NAIC NATIONAL MEETING
SPRING 2023

Draft date: 2/22/23

2023 Spring National Meeting
Louisville, Kentucky

CATASTROPHE RISK (E) SUBGROUP
Tuesday, March 21, 2023
4:30 – 5:30 p.m.
Omni Louisville—Olmsted 5-7—Level 2

ROLL CALL

Wanchin Chou, Chair	Connecticut	Anna Krylova	New Mexico
Virginia Christy, Vice Chair	Florida	Alexander Vajda	New York
Laura Clements	California	Tom Botsko	Ohio
Rolf Kaumann	Colorado	Andrew Schallhorn	Oklahoma
Judy Mottar	Illinois	Will Davis	South Carolina
Travis Grassel	Iowa	Miriam Fisk	Texas
Sandra Darby	Maine		

NAIC Support Staff: Eva Yeung

AGENDA

1. Consider Adoption of its Jan. 30, 2023, and 2022 Fall National Meeting Minutes—*Wanchin Chou (CT)* — Attachment A
2. Discuss its Working Agenda—*Wanchin Chou (CT)* — Attachment B
3. Receive an Update from its Catastrophe Model Technical Review Ad Hoc Group—*Wanchin Chou (CT) and Shaveta Gupta (NAIC)*
4. Hear a Presentation from Travelers on Climate Scenario Analysis for the Hurricane Peril—Eric Nelson (Travelers) and Walter Cieslak (Travelers) — Attachment C
5. Discuss Wildfire Peril Impact Analysis—*Wanchin Chou (CT)*
6. Discuss Any Other Matters Brought Before the Subgroup —*Wanchin Chou (CT)*
7. Adjournment

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Draft: 1/31/23

Property and Casualty Risk-Based Capital (E) Working Group
and Catastrophe Risk (E) Subgroup
E-Vote
January 30, 2023

The Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force conducted an e-vote with the Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force that concluded Jan. 30, 2023. The following Working Group members participated: Tom Botsko, Chair (OH); Wanchin Chou, Vice Chair (CT); Rolf Kaumann (CO); Judy Mottar (IL); Sandra Darby (ME); Anna Krylova (NM); Alexander Vajda (NY); Miriam Fisk (TX); and Adrian Jaramillo (WI). The following Subgroup members participated: Wanchin Chou, Chair (CT); Laura Clements (CA); Rolf Kaumann (CO); Travis Grassel (IA); Judy Mottar (IL); Sandra Darby (ME); Anna Krylova (NM); Alexandra Vajda (NY); Tom Botsko (OH); Andrew Schallhorn (OK); Will Davis (SC) and Miriam Fisk (TX).

1. Adopted the Updated 2022 U.S. and Non-U.S. Catastrophe Risk Event Lists

The Working Group and the Subgroup conducted an e-vote to consider adoption of proposal 2022-12-CR (2022 U.S. and Non-U.S. Catastrophe Risk Event Lists).

Darby made a motion, seconded by Mottar, to adopt the 2022 U.S. and Non-U.S. Catastrophe Risk Event Lists. The motion passed unanimously.

Having no further business, the Property and Casualty Risk-Based Capital (E) Working Group and the Catastrophe Risk (E) Subgroup adjourned.

SharePoint/NAIC Support Staff Hub/ Member Meetings/E Cmte/CADTF/2023-1-Spring/Cat Risk Email Vote 013023

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Draft Pending Adoption

Attachment --
Capital Adequacy (E) Task Force
12/14/22

Draft: 12/14/22

Catastrophe Risk (E) Subgroup
Tampa, Florida
December 12, 2022

The Catastrophe Risk (E) Subgroup met in Tampa, FL, Dec. 12, 2022. The following Subgroup members participated: Wanchin Chou, Chair (CT); Robert Ridenour, Vice Chair (FL); Laura Clements and Susan Bernard (CA); Vincent Tsang and Shannon Whalen (IL); Anna Krylova (NM); Tom Botsko (OH); and Miriam Fisk (TX). Also participating were: Adrienne Lupo (DE); Kevin Dyke (MI); Sandra Darby (ME); Julie Lederer (MO); and Michael Muldoon (WA).

