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EUROPEAN INSURANCE  
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# Climate change in cat models

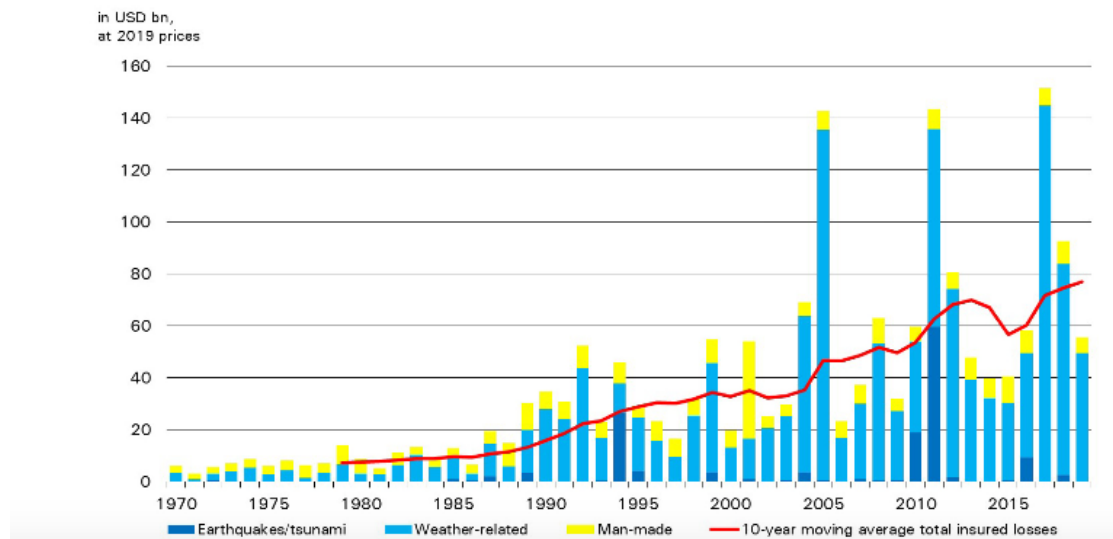
**EIOPA – Marie Scholer**

JRC – Summer school on Sustainable Finance  
September 1-3 2020

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- This presentation focuses on climate change physical risk and cat models.
- Important for (re)insurers as they offer Nat Cat insurance.

**Catastrophe-related insured losses (1970-2019)**



- What are cat models?
- Who uses them, why?
- How does them work?
- Climate change and cat model
- EIOPA's current projects
- What's next?

# What are cat models?

Catastrophe modeling allows insurers and reinsurers, financial institutions, corporations, and public agencies to evaluate and manage catastrophe risk from perils ranging from earthquakes and hurricanes to terrorism and pandemics.

