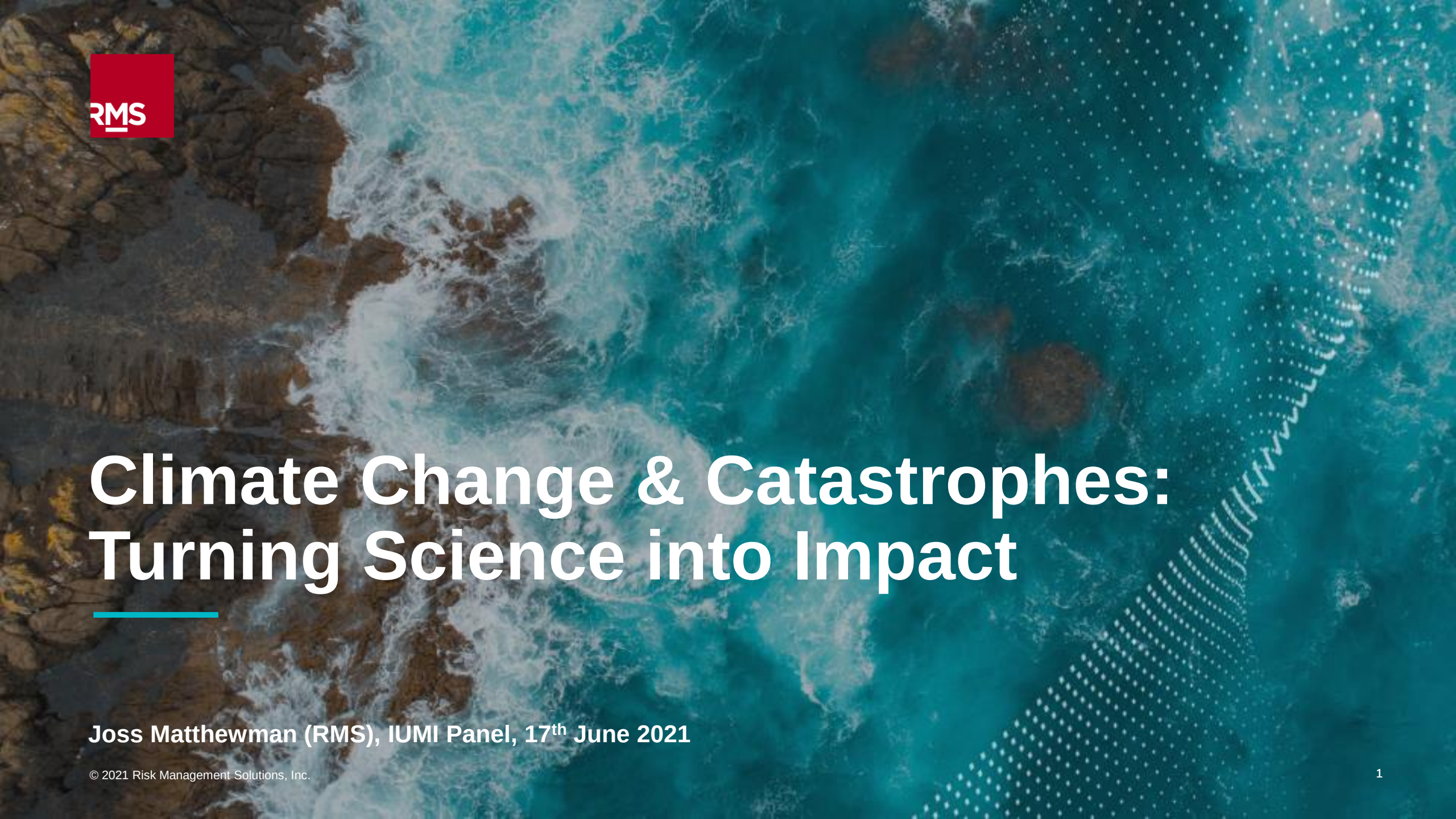
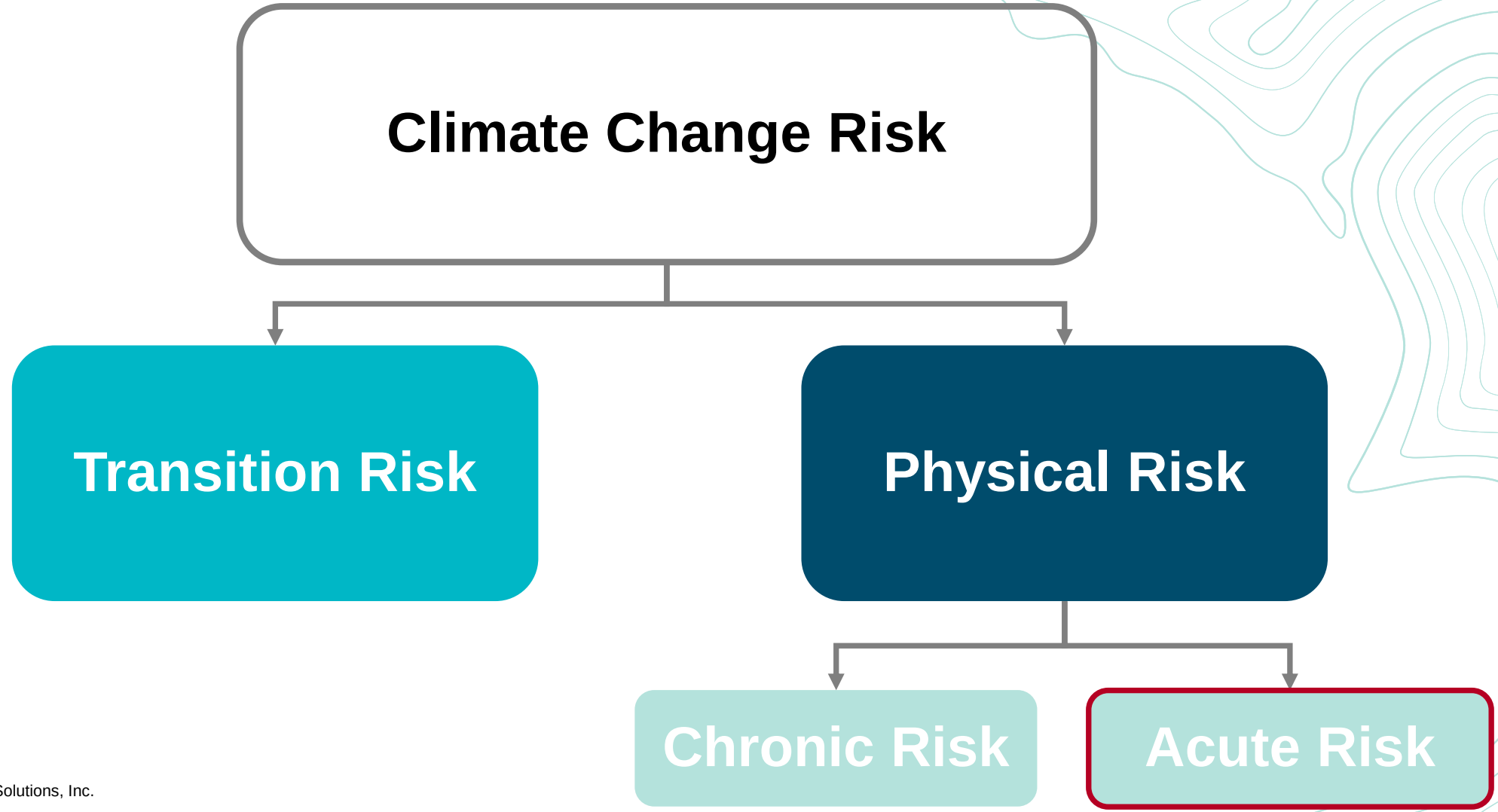