1. Adopted its Nov. 15 and Sept. 26 Minutes

Chou said the Subgroup met Nov. 15 and Sept. 26. During these meetings, the Subgroup took the following action: 1) adopted the Jan. 1–Sept. 30 U.S. and non-U.S. catastrophe risk event lists, which the Subgroup exposed for a seven-day public comment period ending Nov. 8; 2) adopted its Summer National Meeting minutes; 3) adopted proposal 2022-08-CR (Independent Model Review Instructions) with the following revisions: a) capture the spirit of the own model permission review; and b) further clarify the requirements expected from the company that submits its own model for permission; and 4) discussed convective storm modeling and the risk-based capital (RBC) charge development process.

Botsko made a motion, seconded by Ridenour, to adopt the Working Group's Nov. 15 (Attachment XX) and Sept. 26 (Attachment XX) minutes. The motion passed unanimously.

2. Received an Update from its Catastrophe Model Technical Review Ad Hoc Group

Chou said a new ad hoc group was established at the end of September to conduct a more in-depth review on different severe convective storm models. He reiterated that the goal of this ad hoc group is not to approve the models; rather, it is to gain a better understanding of different vendor models by performing a more in-depth technical study of different model assumptions and limitations, conducting impact analyses in the upcoming months, and providing a proper risk charge recommendation to the Subgroup for consideration.

Chou also stated that the following monthly meetings with different modeling vendors have been scheduled: AIR Worldwide on Dec. 19; Karen Clark & Company (KCC) on Jan. 17, 2023; Risk Management Solutions (RMS) on Jan. 18, 2023; and CoreLogic on Feb. 22, 2023. He indicated that the RMS model presentation was rescheduled for Jan. 18, 2023, because they needed more time to prepare materials. Lastly, Chou indicated that the ad hoc group would provide an update in every Subgroup meeting until the impact analysis for the severe convective models are completed. He said the Subgroup members are welcome to participate in the ad hoc group review meetings.

3. Discussed the Wildfire Peril Impact Analysis

Chou said only a handful states were able to participate in the wildfire impact analysis reviewing process in December 2022 due to the concerns from CAT modelers regarding their propriety information. Jeff Czajkowski (NAIC) and Chou are working on the nondisclosure agreements (NDAs) with the vendor modeling companies to obtain the reviewing permission. He also said the status update will be provided during the Subgroup's next meeting.

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4. Discussed its Working Agenda

Chou summarized the changes of the Working Group's 2023 working agenda, which included the following substantial changes: 1) adding the adoption date for proposal 2022-04-CR and the ad hoc group establishment date in the item of "Evaluate other catastrophe risks for possible inclusion" in the charge; and 2) adding another adoption date for proposal 2022-08-CR to the item of "Evaluate the possibility of enhancing the independent Model Instructions." Without hearing any comments from state insurance regulators and industry, Chou said the working agenda will be forwarded to the Property and Casualty Risk-Based Capital (E) Working Group for consideration.

5. Heard a Presentation from Verisk on its Severe Convective Storm Model

Chou said the Subgroup appreciates Verisk providing not only a high-level presentation to the Subgroup, but also an in-depth technical presentation to its ad hoc group in the upcoming week. Julia Borman (Verisk) said this presentation (Attachment xx) includes the following items: 1) an introduction to Verisk extreme event solutions and catastrophe modeling; and 2) approaching severe conductive storm risk with the Verisk severe thunderstorm model for the U.S. Chou urged the interested parties to review the materials and provide feedback to the Subgroup during its next meeting.

Having no further business, the Catastrophe Risk (E) Working Group adjourned.

