

Financial Stability Institute



# FSI Insights on climate risk assessment in the insurance sector – turning up the heat

ASSAL- IAIS Regional Training Seminar for Insurance Supervisors of Latin America,  
15 October 2019

Jeffery Yong

# Agenda

- Background and context – FSI's policy implementation work
- The climate crisis and emergency – scientific findings and recent media coverage
- Key findings from FSI Insights – regulatory approaches and supervisory practices
- Key policy issues

## FSI Policy Implementation Work (PIW) – supporting supervisors globally



- Analysis of **regulatory approaches** and **supervisory practices**
- **Specific topics** of interest to financial regulators/supervisors



- Deliverable is **FSI Insights** publication
- Authored by FSI staff and other staff from supervisory agencies and central banks



Aims to **contribute to international discussions** on policy issues, and implementation challenges faced by financial sector authorities

### **FSI Insights on climate risk assessment in the insurance sector – turning up the heat**

- Aim of paper:
  - regulatory approaches/requirements (risk management)
  - supervisory practices (stress testing)
- Survey of 18 insurance authorities, members of Sustainable Insurance Forum (SIF) and interviews
- Co-authors: FSI, APRA, Bank of England, SIF
- Publication: early November 2019

<https://www.bis.org/fsi/fsiinsights.htm>

## Climate emergency/crisis – call to action

**“Taking strong, effective action now to promote an early, orderly economic transition is essential to minimising those costs and optimising the benefits. Those unwilling to buy into the need to do so will find they pay a far greater price in the long-run.”** – Geoff Summerhayes, Executive Board Member, Australia Prudential Regulation Authority and Chair of SIF

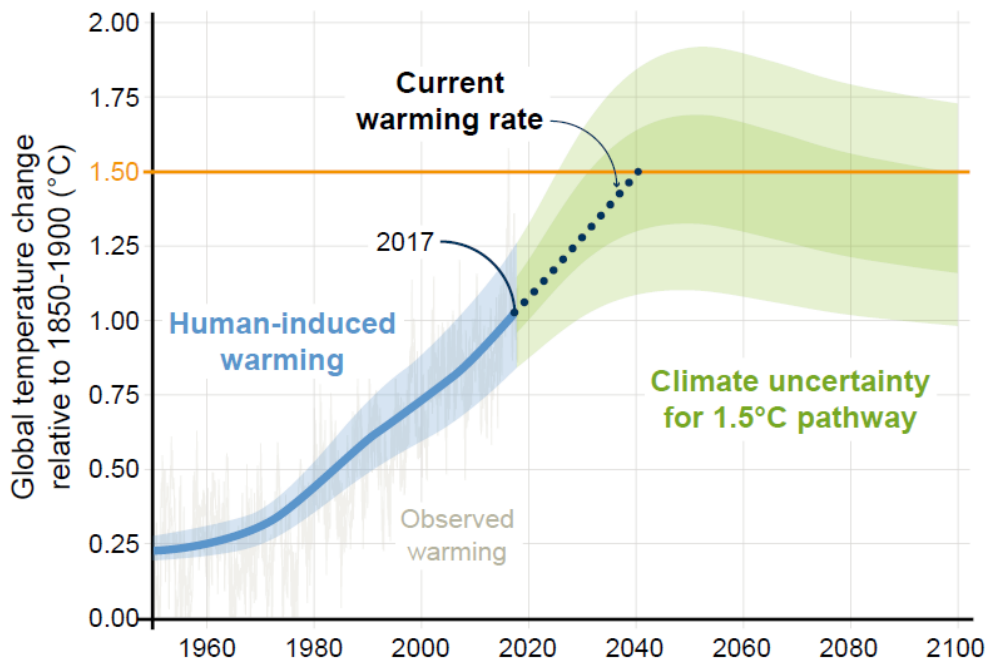


**Issues Paper on Climate Change Risks  
to the Insurance Sector**

July 2018



# Taking the climate pulse



Source: Intergovernmental Panel on Climate Change (2018)

## Warming by 2100

### Physical impacts

- Sea-Level Rise (cm)
- Coastal assets to defend (\$tn)
- Chance of ice-free Arctic summer
- Tropical cyclones: Fewer (#cat 1-5)  
Stronger (# cat 4-5)  
Wetter (total rain)
- Frequency of extreme rainfall
- Increase in wildfire extent
- People facing extreme heatwaves
- Land area hospitable to malaria

### Economic impacts

- Global GDP impact (2018: \$80tn)