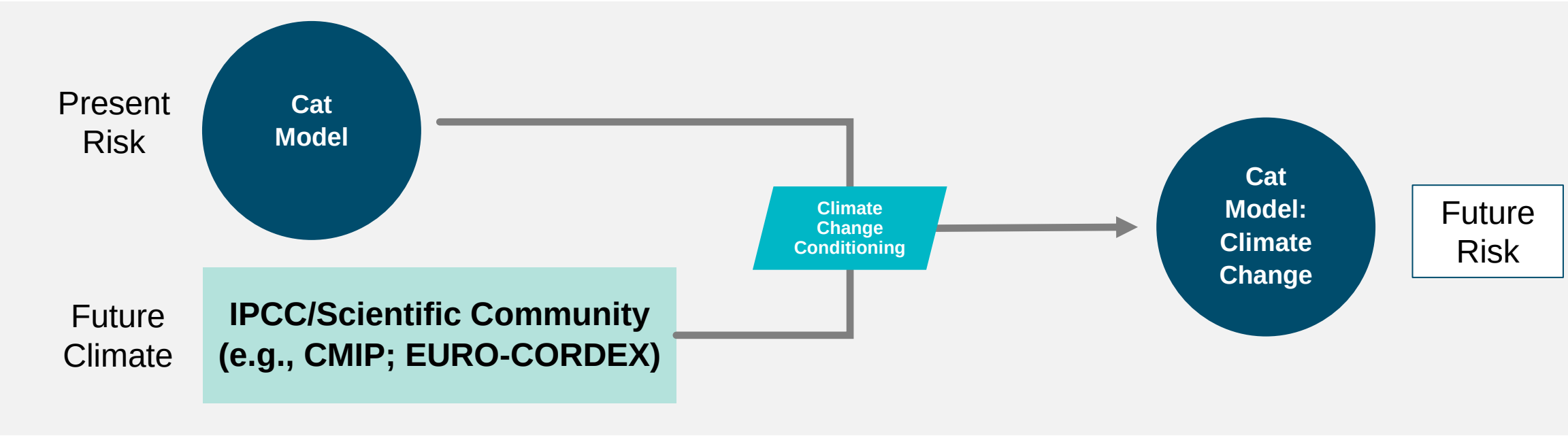
Climate Change & Catastrophes: Turning Science into Impact