SharePoint/NAIC Support Staff Hub/Member Meetings/Fall 2022 National Meeting/Task Forces/CapAdequacy/Cat Risk SG/12-22propertycatsg.docx

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Priority 1 – High Priority
Priority 2 – Medium Priority
Priority 3 – Low Priority

CATASTROPHE RISK (E) SUBGROUP
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2023

2023 #	Owner	2023 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
				Ongoing Items~~Carryover Items Currently being Addressed~~ – P&C RBC			
P1	Cat Risk SG	1		Continue development of RBC formula revisions to include a risk charge based on catastrophe model output:			
			~~Year-end 2023 or later~~	a) Evaluate other catastrophe risks for possible inclusion in the charge - determine whether to recommend developing charges for any additional perils, and which perils or perils those should be.	Referral from the Climate and Resiliency Task Force. March 2021	4/26/21 - The SG exposed the referral for a 30-day period. 6/1/21 - The SG forwarded the response to the Climate and Resiliency Task Force. 2/22/22 - The SG adopted proposal 2021-17-CR (adding the wildfire peril for informational purposes only). The SG continues reviewing other perils for possible inclusion in the Rcat. 8/11/22 – The TF adopted Proposal 2022-04-CR (2013-2021 Wildfire Event Lists) 9/26/22 – The SG formed an ad hoc group to conduct review on different convective storm models.	4/26/2021
~~P4~~	~~Cat Risk SG~~	~~1~~	~~Year-end 2023 or later~~	~~Evaluate the possibility of allowing additional third-party models or adjustments to the vendor models to calculate the cat model losses~~	~~-~~	~~7/15/21 - The SG is continue evaluating this item.~~ ~~10/27/21 - The SG exposed the proposal 2021-15-CR (adding KCC model).~~ ~~12/16/21 - The SG adopted the proposal 2021-15-CR.~~ ~~3/23/22 - The WG adopted this proposal.~~	~~12/6/2019~~
~~P6~~	~~Cat Risk SG~~	~~2~~	~~2023 Spring Meeting or later~~	~~Evaluate the possibility of enhancing the Independent Model Instructions.~~	~~-~~	~~8/9/22 – The SG and WG exposed proposal 2022-07-P for a 30-day public comment period.~~ ~~9/26/22 – The SG adopted proposal 2022-08-CR.~~	~~3/22/2022~~

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New Items – P&C RBC							
P7	Cat Risk SG	1	2024 Spring Meeting	Quantify the R5 Ex-cat Factors for wildfire peril (for informational purposes only) - Evaluate the possibility of adding PR018A to determine the R5 including the wildfire peril			3/21/2023
P8	Cat Risk SG	2	2025 Spring Meeting	Evaluate the impact of flood peril to the insurance market			3/21/2023

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Climate Overview & Scenario Analysis

NAIC Spring Meeting

March 21, 2023

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AGENDA

- Industry Loss Trends
- Climate Change Overview
- Market Disclosure Landscape
- Vendor Capabilities
- Climate Scenario Analysis
- Mitigation and Resiliency
- Wrap-Up