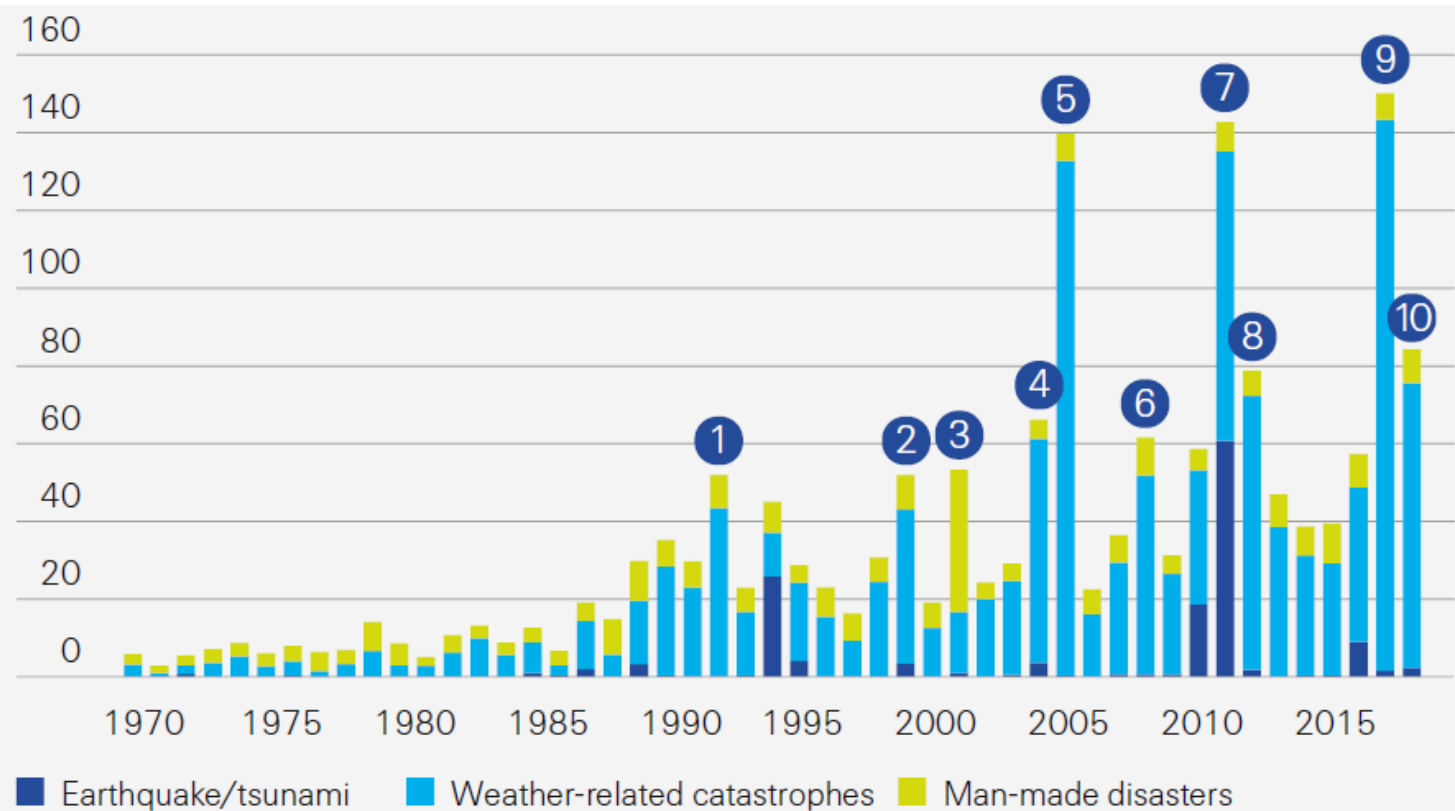
Source: CRO Forum

		<2 °C	3 °C	5 °C
		1.5 °C	2 °C	
Sea-Level Rise (cm)		0.3-0.6 m	0.4-0.8 m	0.4-0.9 m0.5-1.7 m
Coastal assets to defend (\$tn)		\$10.2tn	\$11.7tn	\$14.6tn\$27.5tn
Chance of ice-free Arctic summer		1 in 30	1 in 6	4 in 6 (63%)6 in 6 (100%)
Tropical cyclones:	Fewer (#cat 1-5)	-1%	-6%	-16%Unknown
	Stronger (# cat 4-5)	+24%*	+16%	+28%+55%
	Wetter (total rain)	+6%	+12%	+18%+35%
Frequency of extreme rainfall		+17%	+36%	+70%+150%
Increase in wildfire extent		x1.4	x1.6	x2.0x2.6
People facing extreme heatwaves		x22	x27	x80x300
Land area hospitable to malaria		+12%	+18%	+29%+46%
Global GDP impact (2018: \$80tn)		-10%	-13%	-23%-45%

# Climate risks – key drivers

Insured catastrophe losses,  
1970–2018 (USD billion, in  
2018 prices)

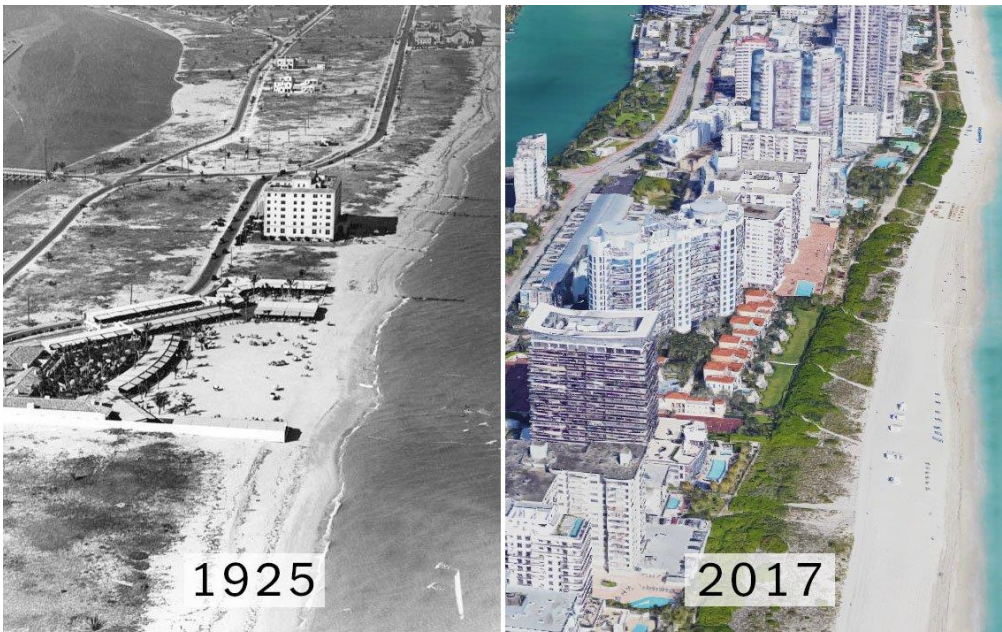
1. Hurricane Andrew
2. Winter Storm Lothar
3. WTC
4. Hurricanes Ivan, Charley, Frances
5. Hurricanes Katrina, Rita, Wilma
6. Hurricanes Ike, Gustav
7. Japan, NZ earthquakes, Thailand flood
8. Hurricane Sandy
9. Hurricanes Harvey, Irma, Maria
10. Camp Fire, Typhoon Jebi



