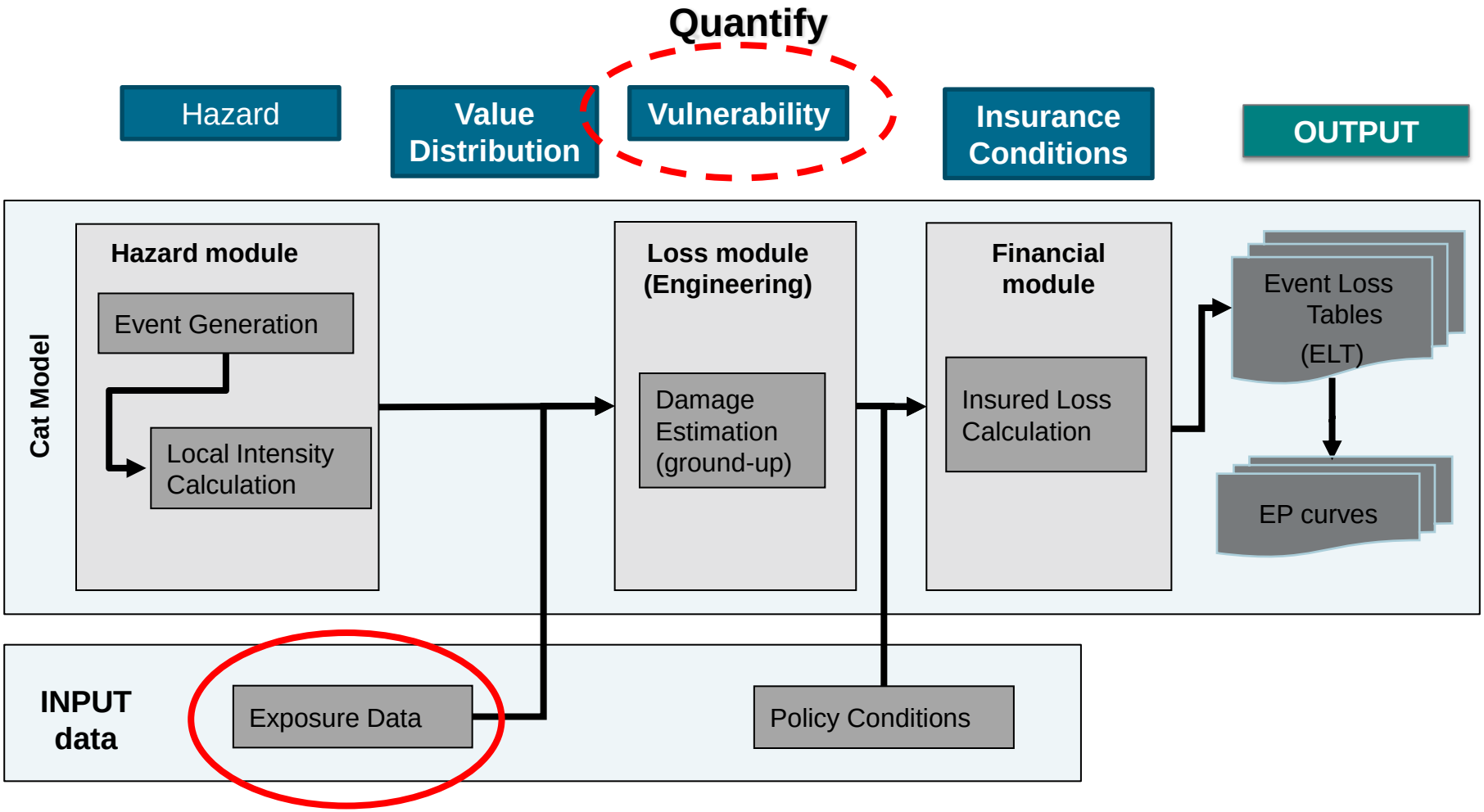
Tropical cyclones, 1945 – 2006



Natural Catastrophe Loss History by Hazard Type

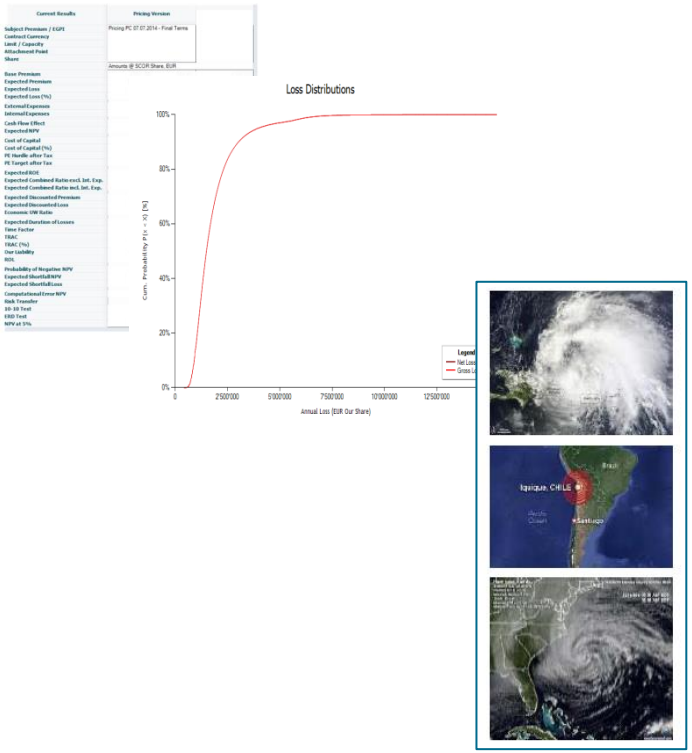


Cat Modeling:
Concept of Cat Risk Assessment



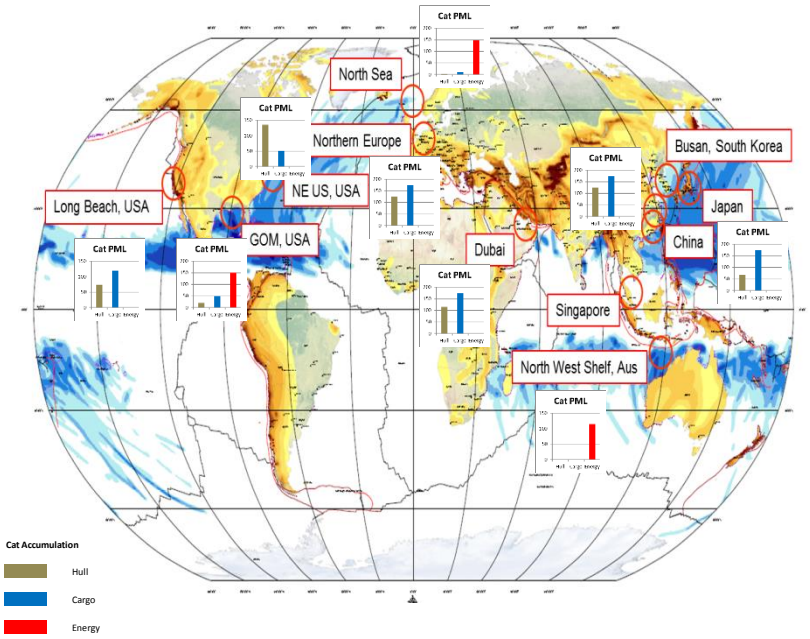
Managing Catastrophe Risk in Marine & Energy
A Reinsurer's View (1/3)

❑ Pricing



❑ Accumulation control

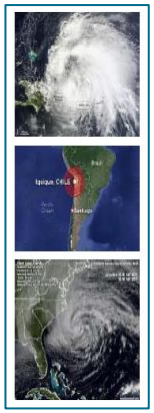
- Per Risk
- Cat



Managing Catastrophe Risk in Marine & Energy
A Reinsurer's View (2/3)

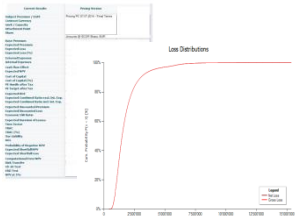
- Pricing

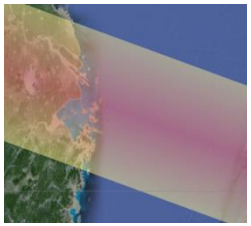
- **Cat Models**



  - For **Cargo** and **Energy** Cat models are being **used by some insurers**.
  - The **application for Cargo** (and other static accumulations, such as Ports and Marinas) involves a **Property model** and the results are currently of **limited benefit**
  - For Offshore Energy only models for **GOM** exist