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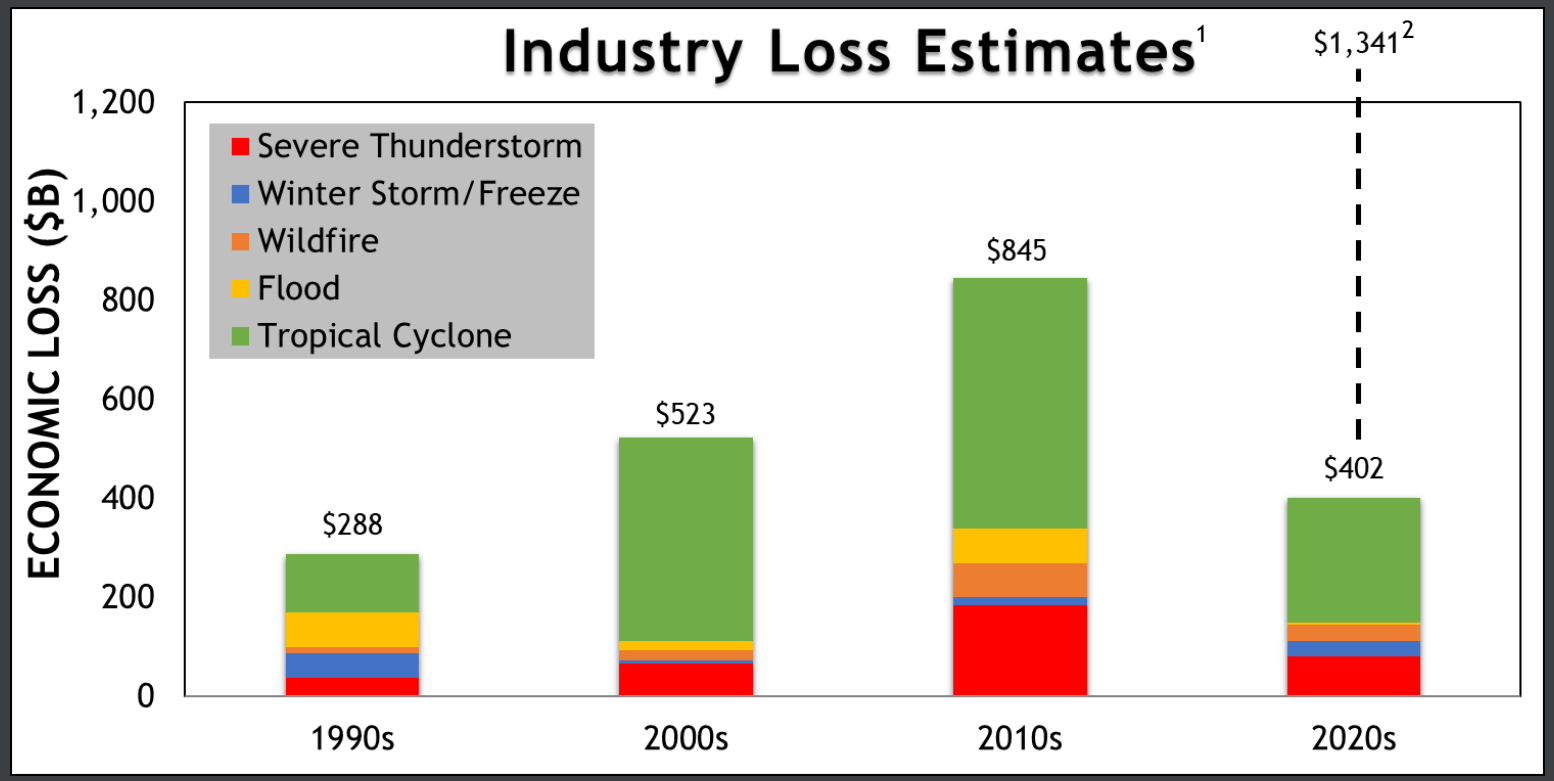
US CATASTROPHES – INDUSTRY LOSSES BY DECADE



[1] NCEI Billion-Dollar Weather and Climate Disasters (CPI-adjusted): https://www.ncei.noaa.gov/access/billions/events
[2] Straight line extrapolation

Top 15 Loss Events ($B)[1]

1) Hurricane Katrina (2005)	$190
2) Hurricane Harvey (2017)	$151
3) Hurricane Ian (2022)	$113
4) Hurricane Maria (2017)	$109
5) Hurricane Sandy (2012)	$84
6) Hurricane Ida (2021)	$80
7) Hurricane Irma (2017)	$61
8) Hurricane Andrew (1992)	$57
9) Midwest Flooding (1993)	$43
10) Hurricane Ike (2008)	$41
11) Hurricane Ivan (2004)	$32
12) Hurricane Michael (2018)	$29
13) Hurricane Florence (2018)	$28
14) California Wildfires (2018)	$28
15) Hurricane Wilma (2005)	$28

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WHY HAVE INSURED LOSSES INCREASED OVER TIME?