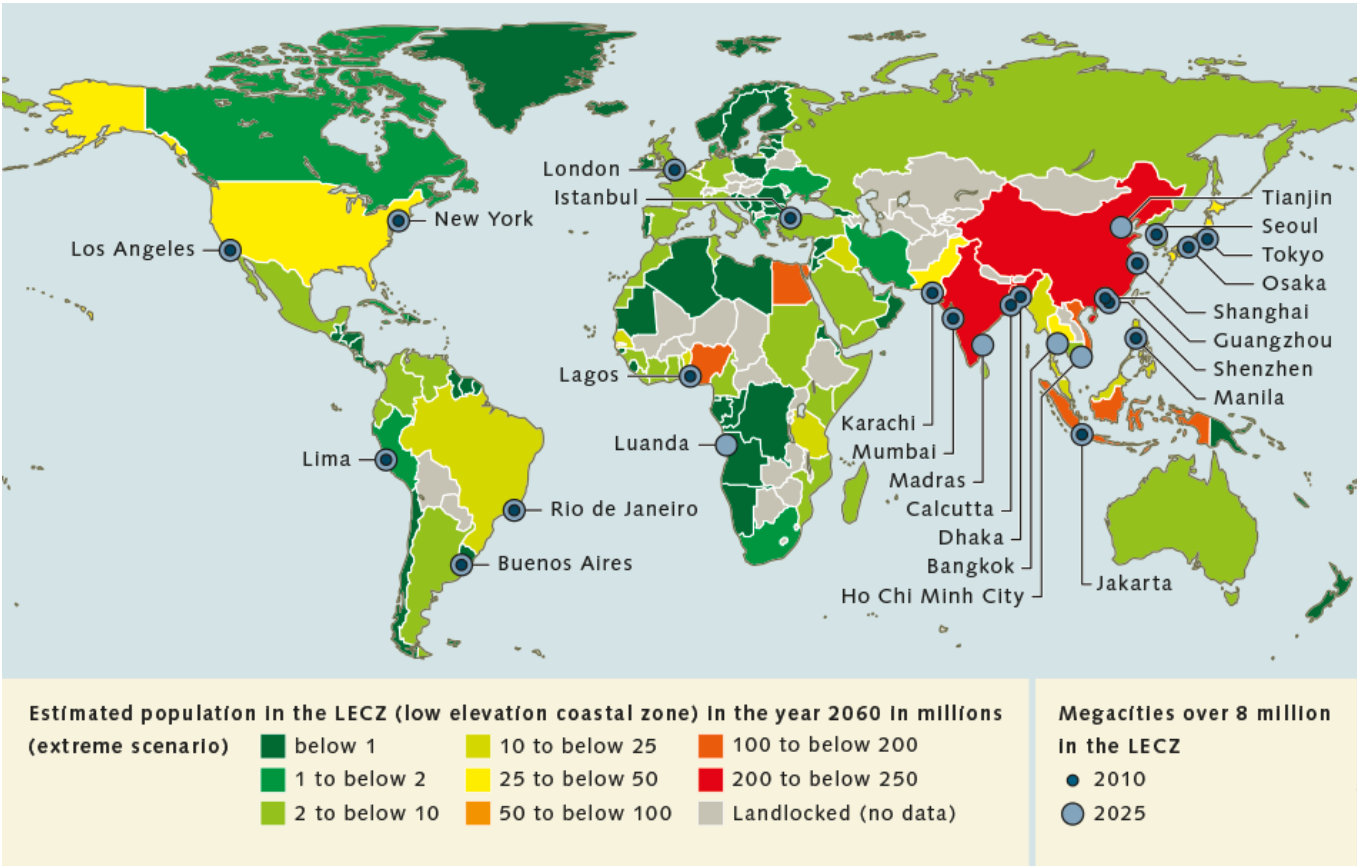
Source: Swiss Re Institute

Insured loss = f (Exposure, Probability of occurrence, Severity of occurrence)

Risk exposure has increased...



