CHANGES IN WEATHER RELATED RISKS AND ITS IMPLICATIONS

GLOBAL INSURER VIEW

AZ Re Cat Risk Management
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Allianz

Japan, aftermath of Typhoon Hagabis October 2019

A WORLD OF AGREEMENT: TEMPERATURES ARE RISING

NASA Goddard Institute for Space Studies
Berkeley Earth
Japanese Meteorological Agency
NOAA National Climatic Data Center
Met Office Hadley Centre/Climatic Research Unit
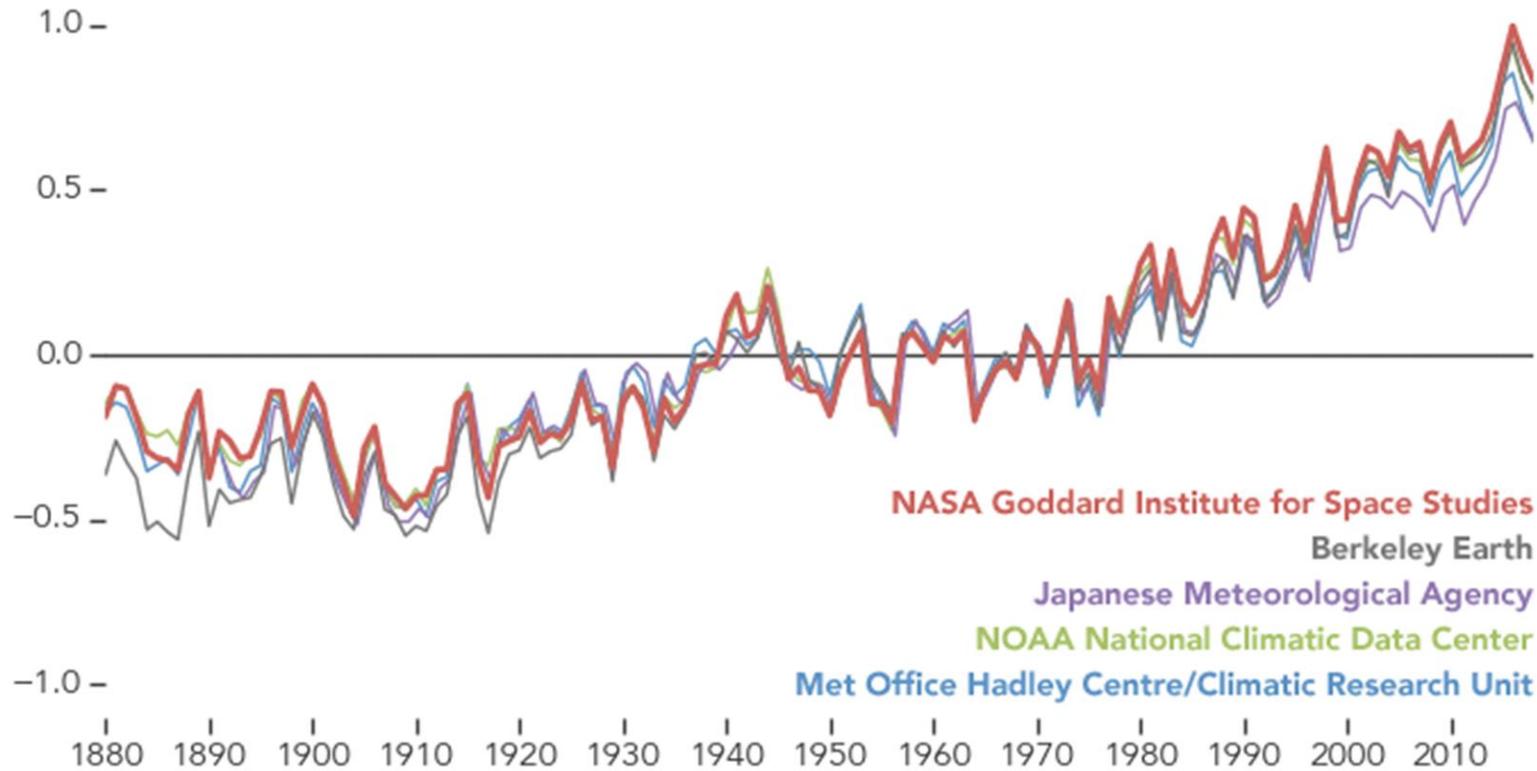
Rank*	Year	Anomaly (°C)
1	2016	0.99
2	2019	0.95
3	2015	0.93
4	2017	0.91
5	2018	0.83
6	2014	0.74
7	2010	0.72
8 (tied)	2005	0.67
8 (tied)	2013	0.67
10	1998	0.65

