

# How Reliable Are Catastrophe Models?

Lessons learnt from 50 years of catastrophe modelling in re(insurance)

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“Providing an order of magnitude measure of overall loss potential associated with natural hazards”

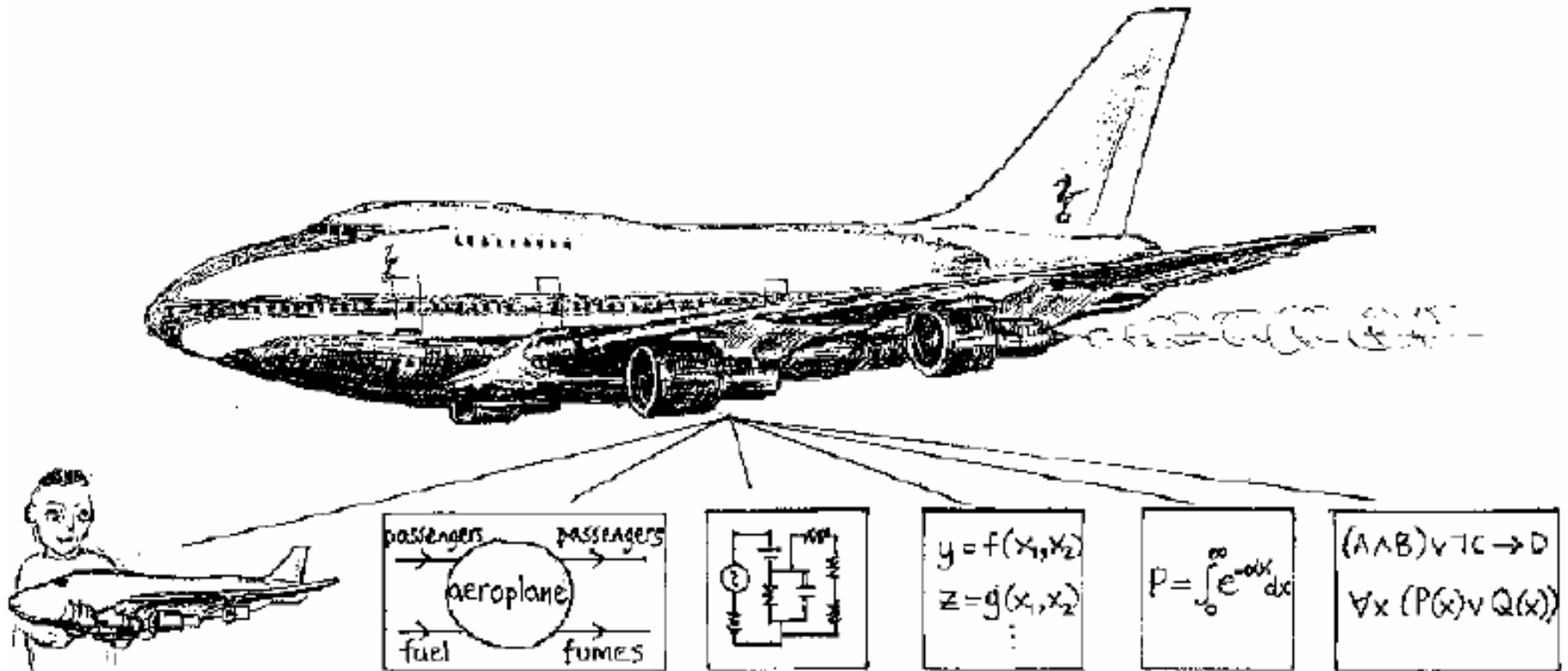
*Dr. Friedman, 1974*

# How Reliable Are Catastrophe Models?

## Agenda

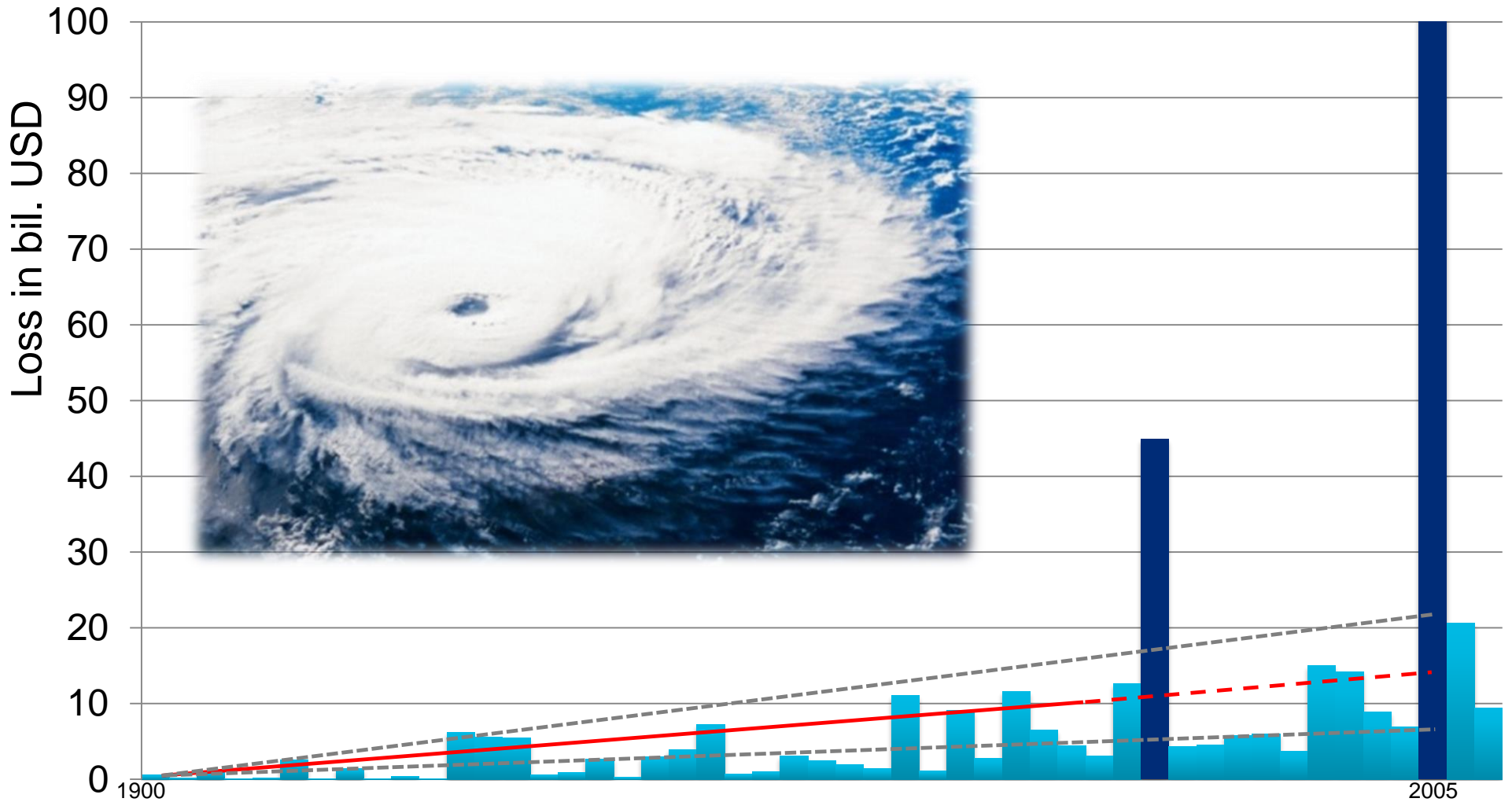
- 1 • What is a (catastrophe) model?
- 2 • Why and how did they appear?
- 3 • How did they evolve?
- 4 • How important is uncertainty?