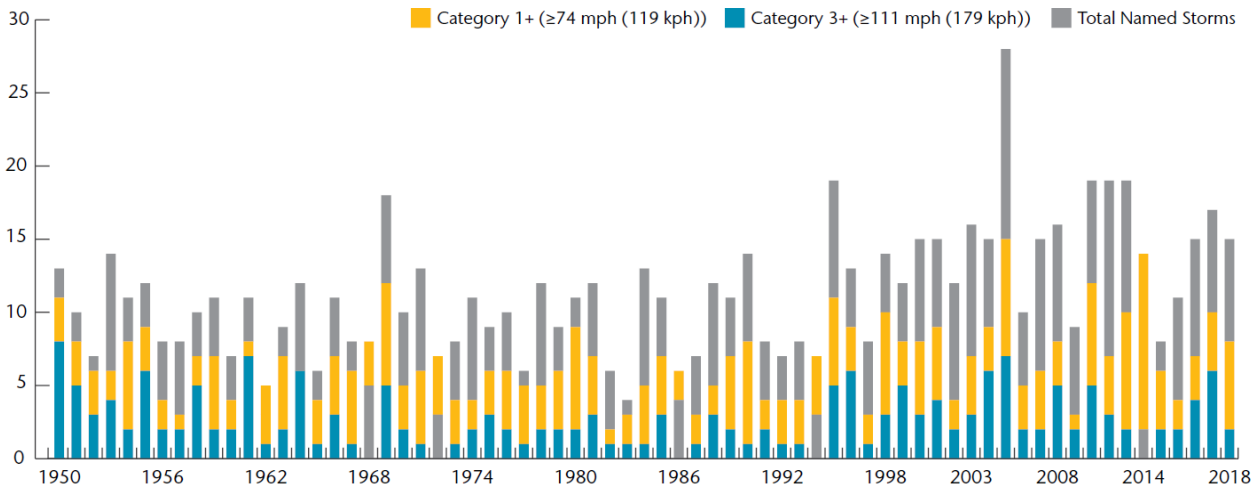
Source: Steven J Frisch



Source: World Ocean Review

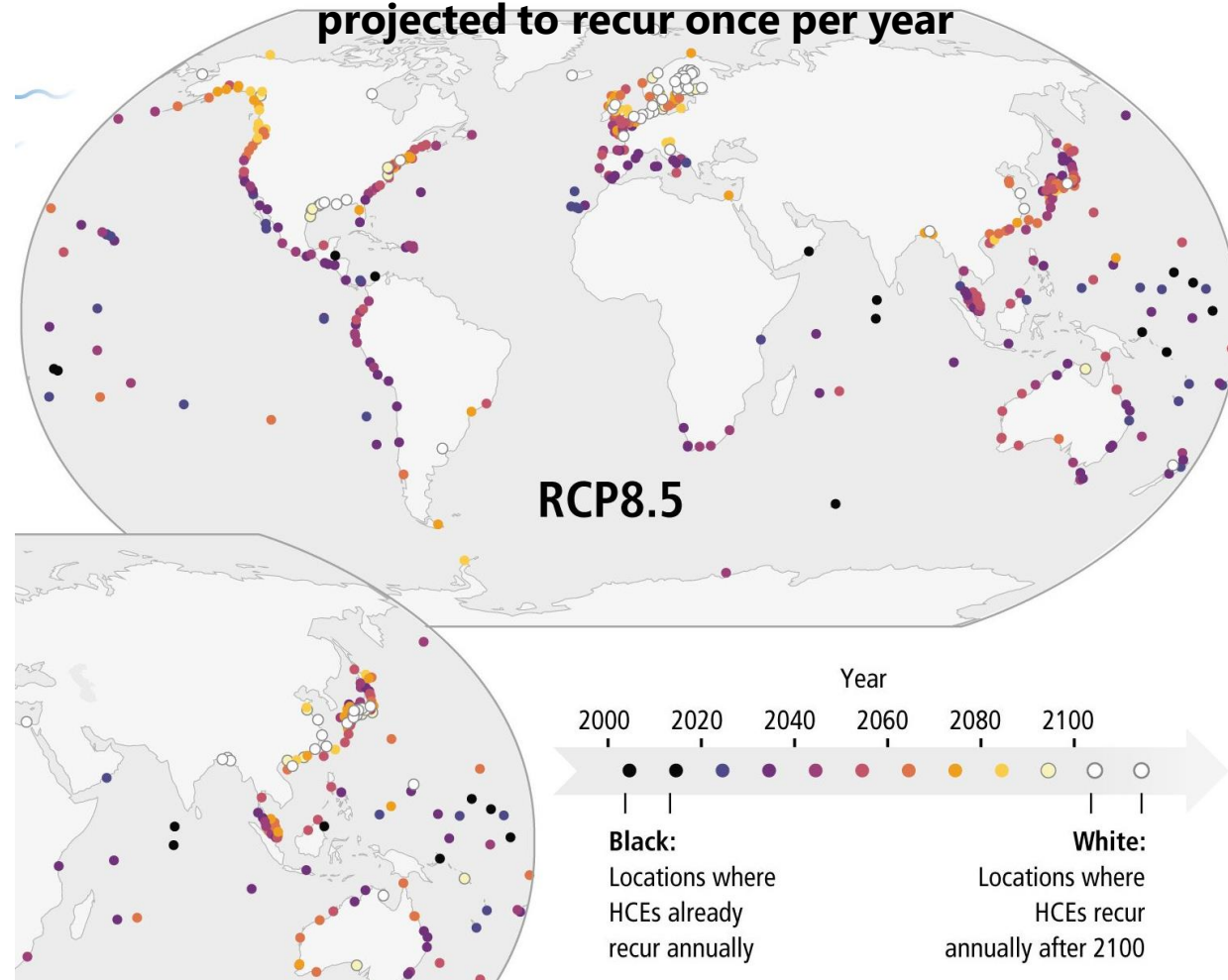
...but changes in frequency and severity of climate-related events are unclear

## Atlantic basin tropical cyclone activity



Source: Aon

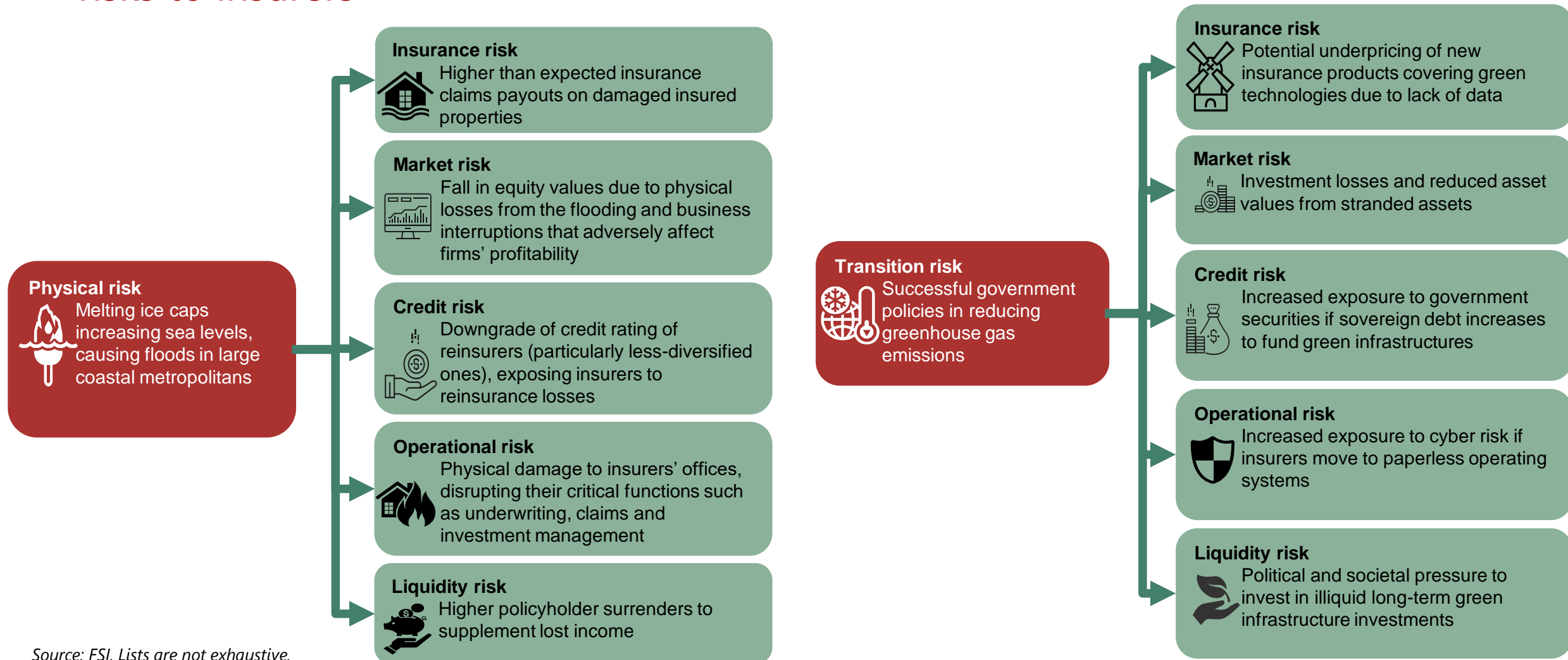
Year when 'historical centennial events' are projected to recur once per year



Source: Intergovernmental Panel on Climate Change



# Prudential relevance of climate change – manifestation in terms of financial risks to insurers



Source: FSI. Lists are not exhaustive.