- **Other Methods**





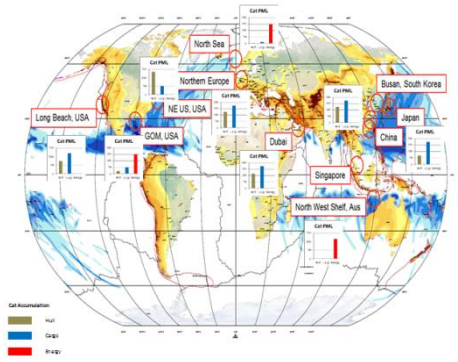
  - As a consequence of the above every Reinsurer has it's own **"homemade"** approach of how to price cat exposures.
  - **Experience** based approach
  - **Scenario** based assumptions
  - Company specific **Cat loading**
  - Etc.

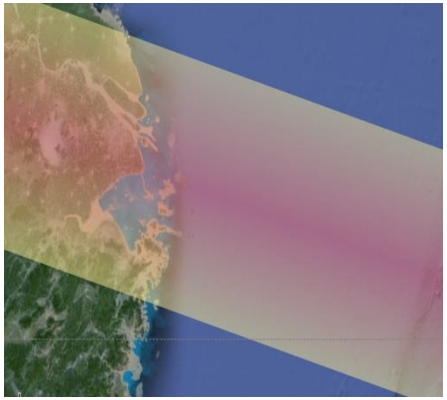
Managing Catastrophe Risk in Marine & Energy
A Reinsurer's View (3/3)

- Accumulation Control

  - **Moving exposures** are notoriously **difficult to monitor**
  - For **"fixed" exposures industry tools exist** but usage varies considerably by region.
  - For **PML estimations** an approach based on conservative assumptions is often used where models are not available (e.g. **RDS** - Realistic Disaster Scenario - type approach)
  - Various reinsurers have their **proprietary tools** to determine their (max) accumulations but their outputs are only as good as the inputs provided

Industry participants need to work together to establish a standardized way of reporting exposures