- Since the 1880s, the average global surface temperature has risen about 1°C
- 8 of the 10 warmest years since 1880 between 2010 and 2019
- Warming driven in large part by increased emissions into the atmosphere of carbon dioxide and other greenhouse gases

... ALONG WITH NAT CAT LOSSES. TREND DOMINATED BY SOCIO-ECONOMIC FACTORS SO FAR ...
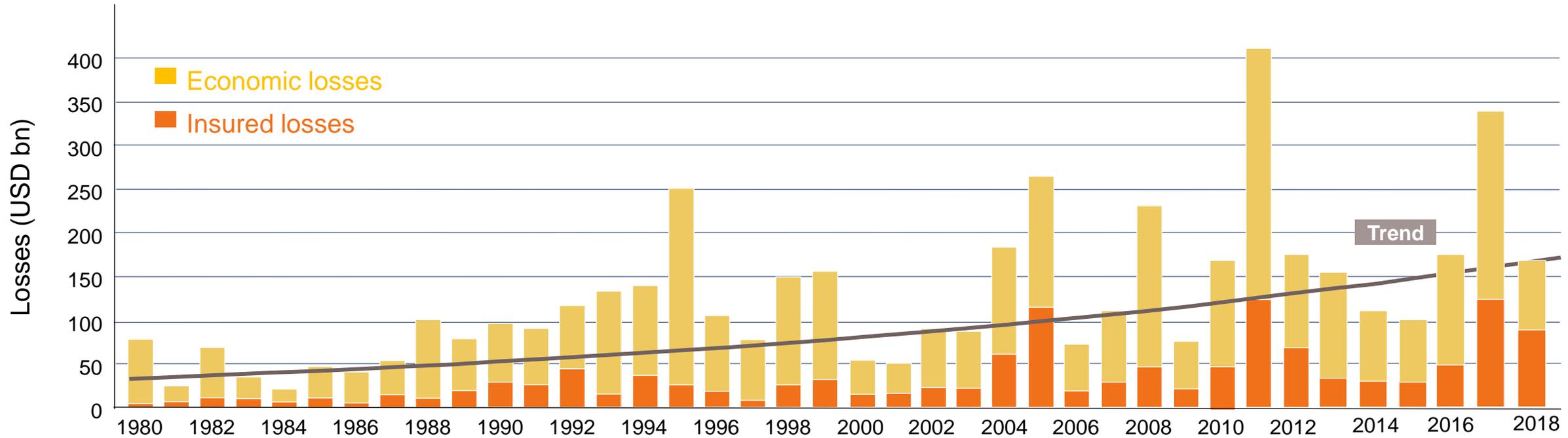
Source economic and industry losses: MunichRe