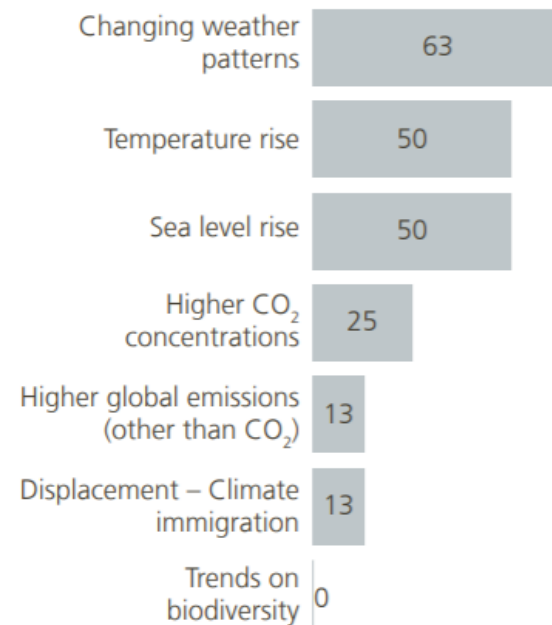
# Example of risk factors from insurers' perspective

## Main physical and transition risks factors according to Belgian insurers

(in % of total respondents)

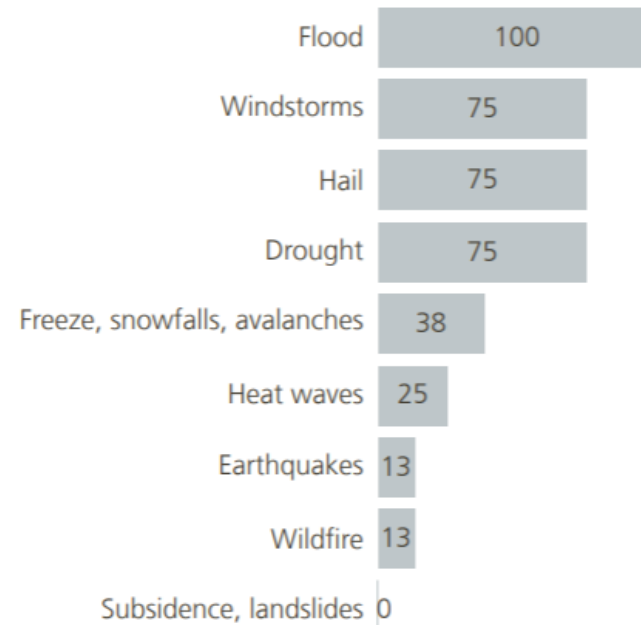
### Key physical risk factors considered most impactful

Climate trends

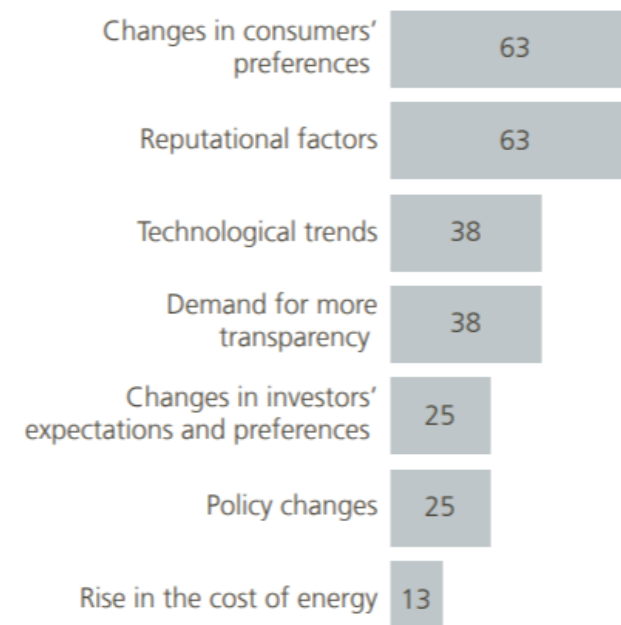


### Key physical risk factors considered most impactful

Climate events



### Key transition risk factors considered most impactful



Source: National Bank of Belgium

## FSI Insights key finding 1 – enterprise risk management (ERM) regulatory requirements

**ICP 16.1 The supervisor requires the insurer's ERM framework to provide for the identification of all reasonably foreseeable and relevant material risks and risk interdependencies for risk and capital management.**

- All surveyed supervisors expect climate risks to be captured in insurers' **ERM frameworks**, specifically in their own risk and solvency assessment (**ORSA**)
- Not many supervisors have **explicit/specific** ERM 'requirements' on climate risks – principles-based approach is sufficiently broad
- ORSA is viewed as an important **supplement to regulatory capital requirements** as these are not currently calibrated to capture climate risks
- Despite technical and operational challenges, it is important to **take the first step**, recognising that initial efforts will not be perfect – learning journey for supervisors and insurers