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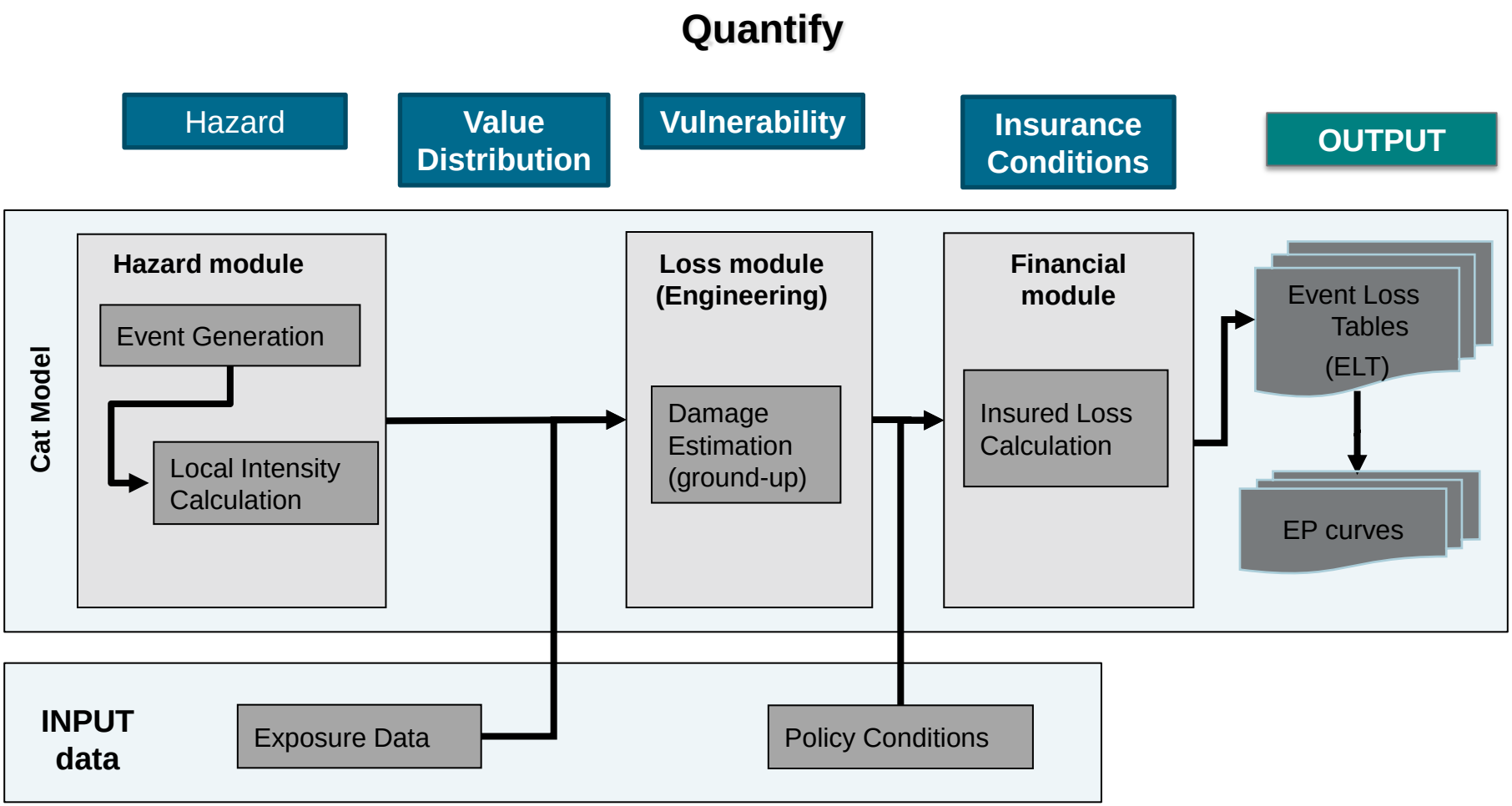
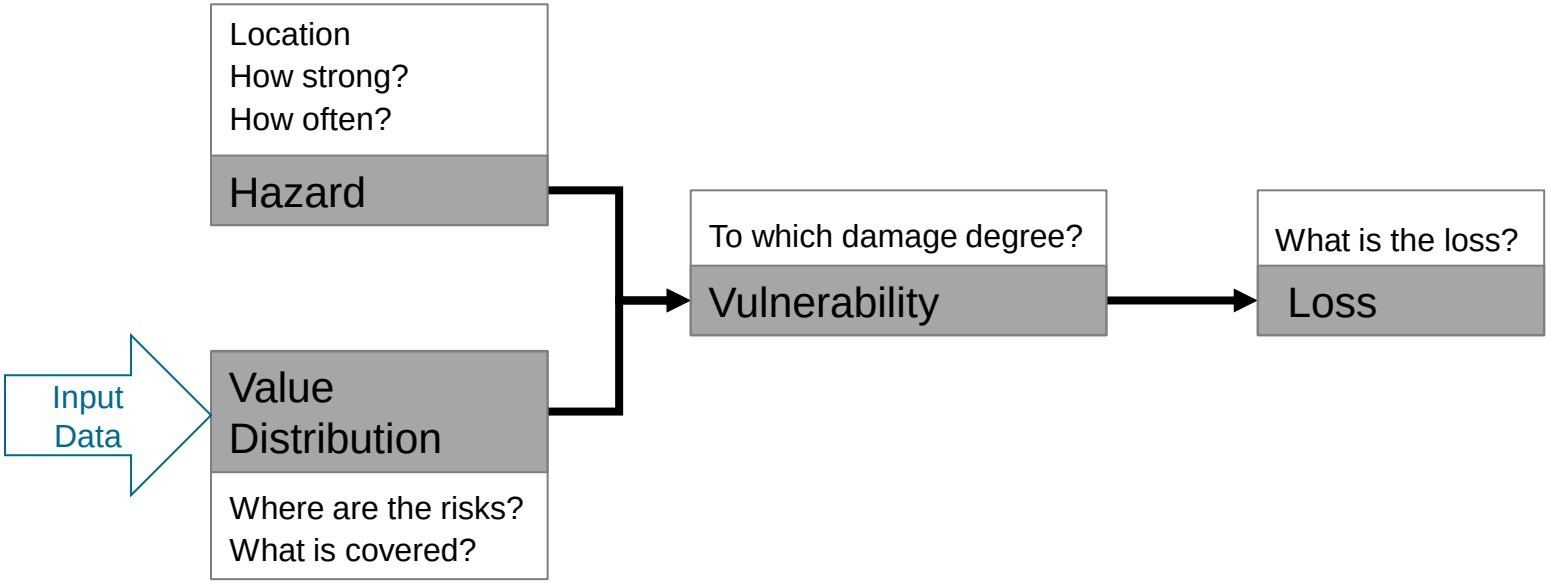