Trend dominated by increasing exposure, developments in high hazard areas and growth of assets (e.g., more people living in coastal areas and floodplains, expanding cities into high risk areas)
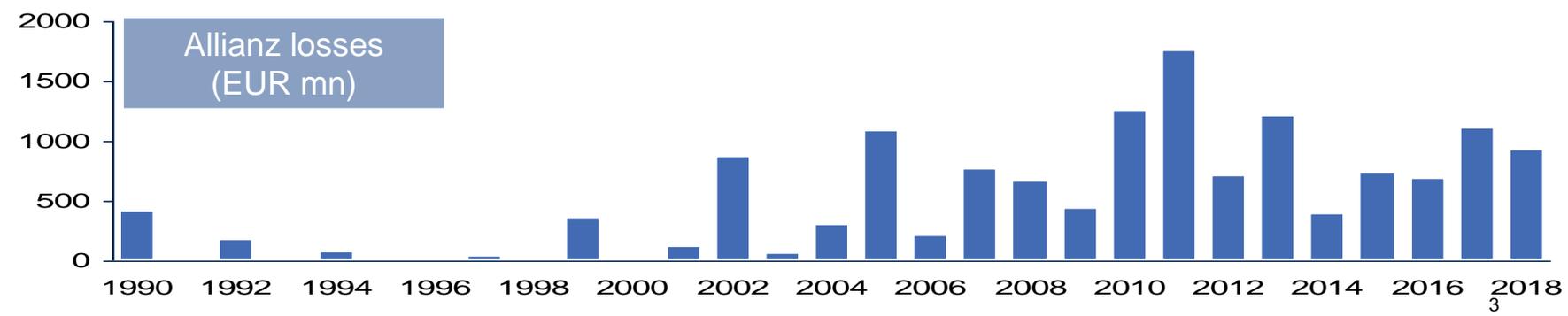
... BUT RECENT YEARS ARE IN-LINE WITH CLIMATE CHANGE IMPACT STUDIES – WETTER STORMS AND MORE FIRES

2017

- Devastating California wildfires, 11.4 bn$ insured loss for October events
- Hurricane Harvey – record precipitation amounts in the U.S., 30 bn$ insured loss

2018

- California Camp wildfire in November, 12.5 bn$ insured loss
- Hurricane Florence – wettest hurricane in the Carolinas on record

2019

- Widespread bushfires primed by record low rainfall in some areas in NSW and Queensland
- Hagabis was the wettest typhoon in Japan's recorded history by inducing 923 mm of rain in just 24 hours

> ➤ A warmer atmosphere can hold more moisture which can lead to higher rainfall amounts
> ➤ Longer heat waves and dryer conditions support fire outbreaks
> ➤ Highlights the interaction of climate change and socio-economic factors

HOW DOES CLIMATE CHANGE AFFECT NATCAT PERILS ?

Climate change signal and confidence/ uncertainty differs by peril and location
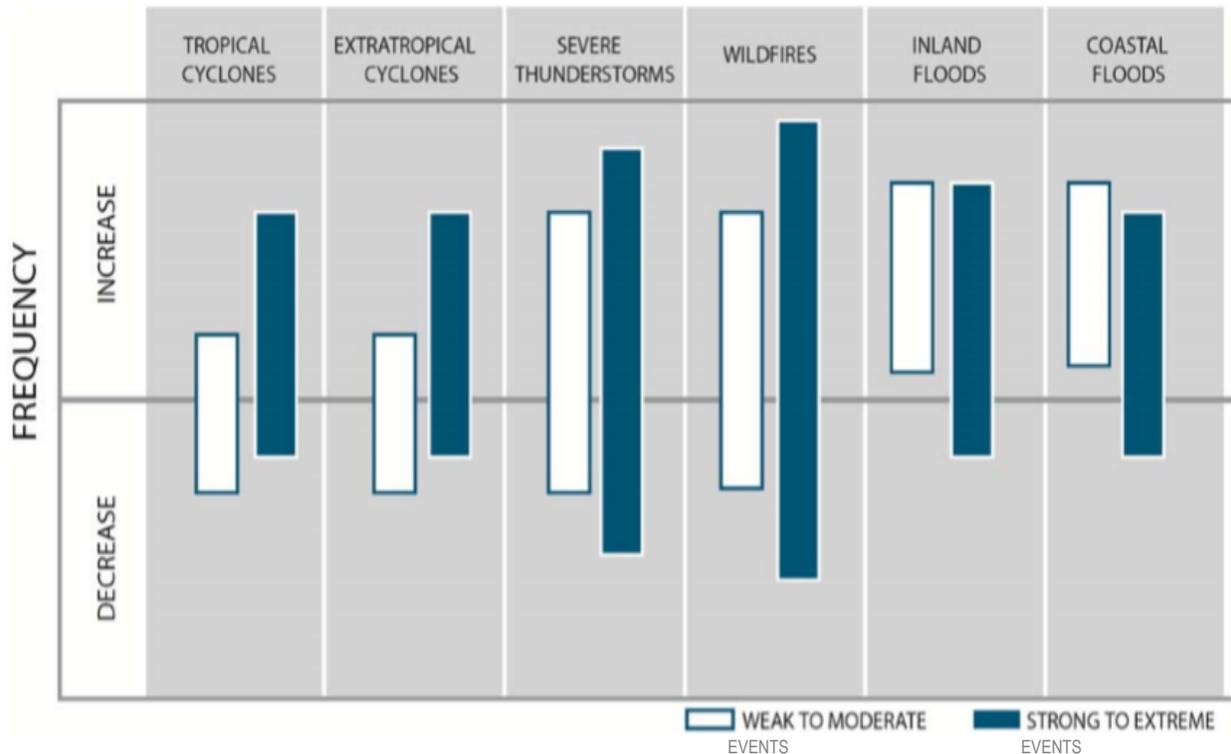
Source: AIR Worldwide