# Models Are ... ... all simplifications



# A Brief History of Catastrophe Modelling

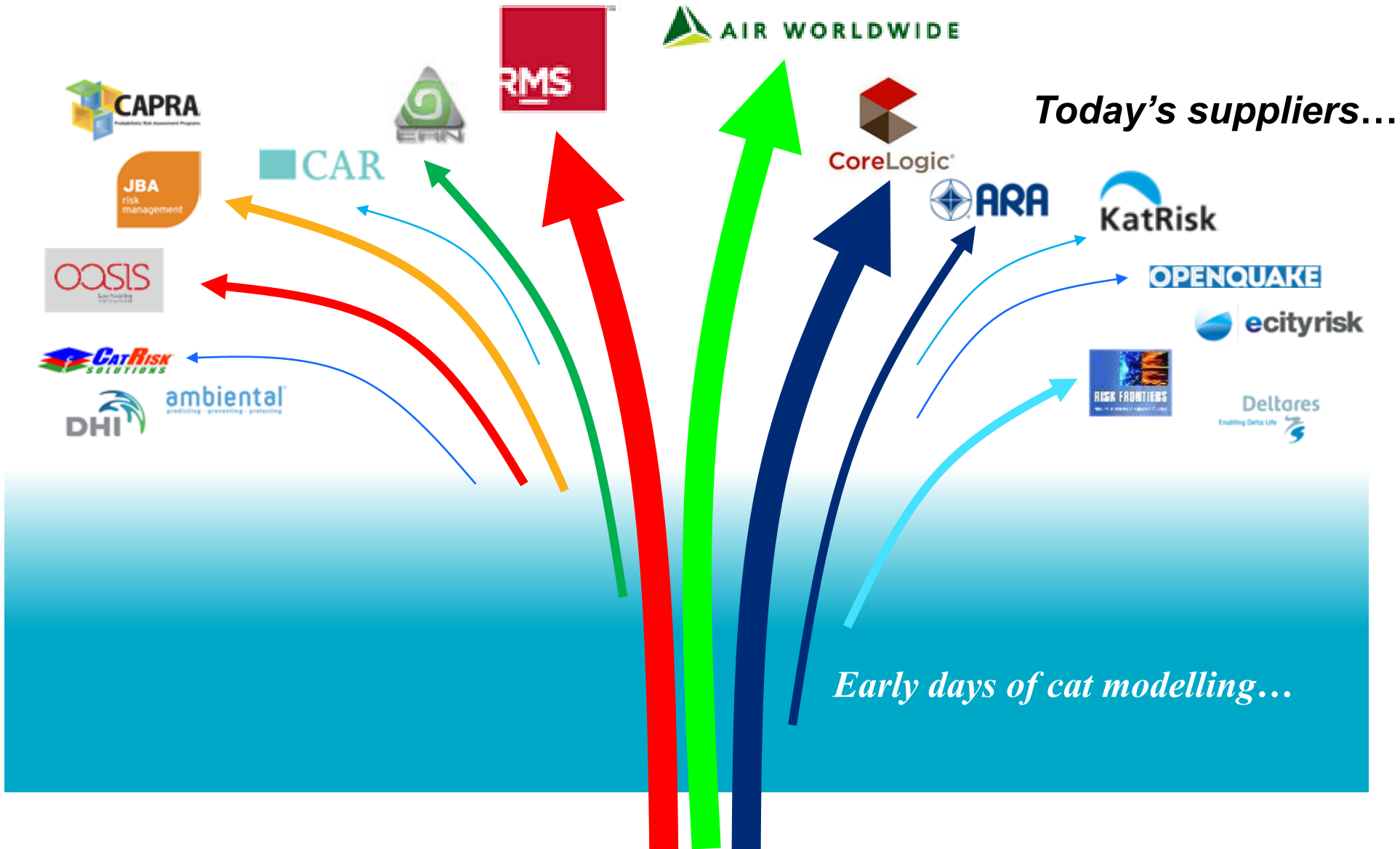
## Why and how did the models appear?