- More people living in high-risk areas (e.g. coastal or rural wildfire prone areas)
- Inflation (material & labor costs; residential greater than commercial)
- Population growth in areas with weak adoption and enforcement of building codes
- Urban expansion creates larger concentration of risk
- Societal expectations & contractor behavior
- US prosperity; increase in size of home
- Building material performance changing over time
- Aging infrastructure
- New/modified regulatory requirements
- Weather / Climate variability

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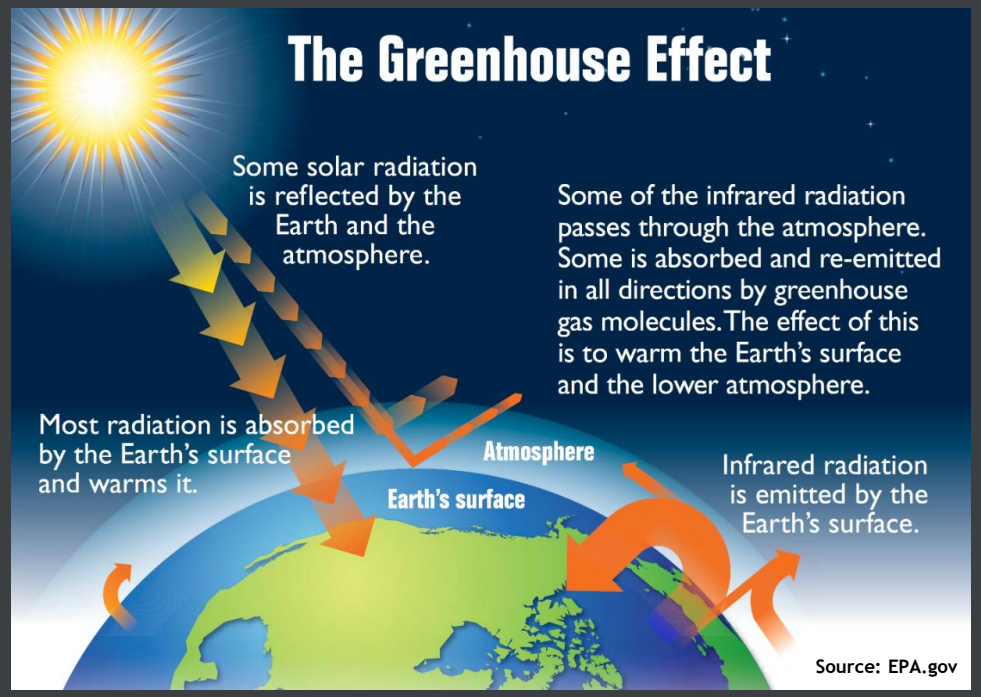
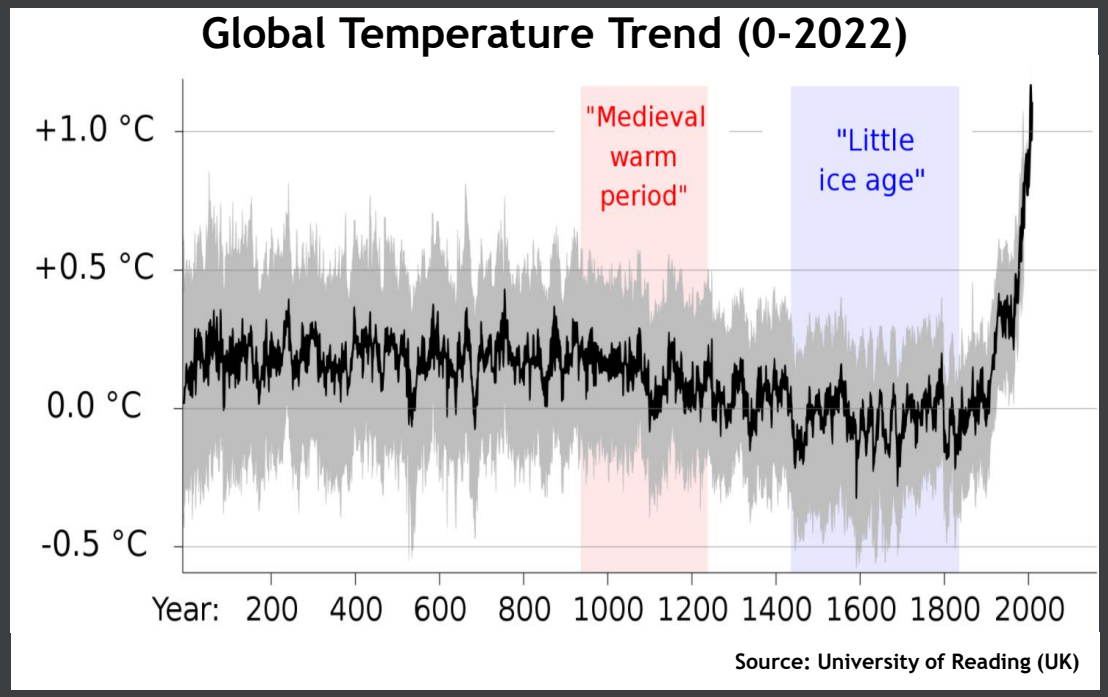
WHY IS THE CLIMATE CHANGING?