- High-level of regulator attention on financial risks of climate change – mainly what-if scenarios

- How can we support our costumers with climate change impact assessments?

- How can we support strategic portfolio decisions ?

- Demand from both Allianz insurance and investment branches

CLIMATE CHANGE AND IMPACT ON INSURED LOSSES - ASSESMENT
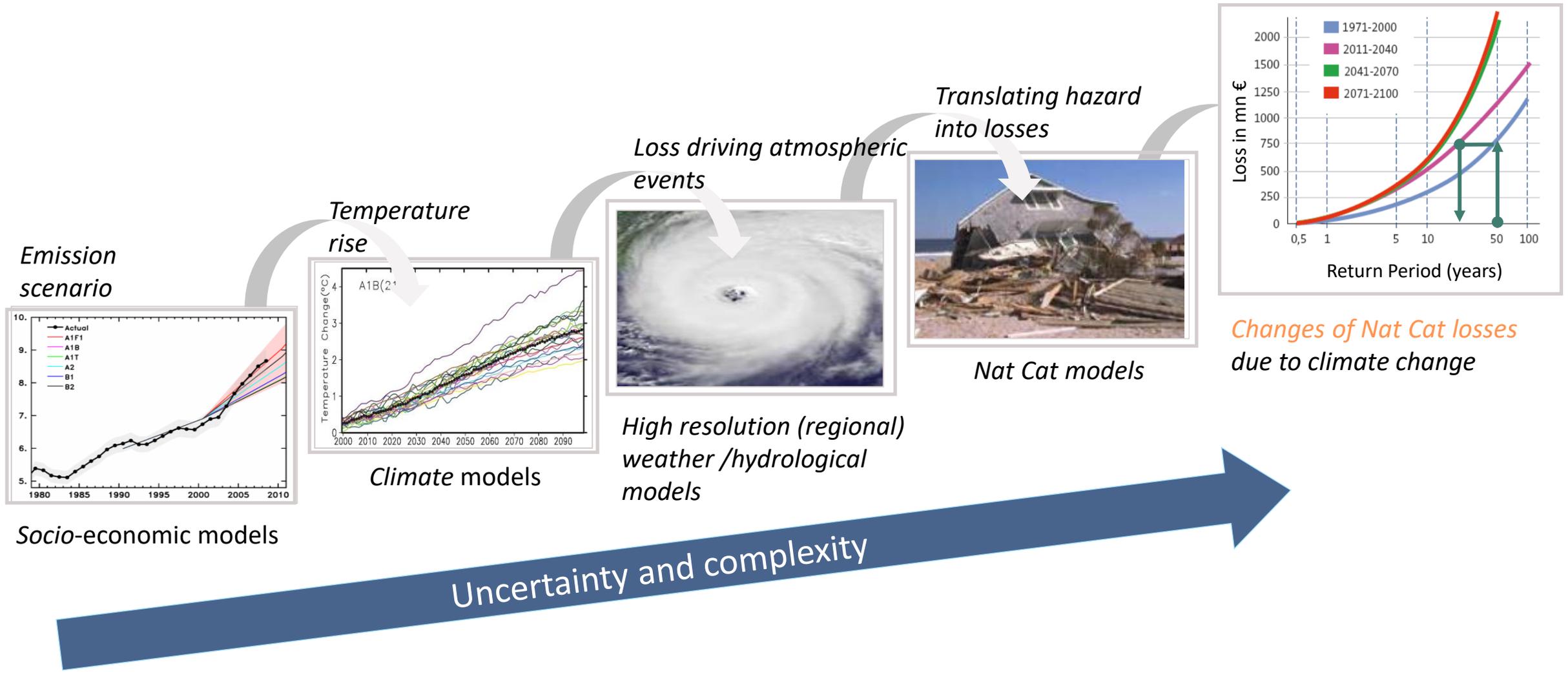
Emission scenario