The past is an imperfect guide to the future

# A Brief History of Catastrophe Modelling

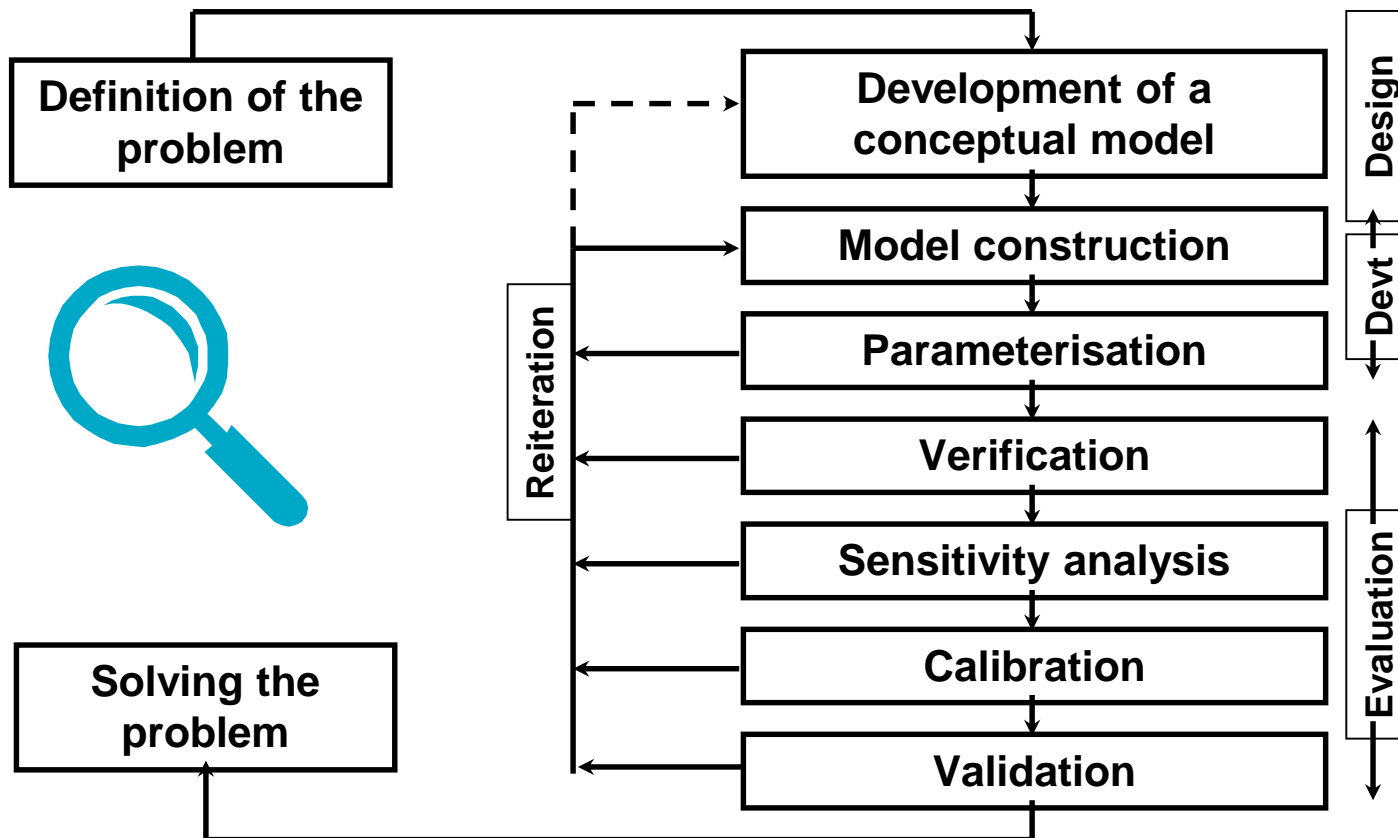
## Expansion of catastrophe quantification capability



# A Brief History of Catastrophe Modelling

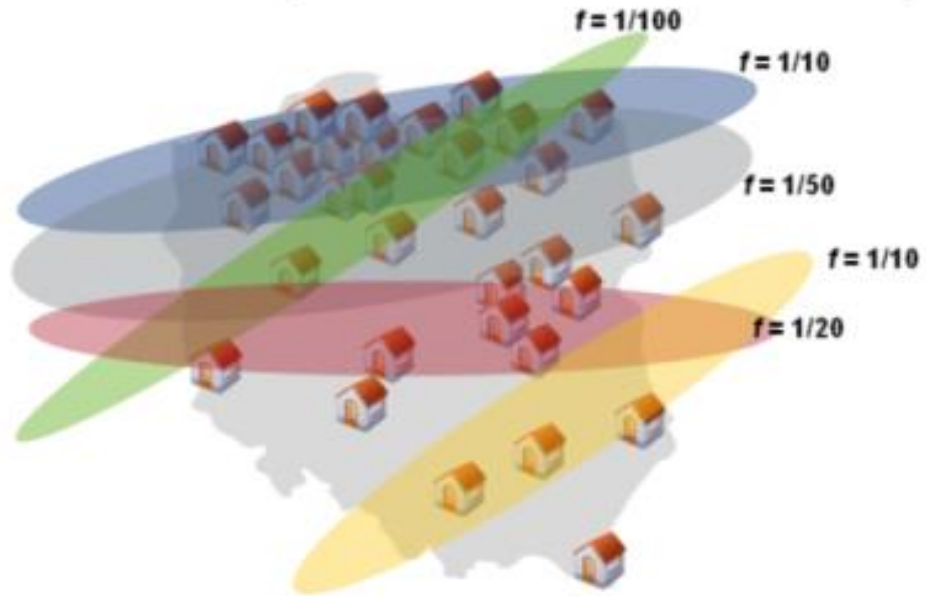
## General catastrophe model build and validation framework