Joss Matthewman (RMS), IUMI Panel, 17th June 2021

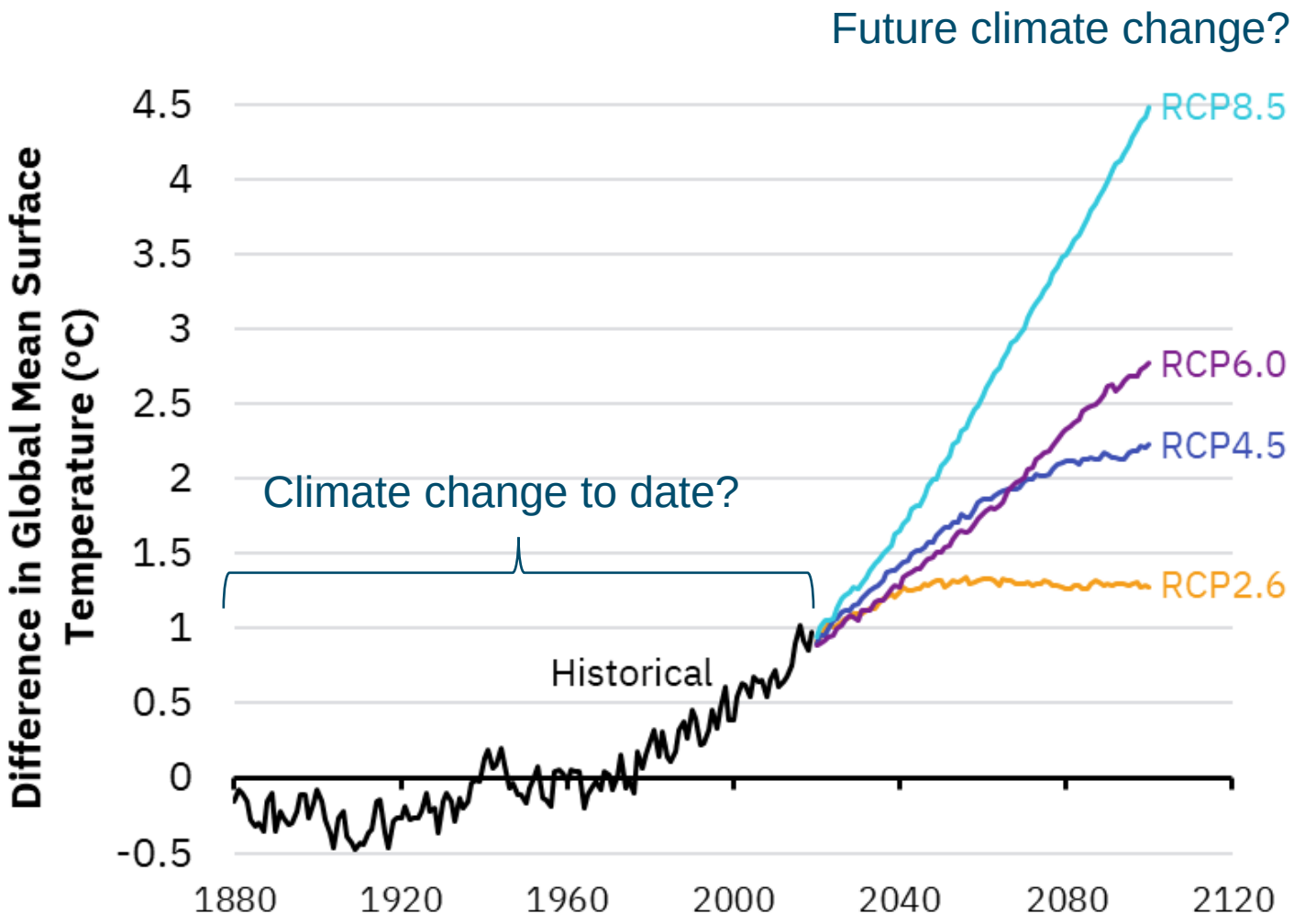
Climate Change Risk



RMS Approach to Climate Change Modelling



Climate Change, Extreme Weather, and Climate Variability



Scientific consensus is strong on the presence of climate change in some physical parameters…

… but what does this tell us about the impact on extreme weather?

Which Region-Perils are Impacted by Climate Change?

HIGH

LEVEL OF CONFIDENCE

LOW

COASTAL FLOOD

SEA LEVEL RISE

INLAND FLOOD

PRECIPITATION

WILDFIRE

PRECIPITATION
WIND

TROPICAL CYCLONE (TYPHOON)

SSTs
ENSO
STEERING
OTHER FACTORS

EXTRATROPICAL (WINTER) STORM

JET STREAM
ENSO
OTHER FACTORS

SEVERE CONVECTIVE STORM

VARIOUS
MICRO AND
MACRO
FACTORS

- Each region/peril must be studied individually
- Scientific consensus is easier to determine in some cases
- For some perils, there is a very high degree of uncertainty

Climate Change Risk to Ports and Storage Facilities

Flood

Extreme Winds

Hail

Climate Change Physical Risk & Cat Models

Hazard

Climate- & Human-related factors

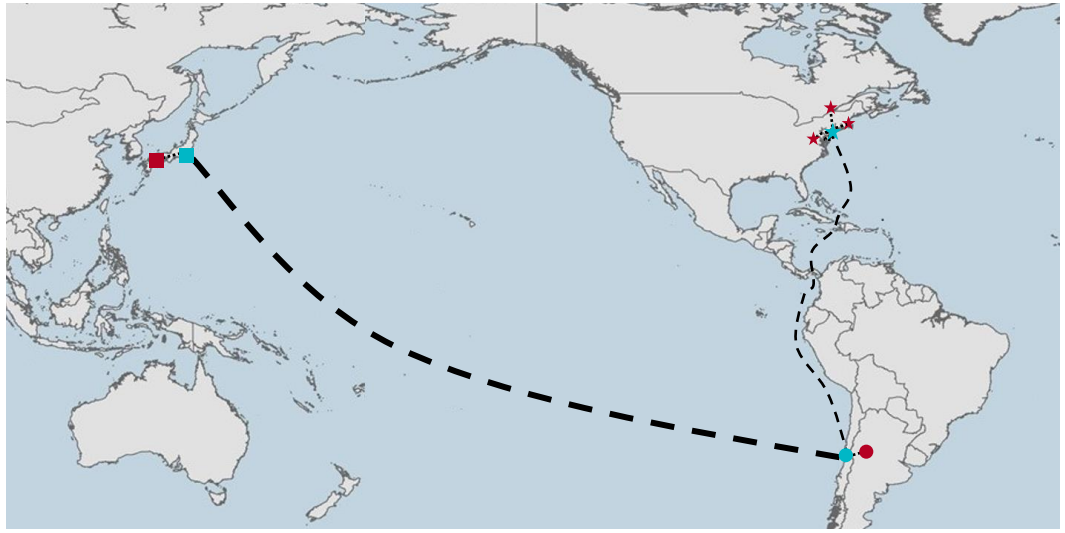
“Whims of humankind”