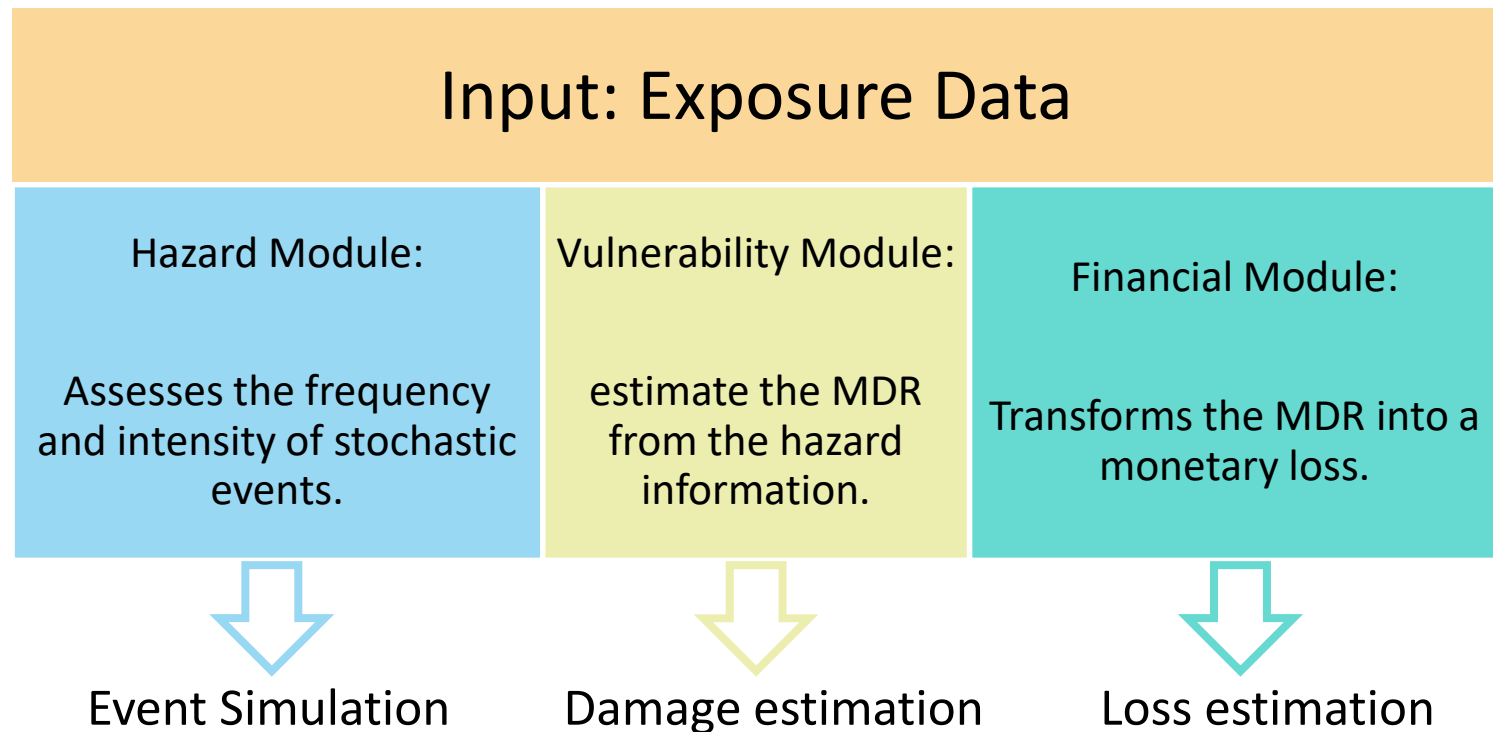


# Who uses cat models and why?



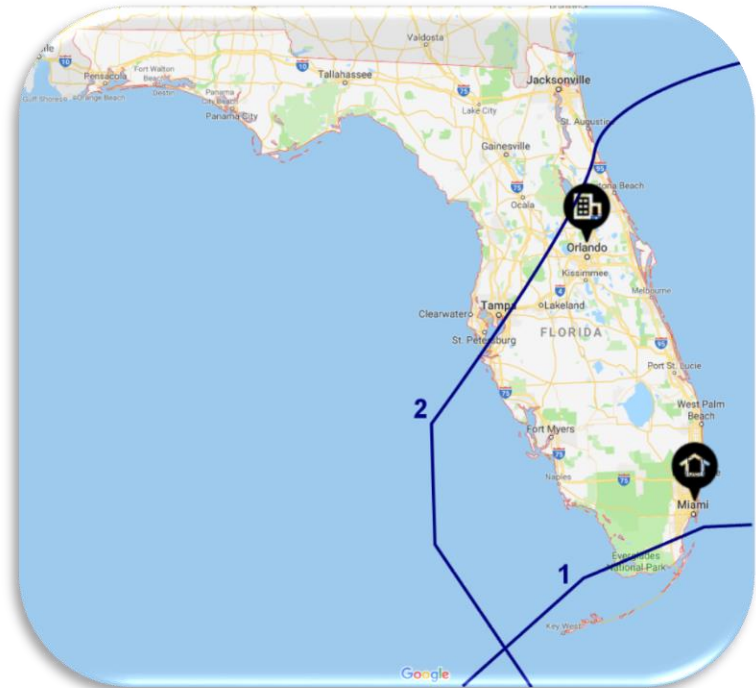
- Insurers and risk managers to assess the risk in their portfolio.
- Reinsurers and reinsurance brokers in the pricing and structuring of reinsurance treaties.
- European insurers to derive the required regulatory capital under the Solvency II regime.
- Insurance rating agencies to assess the financial strength of insurers that take on catastrophe risk.
- Likewise, cat bond investors, investment banks, and bond rating agencies in the pricing and structuring of a catastrophe bond.