Temperature rise

Loss driving atmospheric events

Translating hazard into losses

Changes of Nat Cat losses
due to climate change

Socio-economic models

Climate models

High resolution (regional) weather /hydrological models

Nat Cat models

Uncertainty and complexity

RISK ASSESMENT AT POINT OF SALE - AN IMPORTANT CORNERSTONE OF TECHNICAL EXCELLENCE IN TIMES OF CLIMATE CHANGE

Risk Zone	Pure Premium per 1 Million Sum Insured	
	>	<=
1	1	20
2	20	50
3	50	100
4	100	250
5	250	500
6	500	1000
7	1000	2000
8	2000	5000
9	5000	
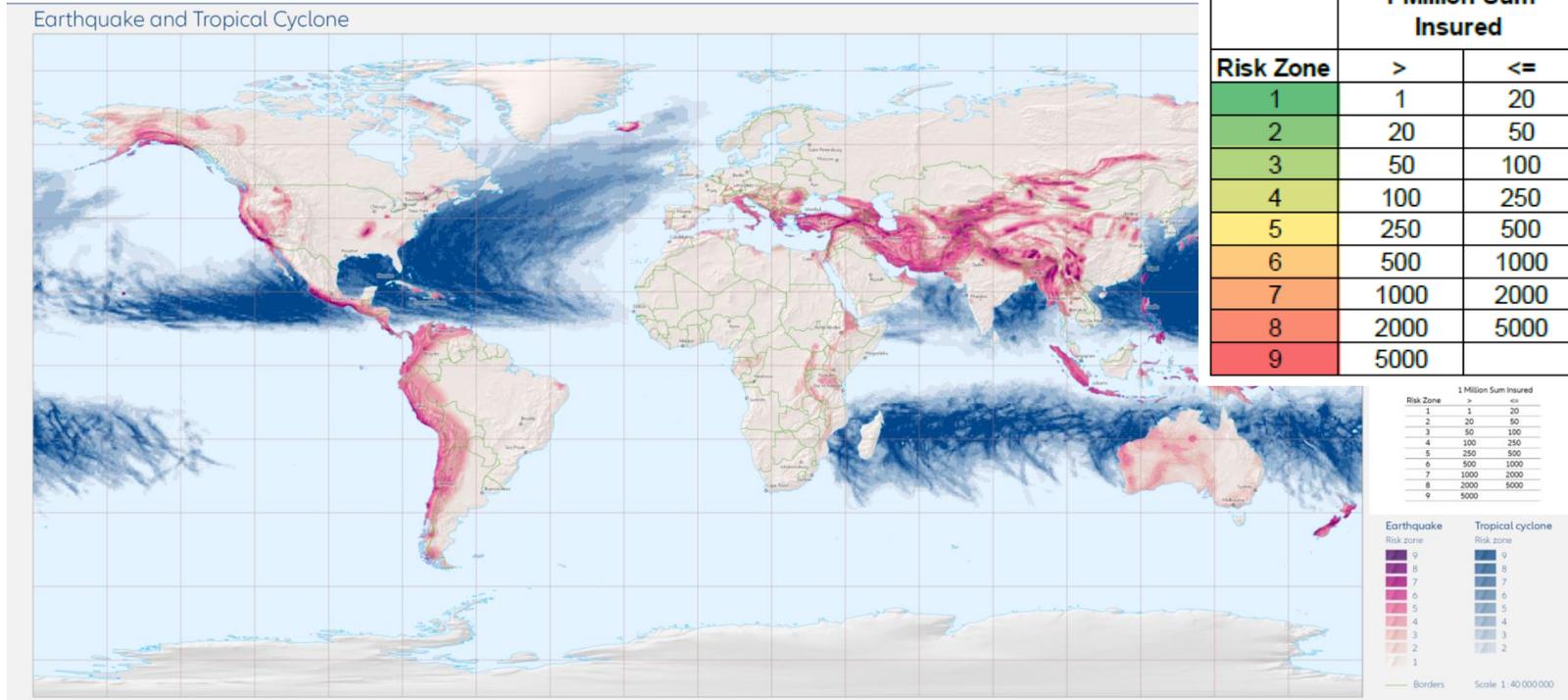
Allianz Global Hazard Layers allow for global risk assessment down to 5 m resolution*