- *The classical black box is nowadays a 'no go'*
- **Ask the right questions**



# A Brief History of Catastrophe Modelling Now...

- *Catastrophe models have evolved into the industry standard*
- &
- Discipline this created is as important as the numbers in output
  - Benchmark for risk – enable market participants to take a position relative to that risk

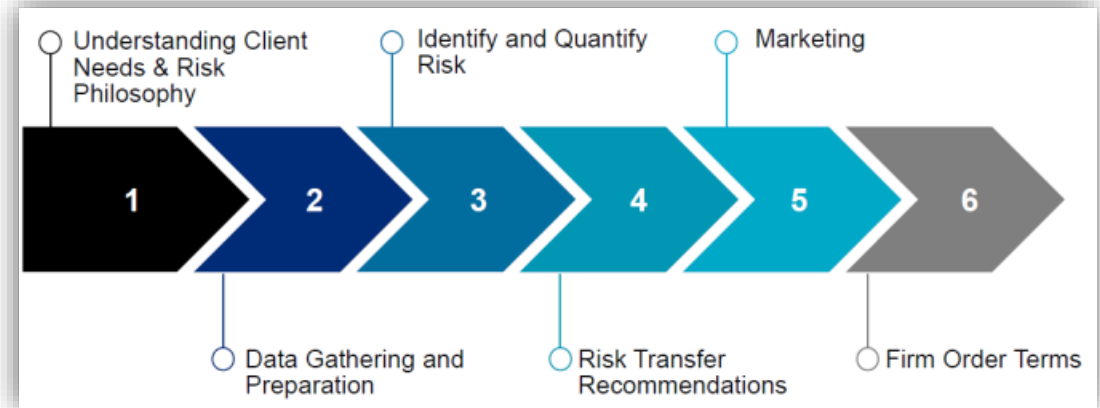




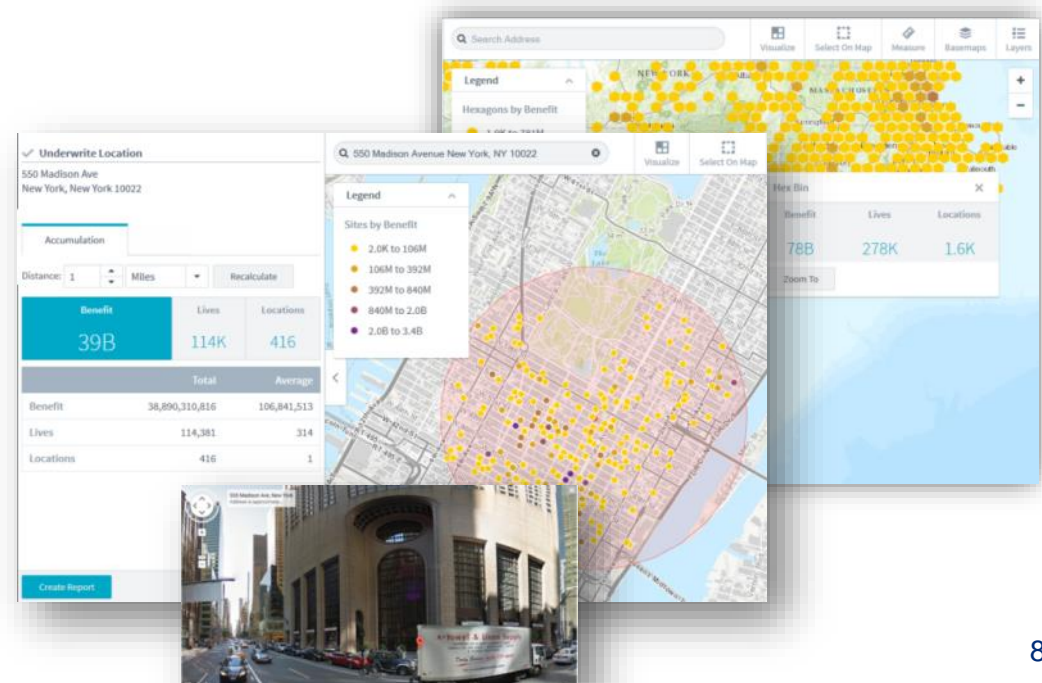
# A Brief History of Catastrophe Modelling