# Cat models – how does it work?



# Hazard Module: a. frequency

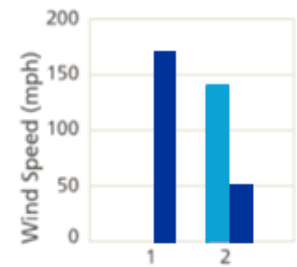
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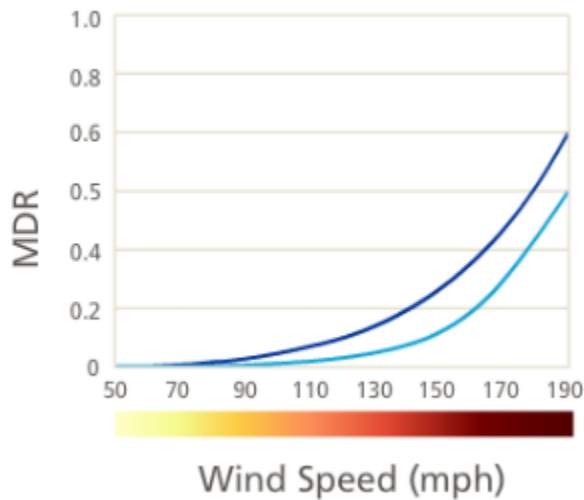
Event ID	Peril	Region	Event Rate
1	Windstorm	North America	1.91 E-06
2	Windstorm	North America	7.00E-06