Vulnerability

Exposure

Cat Models & Today's Climate Risk – an Industry Standard

Country	Earthquake Risk	Windstorm (HU/TY) Risk	Convective Storm Risk
Japan	High	Med	Low
USA – West Coast	High	Low	None
USA – Florida	Low	High	Low
USA - Central	Med	Low	High
USA – NYC	Low	Med	Low



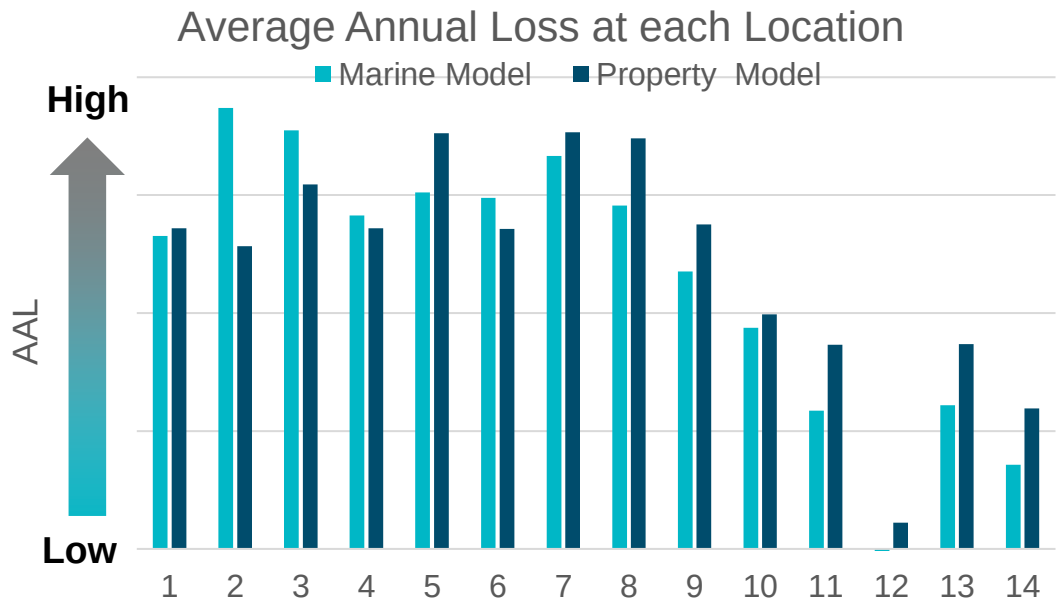
Exposure, Hazard & Vulnerability

↓

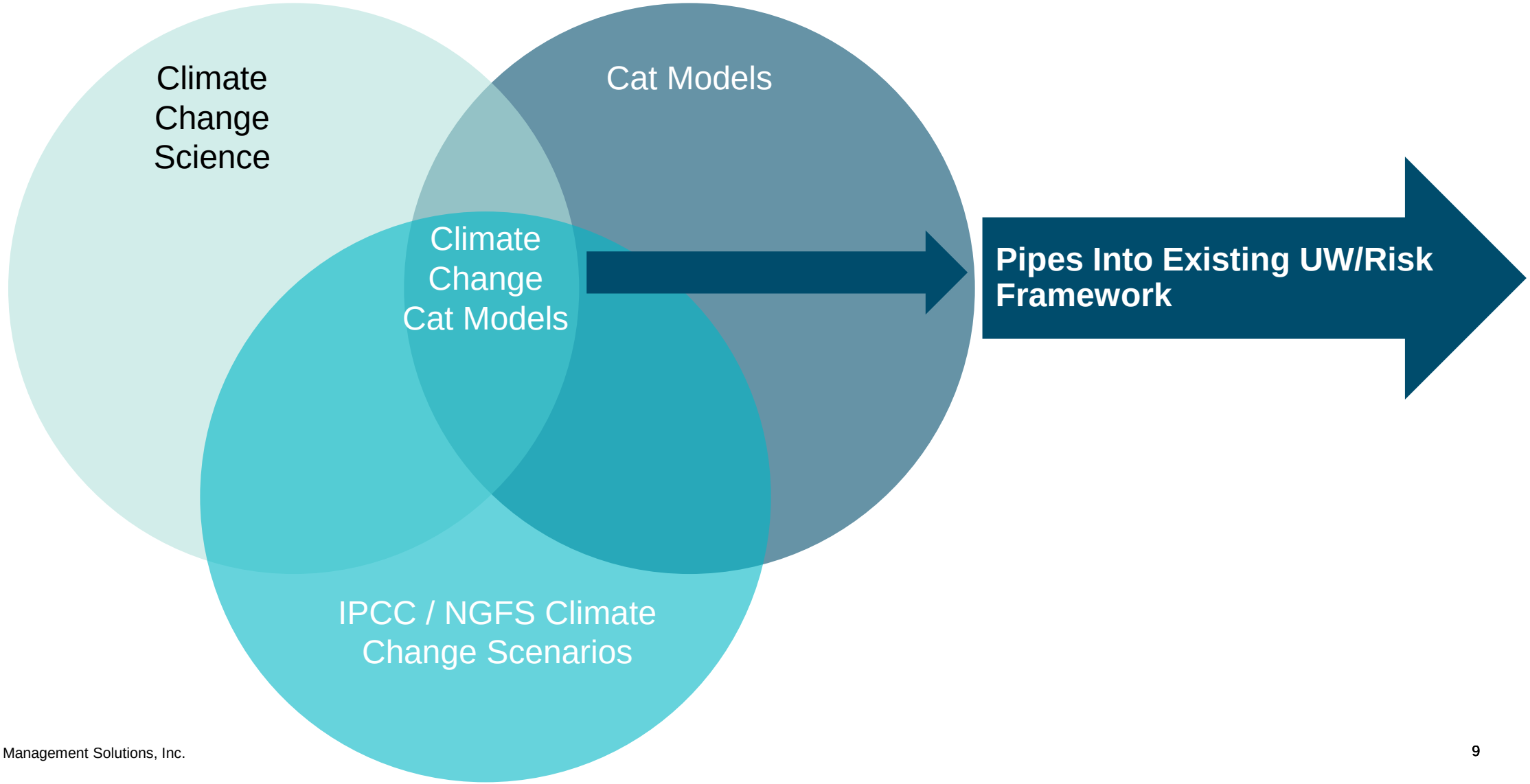
Probabilistic Loss

↓

Underwriting / Exposure Mgt / Capital Modelling



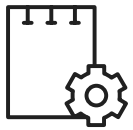
Tools which fit the Existing Risk Management Framework