- Greenhouse effect is a naturally occurring phenomenon
- Greenhouse gases (water vapor, carbon dioxide, etc.) warm the planet by 60°F
- Burning of fossil fuels is enhancing natural greenhouse effect

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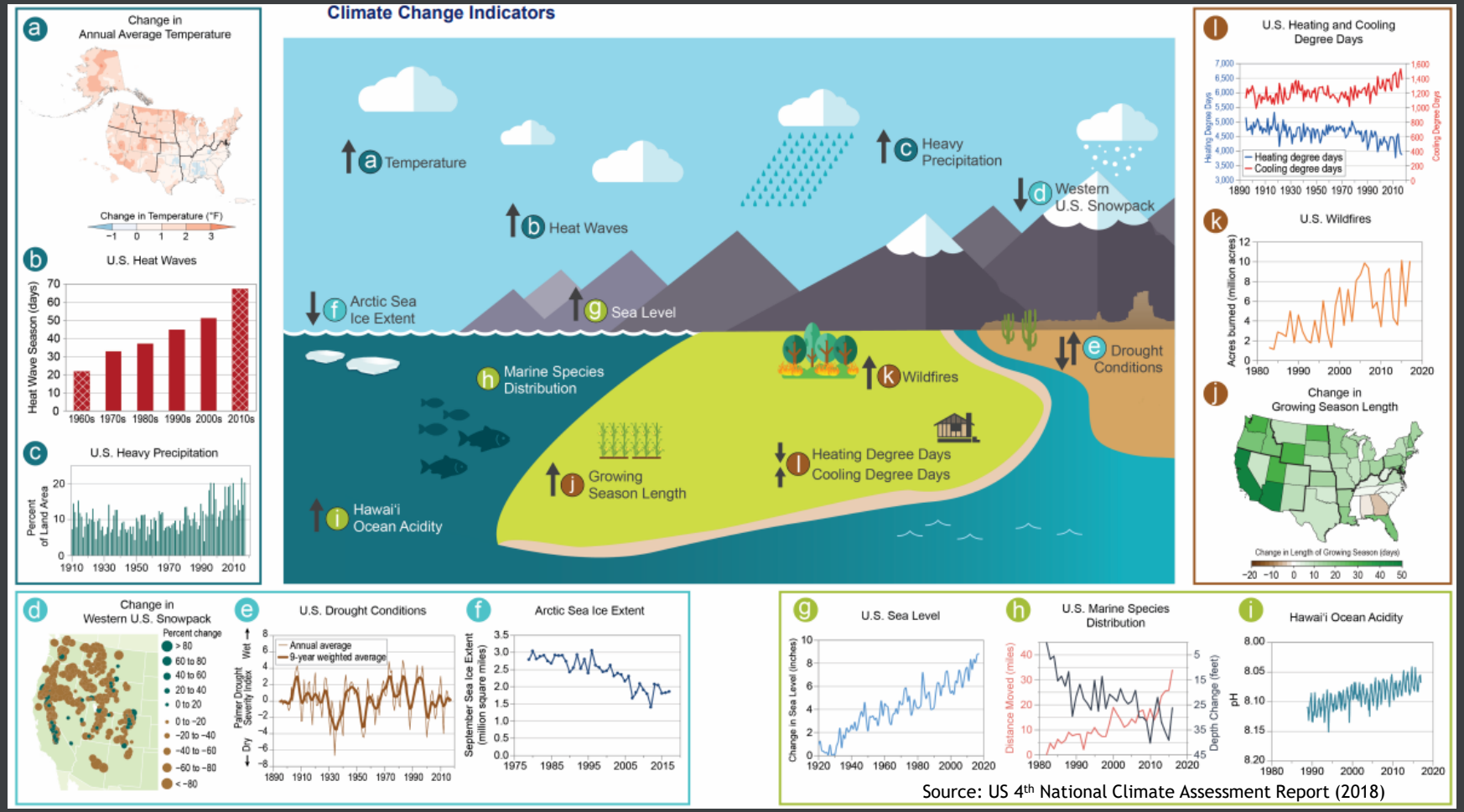
MONITOR CLIMATE CHANGE INDICATORS