- Global Hazard Layers were released in 2017 for six perils to improve underwriting risk assessment and pricing of natural catastrophes

- Allianz losses due to wildfires in USA, Australia, Portugal and Canada showed need for a wildfire layer

- Allianz Re responded to the increasing risk by developing a wildfire hazard layer - released in Q3 2019

*River Flood layer in select countries
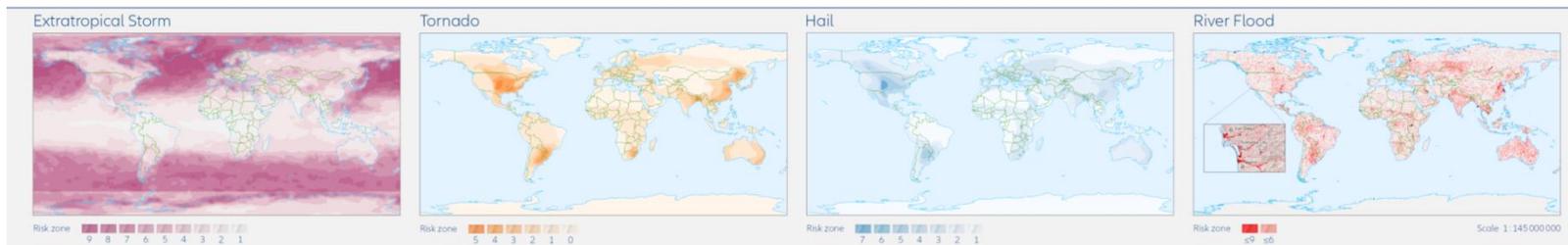
AZ RE CLIMATE RISK SCORE METHODOLOGY

Present climate hazard scores
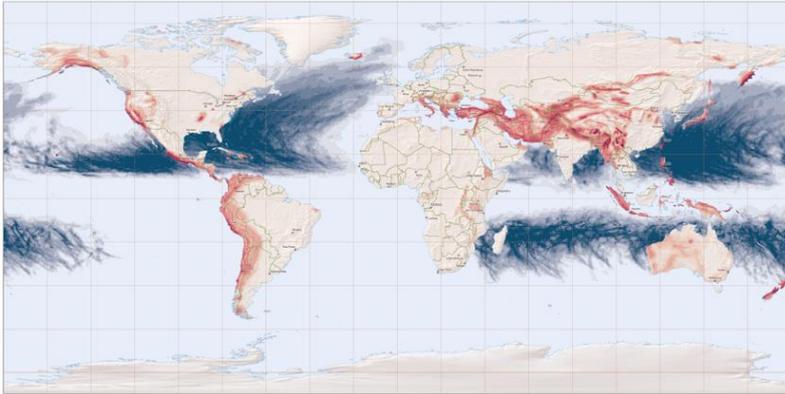
Climate model simulations