Climate Change across the UW & Risk Decision Framework

Underwriting and Pricing

Pricing climate change uncertainty & pricing resilience (VoR)
Risk differentiation in a changing climate



Business Planning

Business readiness for near-term climate change

Stress & Scenario Testing

Understand climate change uncertainty in capital & liquidity

Stakeholder Communications

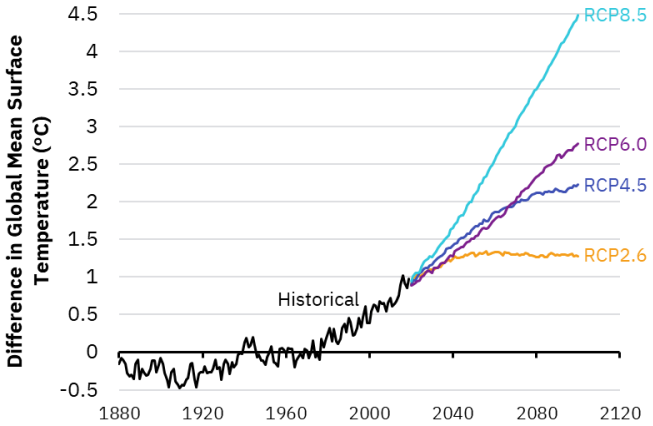
Shareholders, cedants, ILS investors, Rating Agencies

Regulatory Reporting

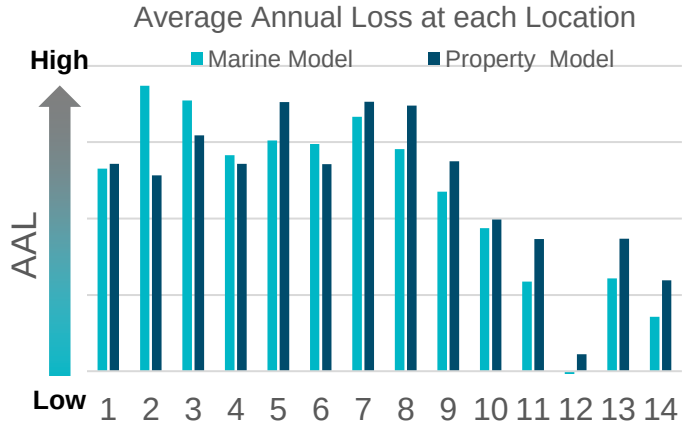
Prescriptive climate change scenarios
Long-term time horizons