# Hazard Module: b. intensity

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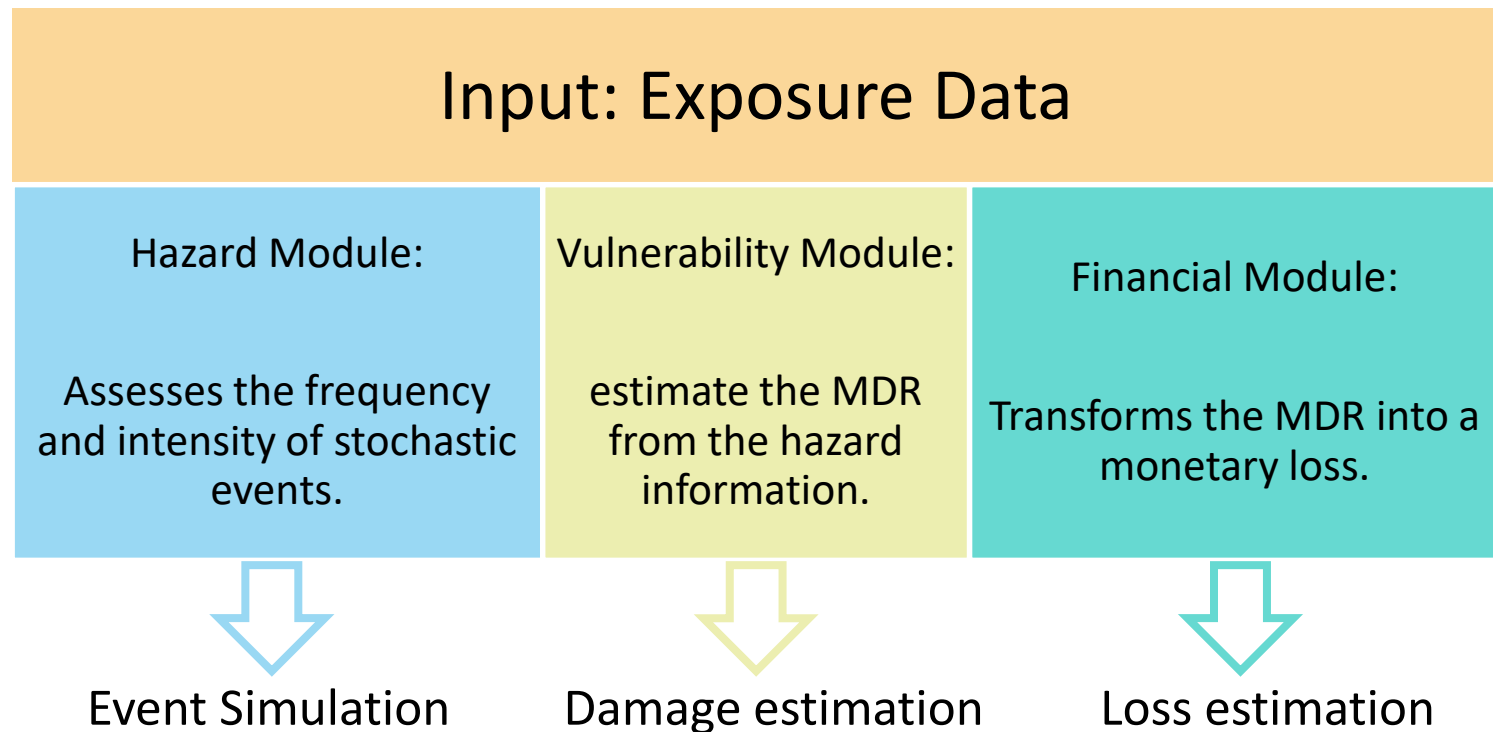






Exposure	House	Building
Sum Insured	200,000\$	900,000\$
Construction Type	Wood frame	Reinforced concrete
Year built	1980	2009
Number of stories	2	4