Attachment C



Source: US 4th National Climate Assessment Report (2018)

Evidence for climate change is significant

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CLIMATE POTENTIAL IMPACT TO THE INDUSTRY

Attachment C

Climate studies by government agencies, academic institutions, catastrophe modeling organizations and other groups indicate that an increase in frequency and/or intensity of hurricanes, heavy precipitation events, flash flooding, sea level rise, droughts, heat waves and wildfires has occurred, and can be expected into the future

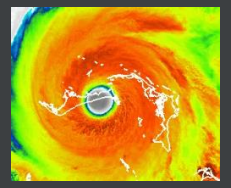

Image Source: nesdis.noaa.gov

"It is likely that the global proportion of Category 3-5 tropical cyclone instances has increased over the past four decades"

Image Source: globalchange.gov

"The frequency and intensity of heavy precipitation events have likely increased at the global scale"

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

The Physical Science Basis

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport_small.pdf

"Fire weather conditions (compound hot, dry and windy events) have become more probable in some regions (medium confidence)"

Image Source: Drought.gov

"In nearly all regions, there is low confidence in changes in hail, ice storms, severe storms, dust storms, heavy snowfall, and avalanches"

Image Source: NOAA.gov

Not all perils impacted the same way for loss potential

Further analysis is needed to understand the impacts by peril

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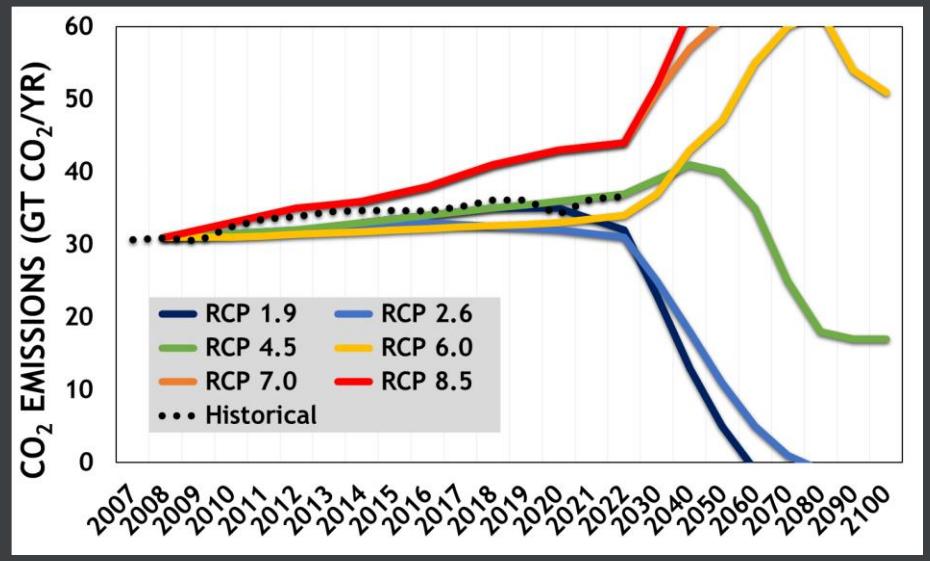
REPRESENTATIVE CONCENTRATION PATHWAYS (RCP)