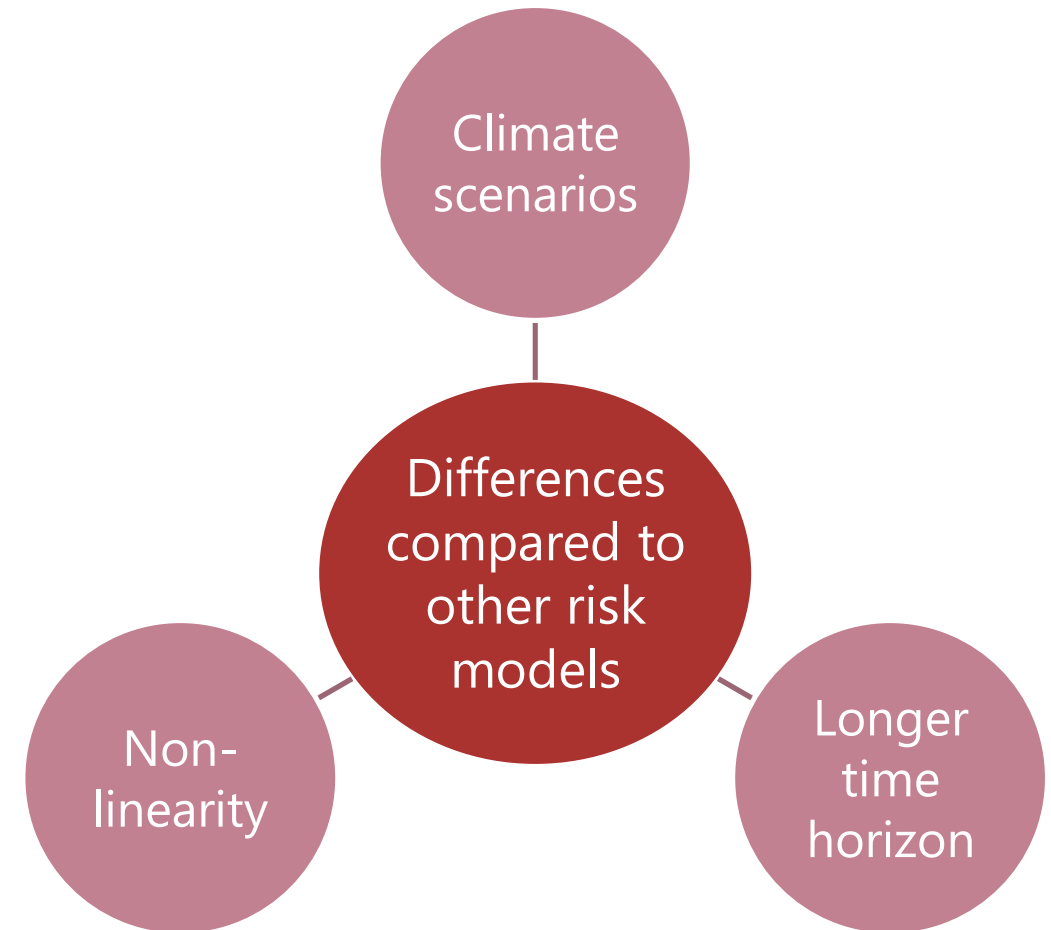
## Expected coverage of climate risks in ORSA reports

ERM step	Expected coverage in ORSA report
Risk identification	<ul style="list-style-type: none"><li>• Clear description of an insurer's exposure to the different climate risks</li><li>• Explanation of how climate risks can manifest in other risk categories</li></ul>
Risk assessment	<ul style="list-style-type: none"><li>• Description of techniques used to assess climate risks</li><li>• Justification of assumptions used to model the risks, including any management actions</li><li>• Forward-looking assessment of potential impact of climate risks on an insurer's risk profile and capital in normal and stressed situations</li></ul>
Risk monitoring	<ul style="list-style-type: none"><li>• List of indicators used to monitor climate risk exposure</li><li>• Risk monitoring processes</li><li>• Risk owners within an insurer of the different climate risks</li></ul>
Risk mitigation	<ul style="list-style-type: none"><li>• Description of risk mitigation actions, particularly any reliance on reinsurance</li></ul>

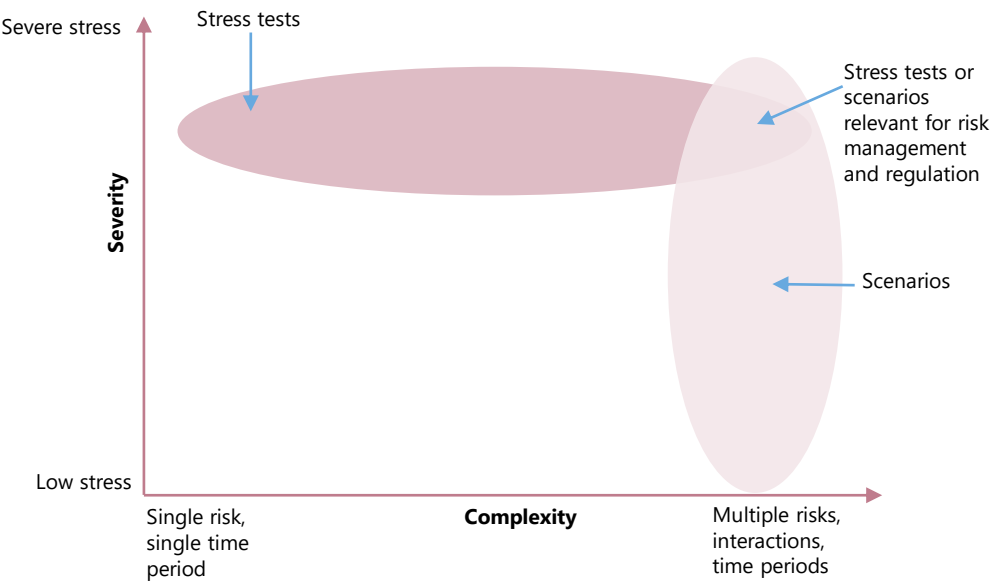


## FSI Insights key finding 2 – insurers' risk assessment models

- Risk quantification techniques to assess climate risk are still at **nascent stage** even though insurers have a long history of modelling natural catastrophe risk
- **Stress test and scenario analysis** are the most common methods – mainly cover physical risks
- **Technical expertise** needed goes beyond traditional quantitative, modelling and actuarial skills
- Modelling results are useful to **inform decision-making and strategy planning** by boards and senior management