# Cat models – how does it work?



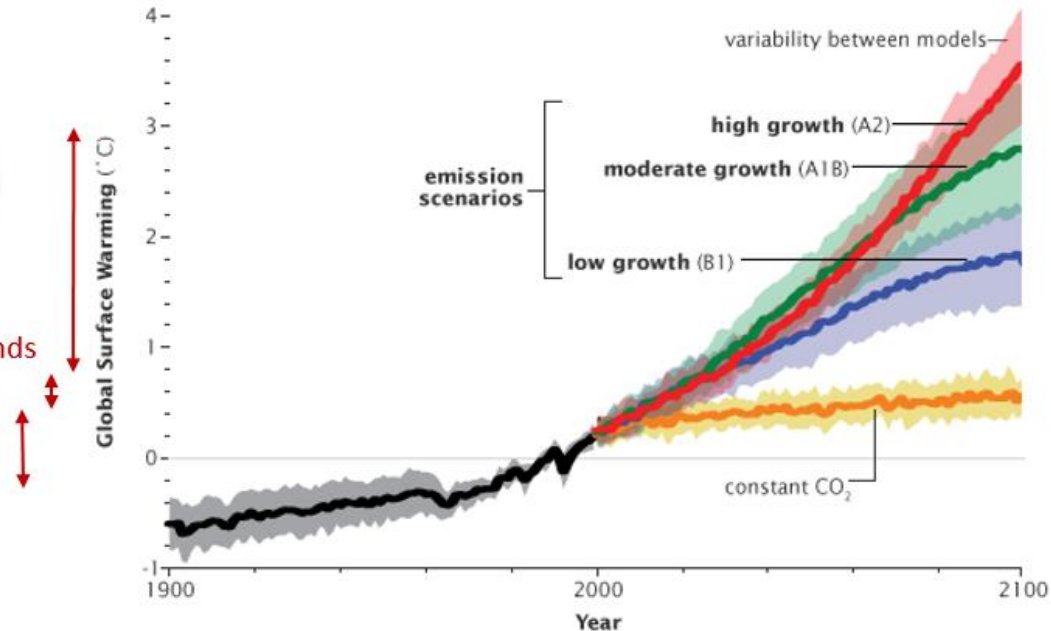
# Cat models and climate change

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Cat models don't generally include future changes

Cat models include adjustments for recent trends

Cat models include historical trends



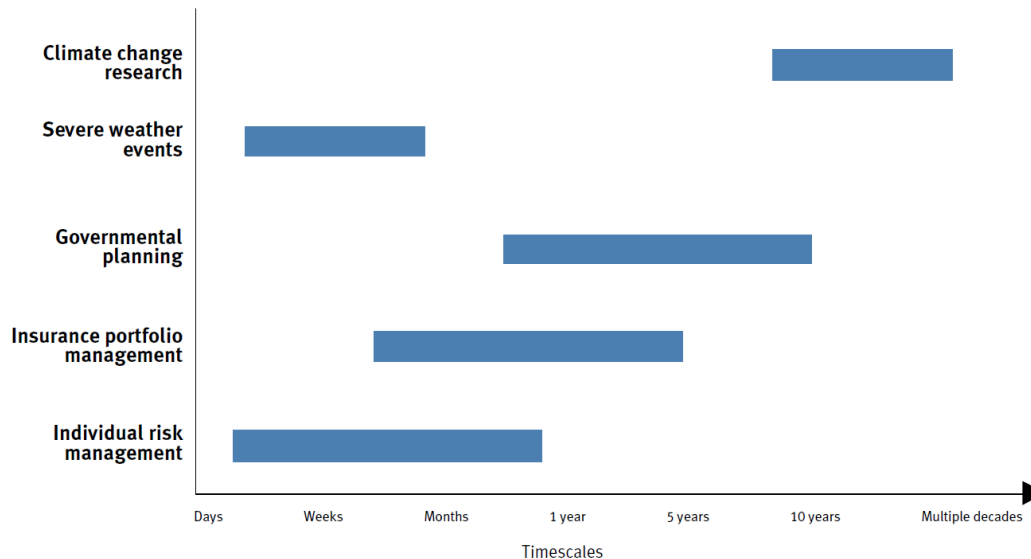
# Linking climate modelling and cat models



- The science of linking climate models together with impact models is still relatively young, yet already in high demand.
- With growing demand for such output there are already clearly many exciting opportunities for partnership between the insurance, cat modelling community and the climate modelling community.