## Evolution of (re)insurance intermediary's role

- Historically a linear process

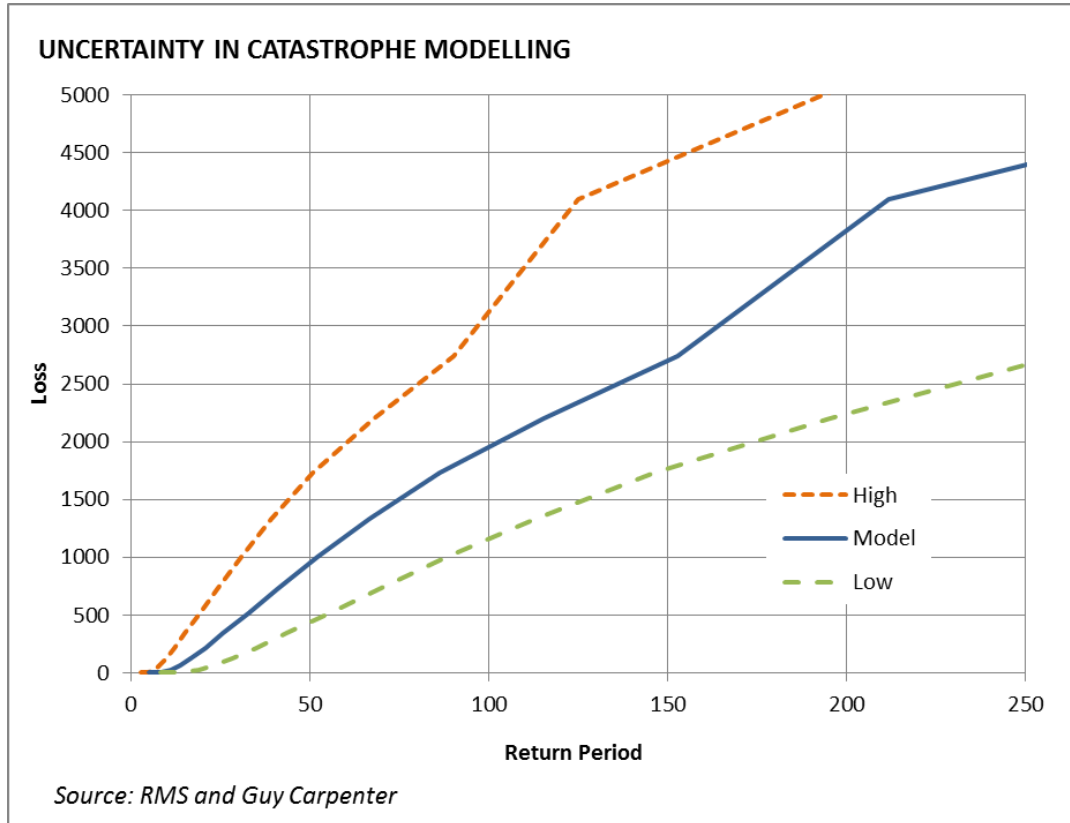


- Currently interactive, dynamic and evolving process & hinges on cat models and analytics