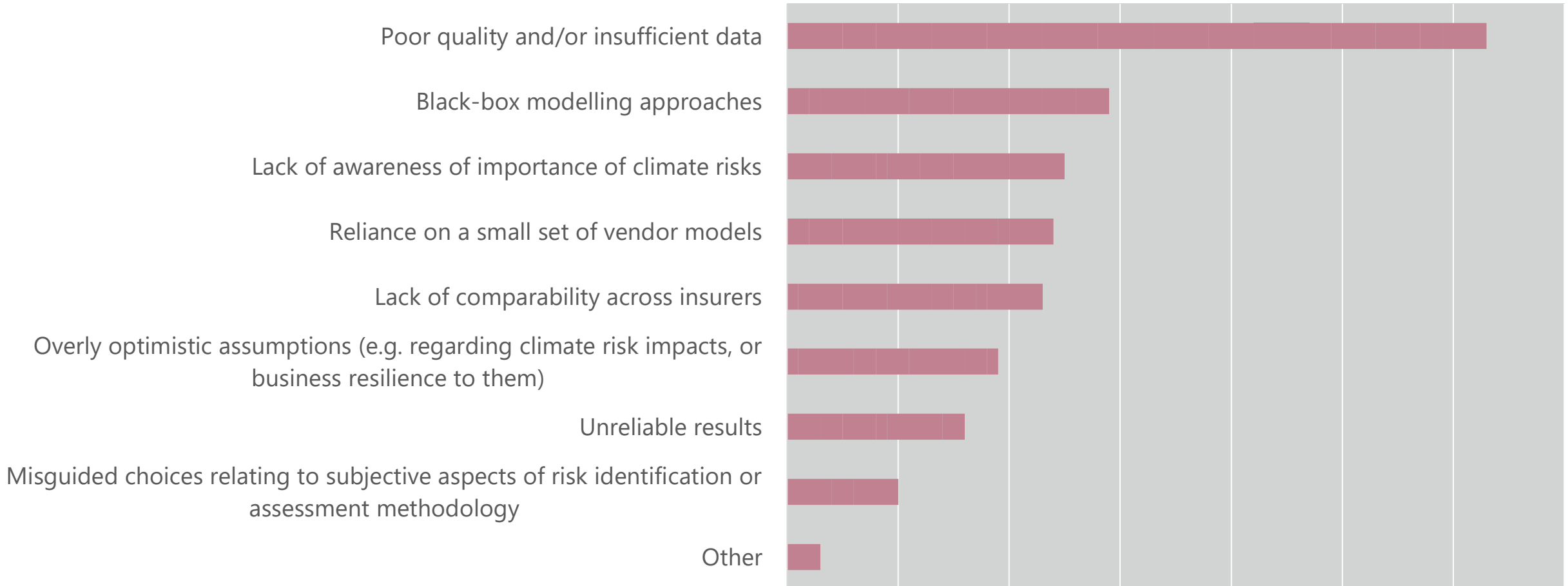
# Examples of risk assessment models



	Paris Agreement Capital Transition Assessment (PACTA)	Climate Value-at-Risk	Cambridge Institute for Sustainable Leadership (CISL) Transition and Physical Risk Frameworks
Developer	2 Degrees Investing Initiative	Carbon Delta	CISL ClimateWise
Objective of model	Used to analyse exposure to transition risks in equity and fixed income portfolios under multiple scenarios	Used to calculate aggregate costs related to specific physical and transition risks over the next 15 years	Enable investors and regulators to manage physical and transition risks and capture emerging opportunities from low carbon transition
Model	Calculates an expected benchmark exposure for each asset class	Calculates economic effects of climate change on underlying business model of thousands of listed companies	Assess asset types exposed to transition risk and the potential financial impact from the low carbon transition, and assets exposed to physical risk

## FSI Insights key finding 3 – top regulatory concerns

Top regulatory concerns surrounding identification and assessment of climate risks by insurers



## FSI Insights key finding 4 – supervisory risk assessment tools

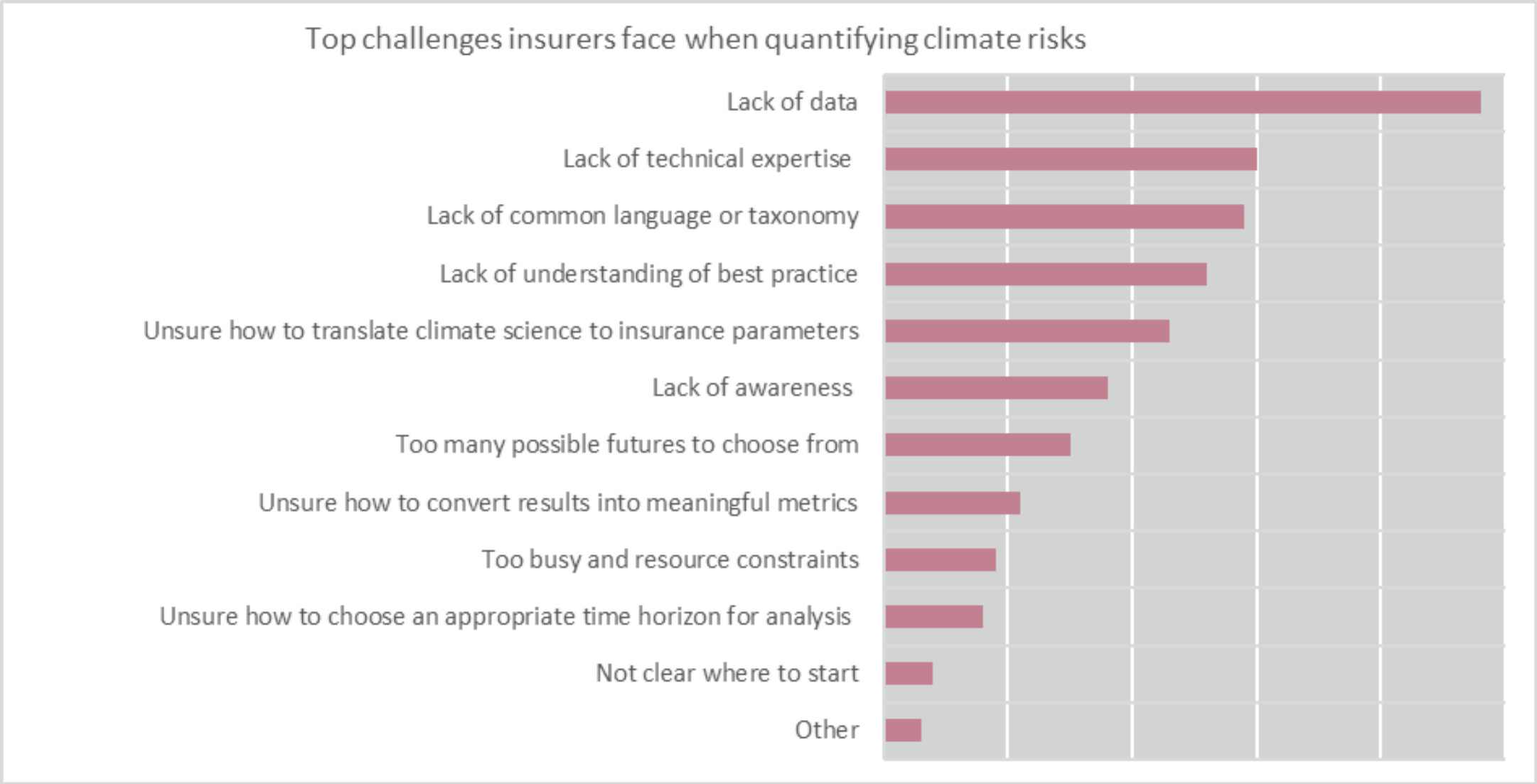
- Some authorities use **stress test or scenario analysis** to assess insurer's climate risk exposures – mostly physical and transition risks
- A **key challenge** is translating future climate possibilities into stresses – need to liaise with academia, climate scientists, meteorology experts
- Tools mainly used to **enhance understanding** of nature of risks, rather than supervisory actions
- There is scope to enhance **international cooperation** among insurance supervisors and other climate-related fora to improve understanding of the nature of climate risks