Structure of Physical NatCat Models

- A NatCat model is a computerized system that generates a robust set of simulated events and
  - Estimates the **magnitude/intensity and location**
  - Determines the amount of **damage**
  - Calculates the **insured loss**
- The four basic components are:



Use of NatCat Models

- **Underwriting (insurance/reinsurance)**
  - **Pricing** catastrophe risk (check insurability of cat risk)
  - Assessment of **accumulation risk**
  - Determine tail of the distribution if not sufficient historical claims
  - **Capital cost loadings**
- **Broker**
  - Use Cat models as **service for structuring and/or optimizing the reinsurance program(s)** of their clients
  - Benchmarking of the various NatCat vendor models
- **Capital market**
  - Pricing Cat bonds
- **Rating agencies**
  - **Require results** of NatCat models (vendor models not in-house models!)
- **Regulatory solvency capital requirements**
  - Results of NatCat models can be integrated in **standard and/or internal model**

Limitation of NatCat Models

- "**Black box**" character of vendor models
- Model changes → possible "surprises"
- Model understanding
- **Model uncertainty** (Event, intensity, vulnerability, risk information, etc.)

So can we trust NatCat models?

! **Caution** necessary if
  - model **not calibrated**
  - **exposure information is inappropriate** (poor geographic resolution, poor/absent object description, sums insured inadequate)
  - model inconsistent with policy wording (consequential perils, secondary effects, complex policy structures)

✓ **Yes** if used within their limits
  - model **calibrated**
  - **exposure data** has sufficient detail level and is of high quality
  - unmodeled perils and other risk-impacting factors are properly considered in pricing process

It is necessary to better integrate the utilization of Cat Management techniques into our Underwriting and Risk Management Processes

Summary

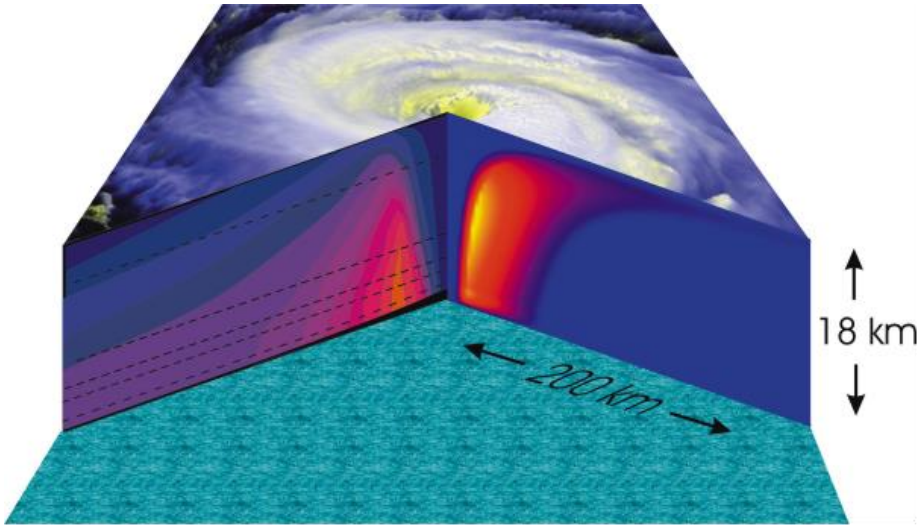
- Catastrophe losses are a significant reason why insurance companies fail
- The contribution of Marine losses to the overall loss burden from natural catastrophes is underestimated – Marine is a less diversifying line of business than people think
- The Marine (Re)Insurance industry should work closer together to further enhance catastrophe management techniques; e.g. we should use consistent data standards and invest in the refinement of catastrophe models

Tropical Cyclones
Meteorological Aspects, Conditions and Structure

A tropical cyclone is an **intense** tropical ***weather system with a well defined circulation*** and ***minimum sustained winds*** of 74 mph (33 m/s).