# Cat Model Uncertainty

## ... multiples, not fractions, of the estimate

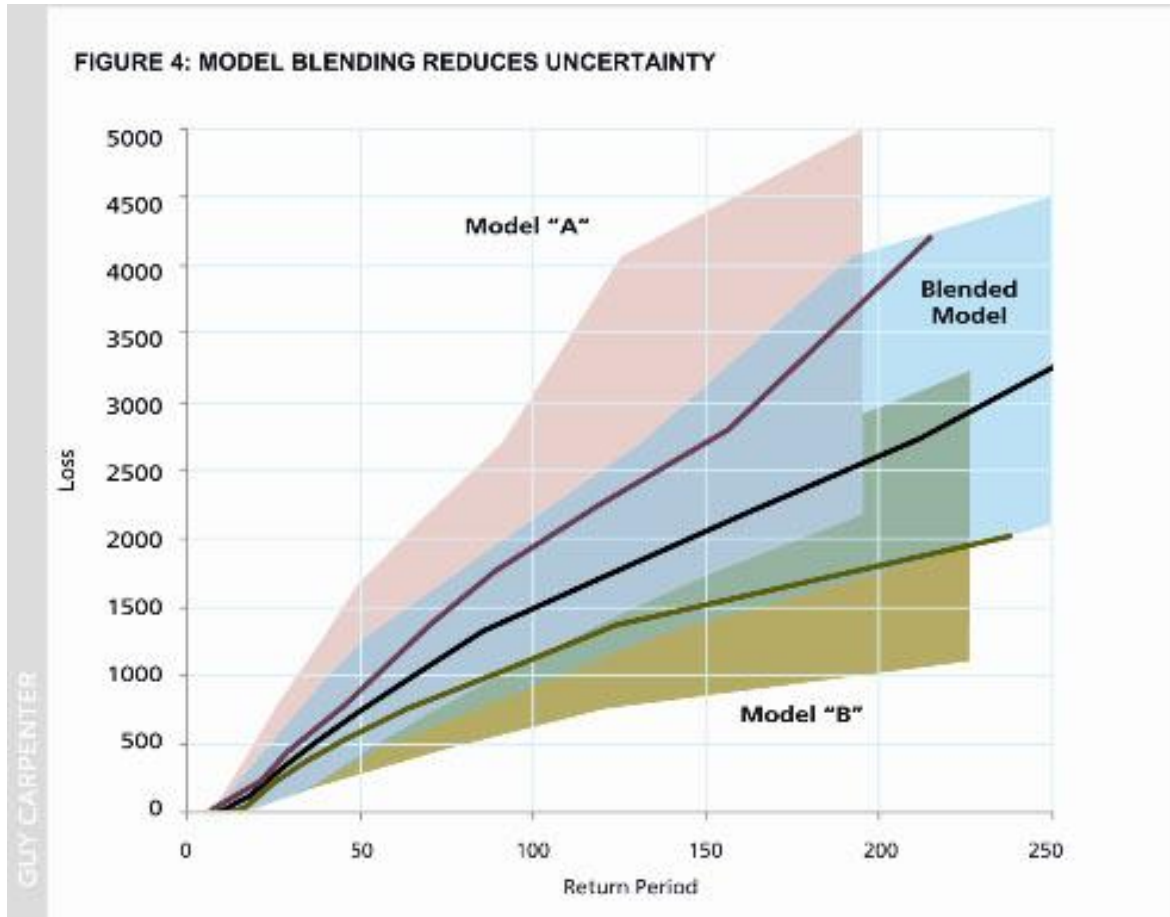


Hurricane Harvey Loss Estimates (bil. USD)			
	Low	Mid	High
<b>AIR</b>		10	
<b>RMS</b>	25	30	35
<b>CoreLogic</b>	7.5	9.5	11.5
<b>KCC</b>	12.4	13.9	15

Geographic Scale	Lower Value of Range	Upper Value of Range
<b>National</b>	<b>60% of PML</b>	<b>190% of PML</b>
<b>Regional</b>	<b>40% of PML</b>	<b>270% of PML</b>
<b>Localized</b>	<b>25% of PML</b>	<b>430% of PML</b>