Global mean temperature near–term projections relative to 1986–2005

Legend:
- Observations
- Historical (41 models)
- RCP 2.6 (32 models)
- RCP 4.5 (41 models)
- RCP 6.0 (25 models)
- RCP 8.5 (39 models)

Y-axis: Temperature anomaly [°C]
X-axis: 1990, 2000, 2010, 2020, 2030, 2040, 2050

Historical ← → RCPs
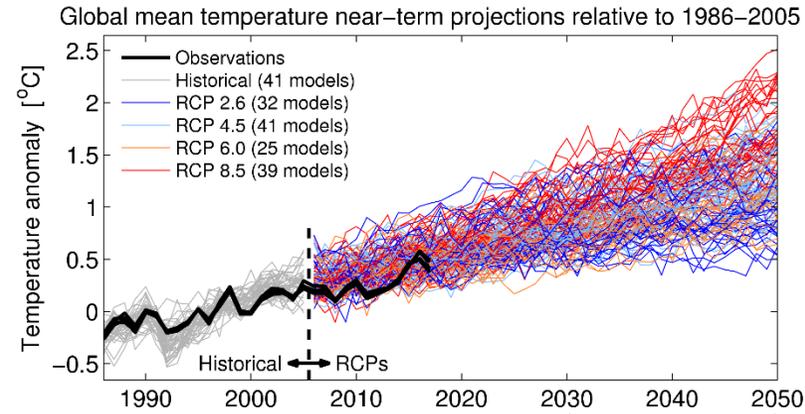
2080

Climate scenarios:
RCP2.6: "very stringent" pathway
RCP4.5: emissions peak 2040, then decline
RCP6.0: emissions peak 2080, then decline
RCP8.5: "worst case", no GHG decline

$$Risk = \sum (\Delta Severity \times \Delta Frequency)$$

✓ Object-level & portfolio-level climate risk analysis

✓ Basis for portfolio management decisions for climate change

✓ Can be used for regulatory stress tests

EXAMPLE PORTFOLIO

1Mio € at 14 locations comprising AZ offices and famous landmarks:

Method:

1. Identify current flood risk scores & AAL

2. Identify climate scenario changes

3. Perturb return periods based on climate change delta

4. Re-calculate future scores & AAL

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5	250	500
6	500	1000
7	1000	2000
8	2000	5000
9	5000	