## Example of stress test factors for physical risk in the UK

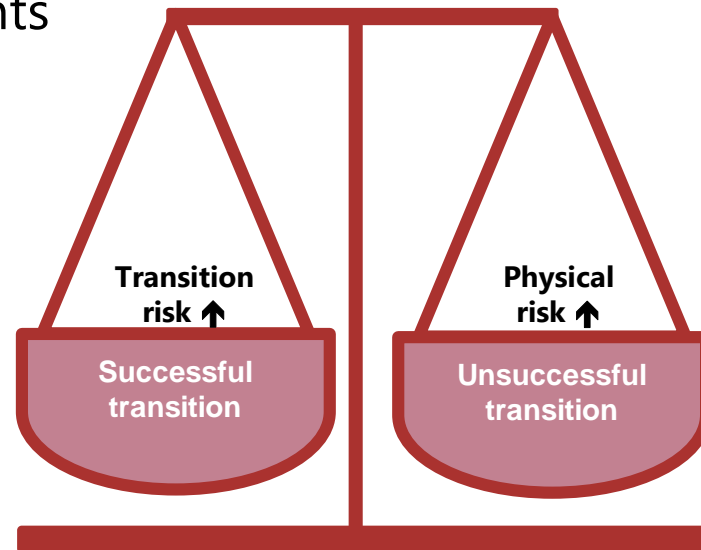
Sector	Assumptions	Scenario		
		A	B	C
US hurricane exposed lines of business	% increase in frequency of major hurricanes	5%	20%	60%
	Uniform increase in wind speed of major hurricanes	3%	7%	15%
	% increase in surface run-off resulting from increased tropical cyclone-induced precipitation (cumeecs)	5%	10%	40%
	Increase in cm in average storm tide sea-levels for US mainland coastline between Texas and North Carolina	10cm	40cm	80cm
UK weather exposed lines of business – flood, freeze and subsidence	% increase in surface run-off resulting from increased precipitation (cumeecs)	5%	20%	60%
	Uniform increase in cm in average storm tide sea-levels for UK mainland coastline	5%	10%	40%
	Increase in frequency of subsidence-related property claims using as benchmark the worst year on record	3%	7%	15%
	Increase in frequency of freeze-related property claims using as benchmark the worst year on record	5%	20%	40%

# FSI Insights key finding 5 – top challenges facing insurers

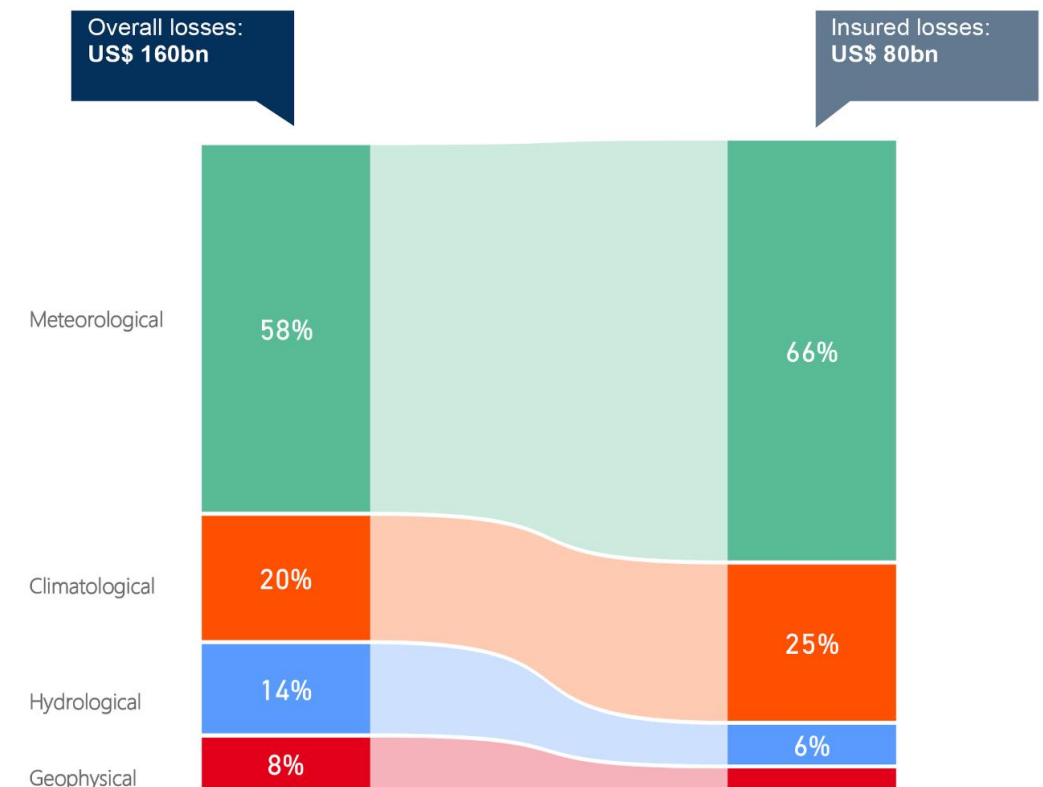


## Key policy issues for consideration

- Tradeoff between risk quantification versus protection gap (cost, availability)
- Role of insurer – financial inclusion, incentivising green finance
- ERM requirements – explicit
- Capital requirements



Hurricanes and wildfires cause high losses  
Global losses from natural disasters in 2018



Munich Re

Source: Munich Re NatCatSERVICE