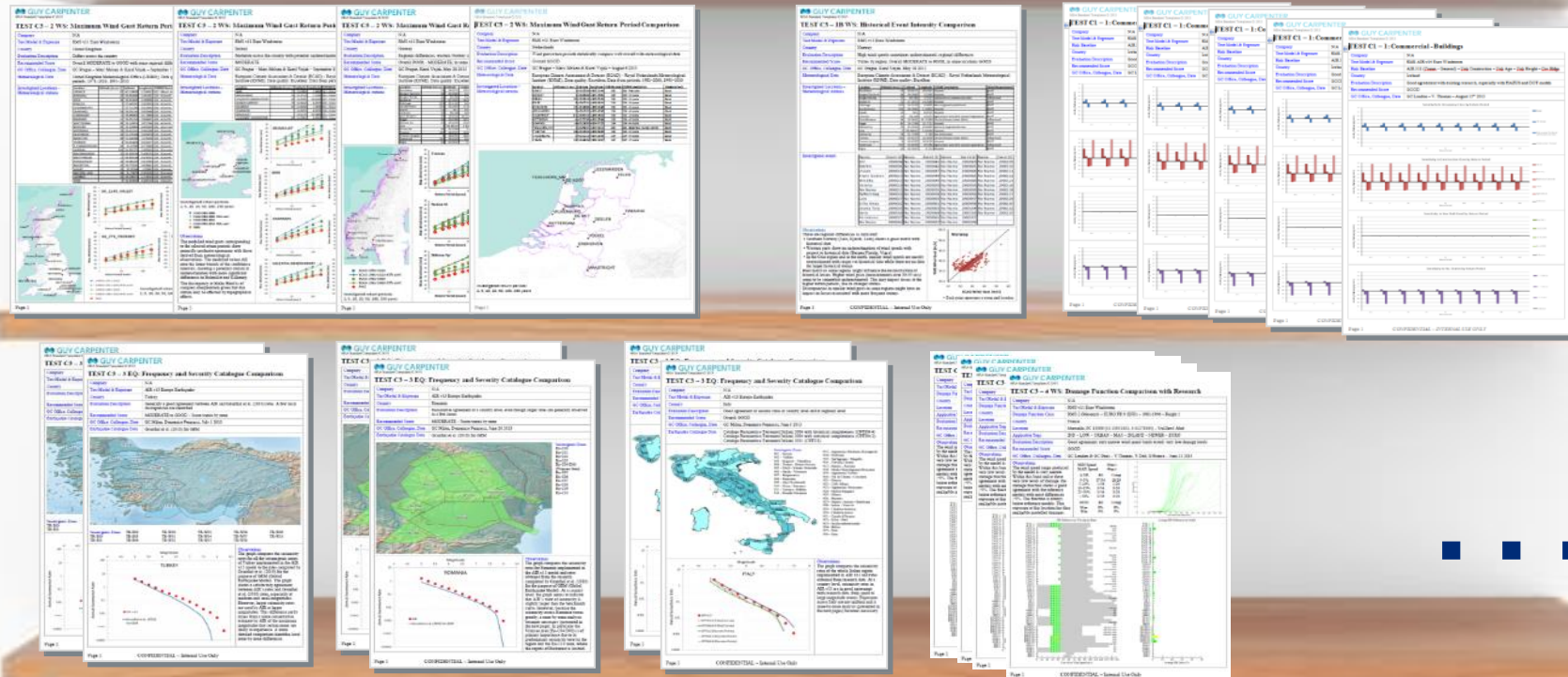
# Coping With Uncertainty

## Multi-model techniques

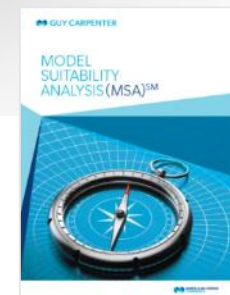


Source: Guy Carpenter & Company, LLC

# Coping With Uncertainty GC's MSA test library



Clients can pick tests from the MSA Test Library and use them to build their own view of risk. Tests can also be executed collaboratively



# Conclusions

## Keep the models in their place

*The only certainty we have regarding the next cat event is it will be different from anything we have seen before*

- Catastrophe Modelling is not a synonym for Catastrophe Management
- Models are tools in the risk management and risk selection process
- Help us understand the range of possibilities over the long term by creating a history that never happened
- The foundation element of our industry is underwriting – good underwriting judgement and experience
- The underwriter must be empowered
- Maintaining recognition of what a model can and can not do is everyone's job
- Additional skill sets will be required to operate in this complex risk transfer environment
- Cat models enhancements are driven by events

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