Conditions

- sea surface temperature > 26.5º celsius
- minimum strength of coriolis force is required, that is > 5º south and north, respectively)
- high relative humidity
- absence of strong shear winds throughout an air column of about 10 km



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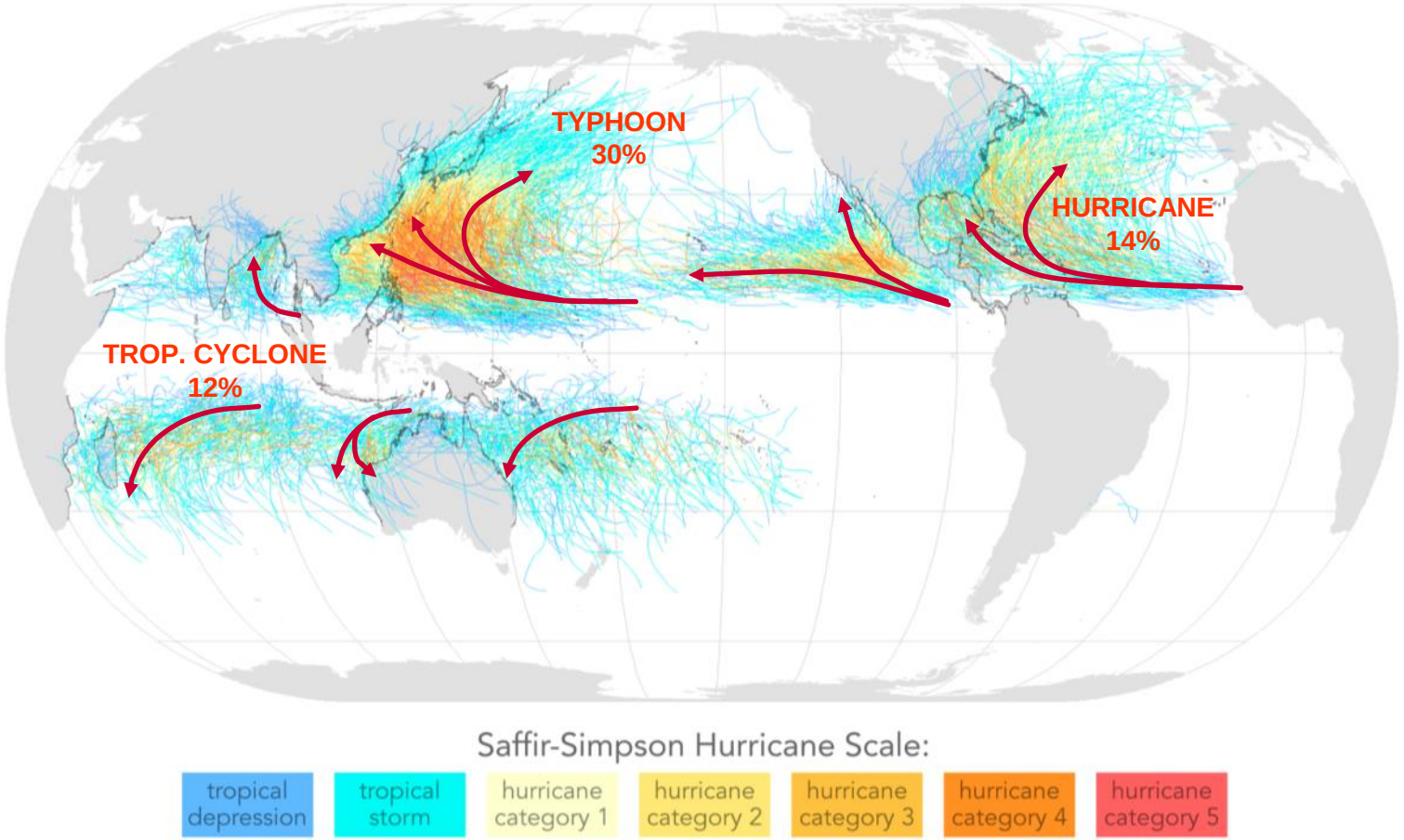

Tropical Cyclone Yasi and Oswald

Tropical Cyclone Oswald
17. – 28.1.2013
Insured Loss: $1.0b

Tropical Cyclone Yasi
2. – 7.2.2011
Insured Loss: $1.4b

Source: ICA, SCOR

TERRE DE SIENNE Paris • Photo credit: Getty Images

LET'S ADAPT TO A CHANGING RISK UNIVERSE TOGETHER

Over the past 50 years, the insurance and reinsurance industry has seen tremendous changes. From products, services and distribution networks to risk management, capital management and regulation, nothing is how it used to be. Far from slowing down, the pace of this change is accelerating. New technology is having a profound impact on the way in which we assess, model, price and reserve risks. At SCOR, we have the experience and expertise to stay at the cutting edge of these developments.

By sharing the art and science of risk with our clients, we can adapt to a changing risk universe together.

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