EXAMPLE PORTFOLIO - RESULTS

Current Climate AAL per 1m € insured

Change in AAL, 2056, two emission pathways

Warsaw Zoo: AAL: 344€

Protected up to 500yr RP

2056 4.5: +24%
2056 8.5: +72%
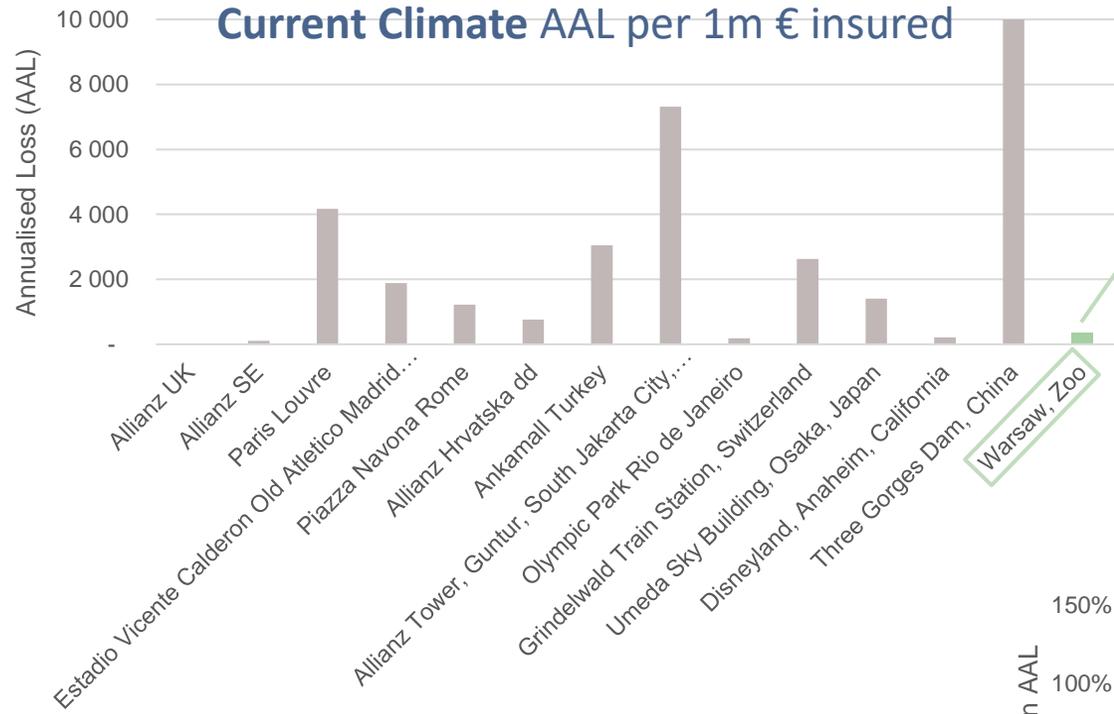
High-resolution climate data shows location-level changes ≠ mean portfolio changes
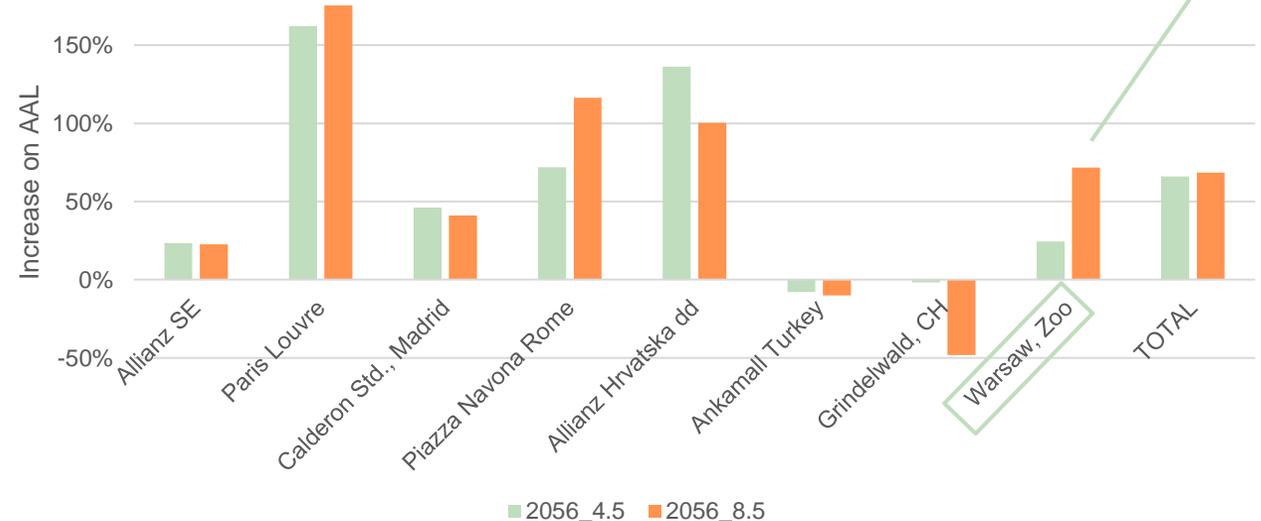
THANKS FOR YOUR ATTENTION!