Climate Change Challenge

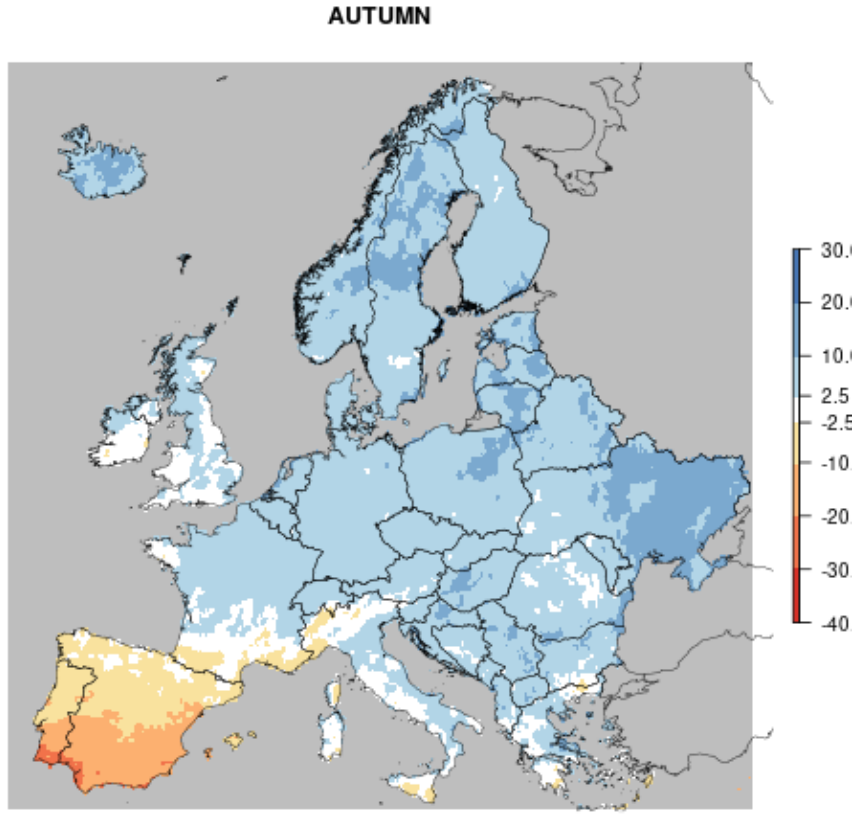
Turning this…



… into this



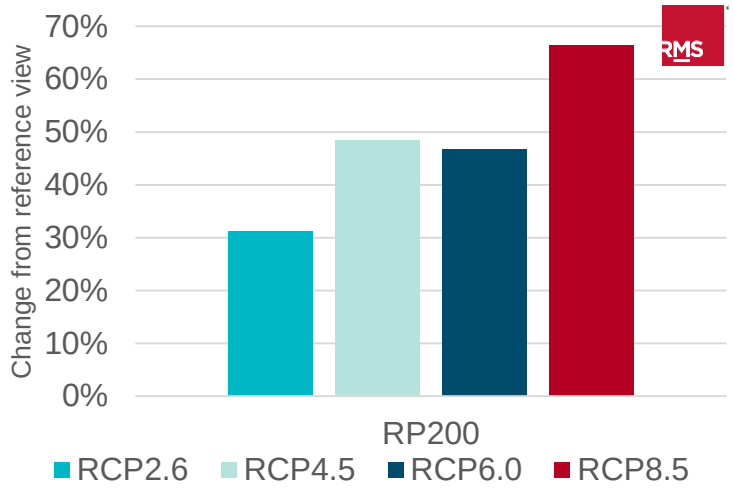
Capturing Variations



Change in daily extreme precipitation: 2041-2070 vs present

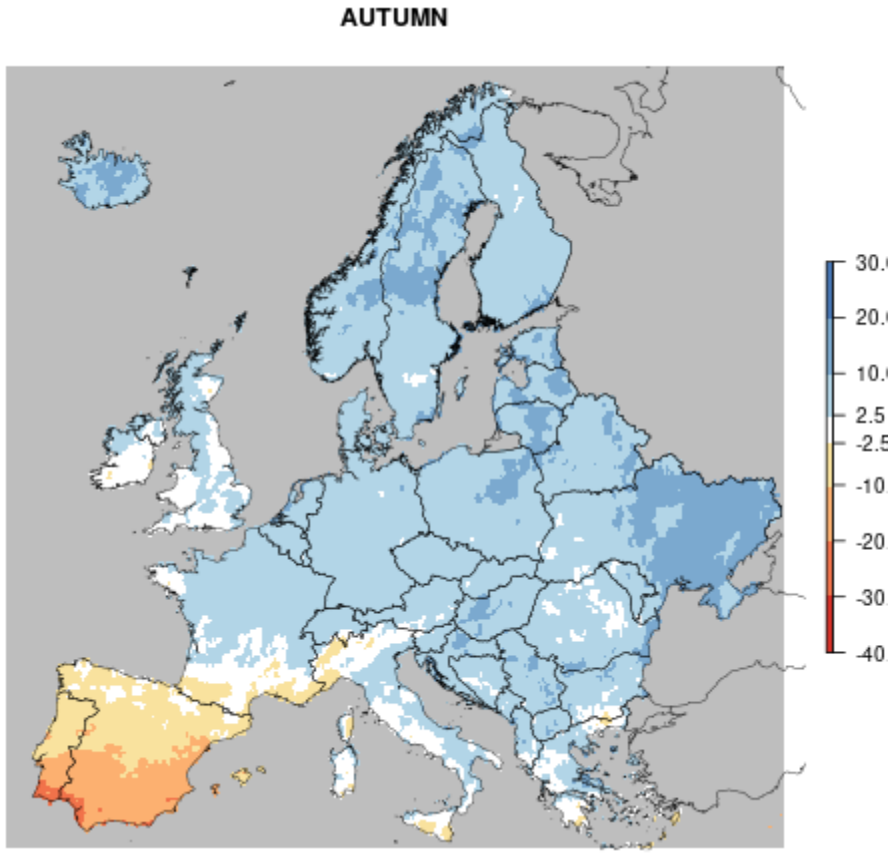
Source: EURO-CORDEX data

Uncertainty



Climate Change Impacts, Regionally and Locally

Differences in climate change signal

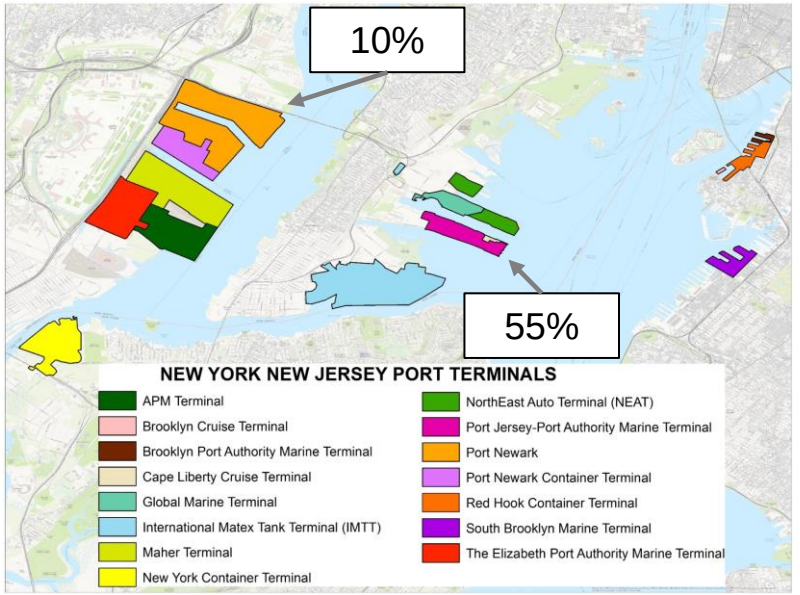