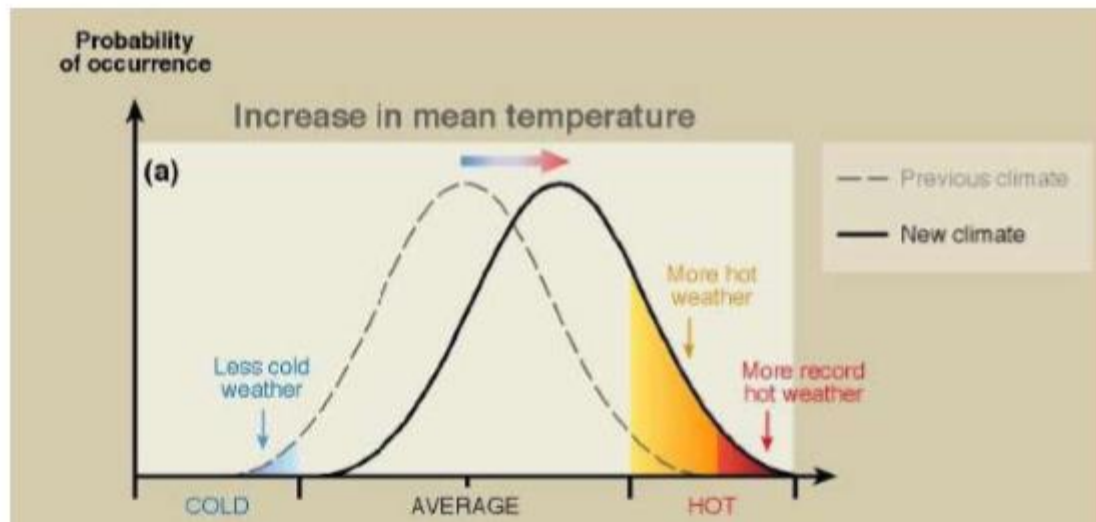
# Challenges: different scales

- Temporal scale:



- Geographical scale: climate model operates on a fairly coarse grid, with prediction points typically a few hundred kilometres apart. The insurance sector consider risk at a local level, for different properties.

- Too much focus on the mean: when assessing catastrophic losses, it is more important to understand extreme events rather than the average.



- Identification of trends: difficult to isolate if trends are clearly linked to human induced climate change.

# EIOPA's current projects



In order to emphasize the need for the (re)insurance sector to look into the impact of climate change physical risk on their portfolio EIOPA is working on the different projects.

EIOPA is preparing a focused analysis of the sensitivity of insurers' balance sheet to climate-change related financial risks.

The work is a pilot/learning exercise, which aims to support future work and considerations around possible future stress-testing. The main objective of this work is to assess key financial risks embedded in insurers' asset portfolios in relation to the transition to a low-carbon economy.

To assess insurer's physical risks, EIOPA is currently working with Cat model vendors to investigate how to link climate models with Cat models to develop new sensitivity scenarios.



# How to potentially include climate change in the Nat Cat Capital requirement calibration



Solvency II is the prudential regime for insurance and reinsurance undertakings in the EU.

Under the Solvency II regime, insurers need enough capital to cope with worst losses over a year.

Undertakings have to calculate the capital requirement needed to cover their Nat Cat risks.

EIOPA investigates how climate change could be included in the calculation of the capital requirement.

# Climate change scenarios in the ORSA



In addition, under Solvency II, as part of its risk-management system every insurance undertaking and reinsurance undertaking shall conduct its own risk and solvency assessment (ORSA).

EIOPA is currently writing an opinion paper to include climate change scenarios in the ORSA.

# Re-pricing in the context of climate change



A common argument for non-life insurer to not explicitly consider climate change in the pricing of Nat Cat insurance contracts is the fact that non-life contract are usually one year contracts and can therefore be re-priced annually if the risk has changed.

In light of climate change, on a mid to long-term this can result into unaffordable contracts.

EIOPA investigates how the (re)insurance sector can promote climate change mitigation and adaptation.

# EIOPA wants to address the insurance protection gap



- EIOPA is concerned that affordability and insurability are likely to become an increasing concern.
- It is therefore key to understand the insurance the protection gap and identify where it comes from.
- EIOPA is currently working on a dashboard on the nat cat protection gap.

# What's next?



EIOPA will organise a workshop with the Cat Risk Expert Network mid-September to promote further collaboration between the insurance, cat modelling community and the climate modelling community.

- EIOPA's sensitivity analysis
- Opinion on climate change scenario for the ORSA
- Paper on how to potentially include climate change in the Nat Cat capital requirement
- Paper on re-pricing in the context of climate change
- EIOPA's protection gap dashboard

are expected to be published by end 2020.

Opinion on sustainability within Solvency II:

<https://www.eiopa.europa.eu/content/opinion-sustainability-within-solvency-ii>

Discussion paper on protection gap:

<https://www.eiopa.europa.eu/content/discussion-paper-protection-gap-natural-catastrophes>



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**Thank you**

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