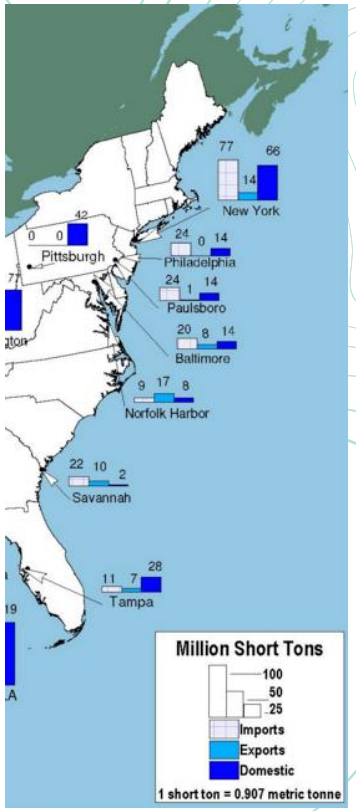
Change in daily extreme precipitation: 2041-2070 vs present

Source: EURO-CORDEX data

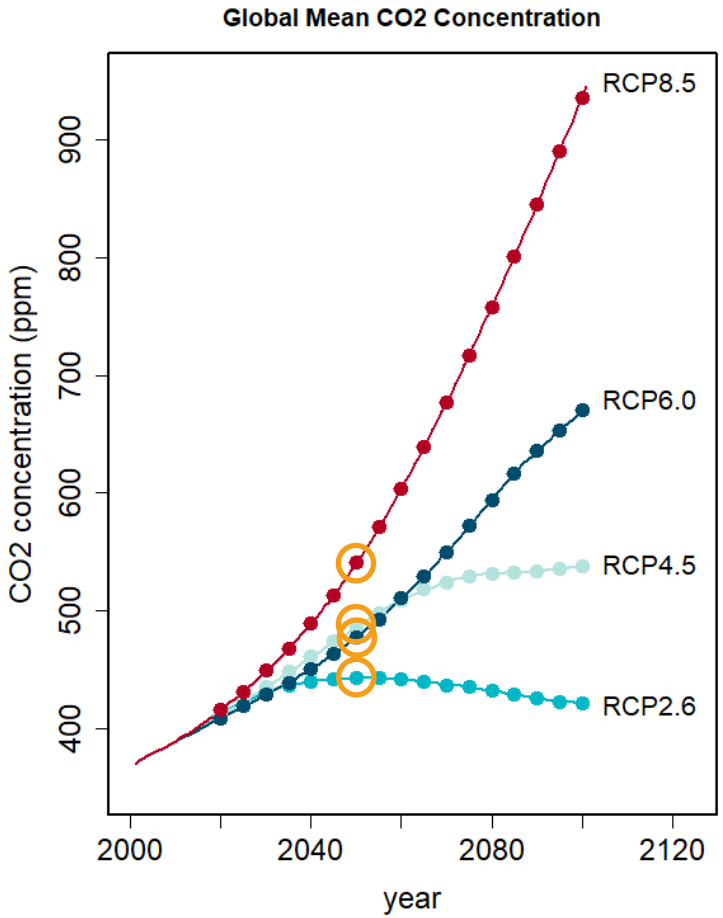
Differences in response to the same signal

Modeled Open Lot Automobile Damage – Superstorm Sandy





Regional Variation in Climate Change Impacts

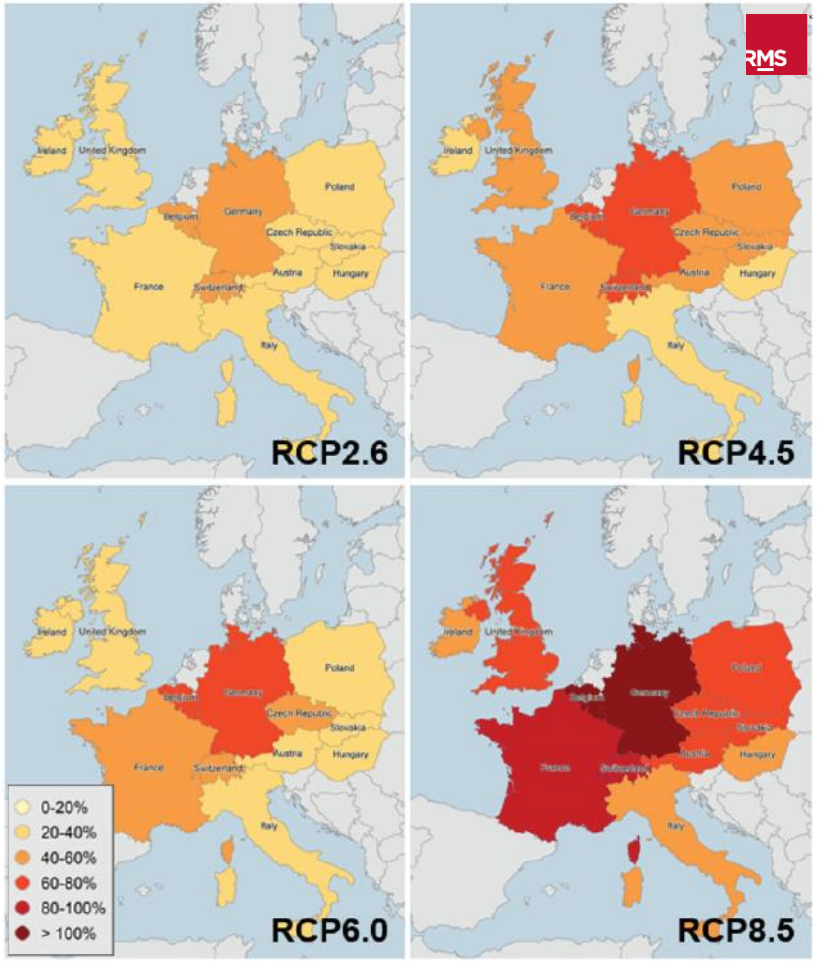


CO2 concentration data from the WMO.

Source: M. Meinshausen, S. Smith et al. The RCP GHG concentrations and their extension from 1765 to 2500, in prep., Climatic Change

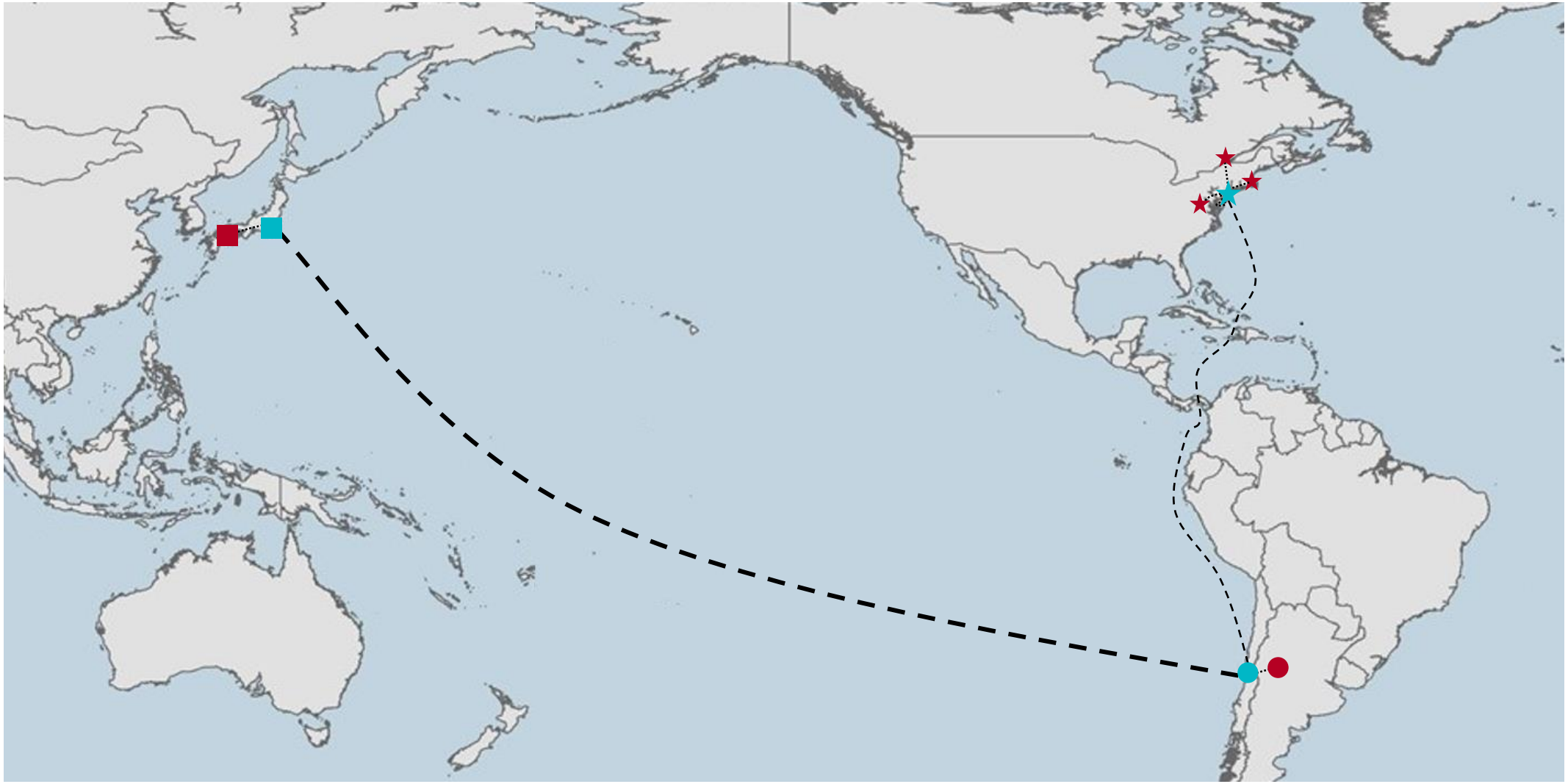
RMS Europe Flood Climate Change Model:

Change in 2050 Average Annual Loss vs Current Climate

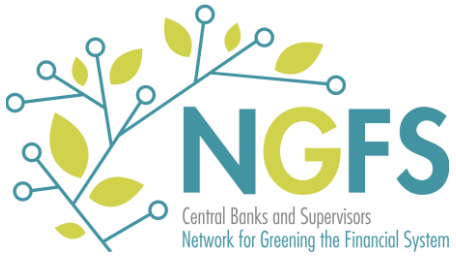


Preliminary results from https://www.rms.com/offer/europe-flood-whitepaper

Interconnectedness of Risk in a Changing Climate



Emerging Regulation around Climate Change



Thank you.