- Scientific community developed a series of forward-looking emission scenarios
- Historical data aligns with 2.0°C to 3.0°C by 2100 (2022: +1.2°C)

RCP	Definition	Peak Temperature
1.9	Extremely stringent	< 1.5°C by 2100
2.6	Very stringent	< 2.0°C by 2100
4.5	Intermediate	< 2.5°C by 2100
6.0	Intermediate	< 3.0°C by 2100
7.0	High	< 4.0°C by 2100
8.5	Worst case	< 5.0°C by 2100



Source: International Energy Agency (IEA.org)

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MARKET DISCLOSURE LANDSCAPE

Attachment C

Sample 10	Scenario Analysis Disclosure	
Company	Qualitative	Quantitative
1	X	X
2	✓	X
3	X	X
4	X	X
5	✓	✓
6	X	X
7	✓	X
8	✓	X
9	X	X
10	✓	X

Sources: Annual reports, TCFD reports, Sustainability websites, ESG reports

Scenario analysis is an emerging risk management tool to better understand how climate change may impact a company's risk profile

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VENDOR CAPABILITIES: MOODY'S RMS

Peril	Probabilistic Model	Climate Scenario
US Severe Thunderstorm	✓	X
US Hurricane	✓	✓
US Wildfire	✓	✓
US Winter Storm	✓	X
US Flood	✓	✓
Europe Flood	✓	✓
Europe Wind	✓	✓
Japan Typhoon	✓	✓

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Moody's RMS Climate Change Models

- Climate change conditioning driven by robust science
- Probabilistic modelling of climate change impacts, e.g. average annual loss, return period loss etc.
- Moody's RMS climate change models include: RCP2.6, RCP4.5, RCP6.0, RCP8.5; From 2020-2100 in 5-year intervals
- The wide range of RCPs & time horizons in the Moody's RMS Climate Change Models can be mapped to many use-cases and regulatory requirements

Mapping of Moody's RMS model views to existing climate regulatory disclosures

Global Mean Surface Temperature (GMST) increase relative to pre-industrial (1880-1900) levels																		
	Year																	
	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
RCP2.6	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
RCP4.5	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.0	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.4
RCP6.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.2	2.4	2.5	2.7	2.8	2.9	3.0
RCP8.5	1.2	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.0	3.2	3.5	3.7	3.9	4.2	4.4	4.6

P&L Driving Business Decisions

- Pricing adequacy
- Business planning
- Stress testing

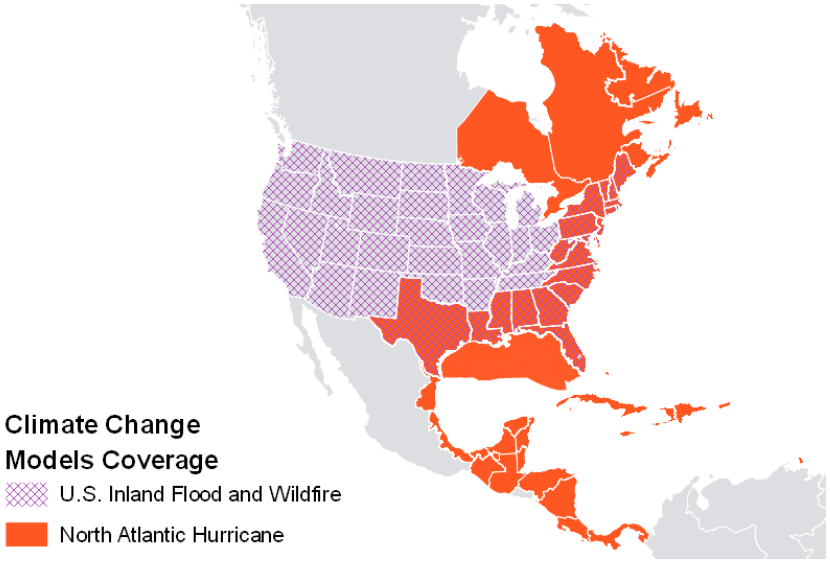
NGFS Central Banks and Supervisors Network for Greening the Financial System

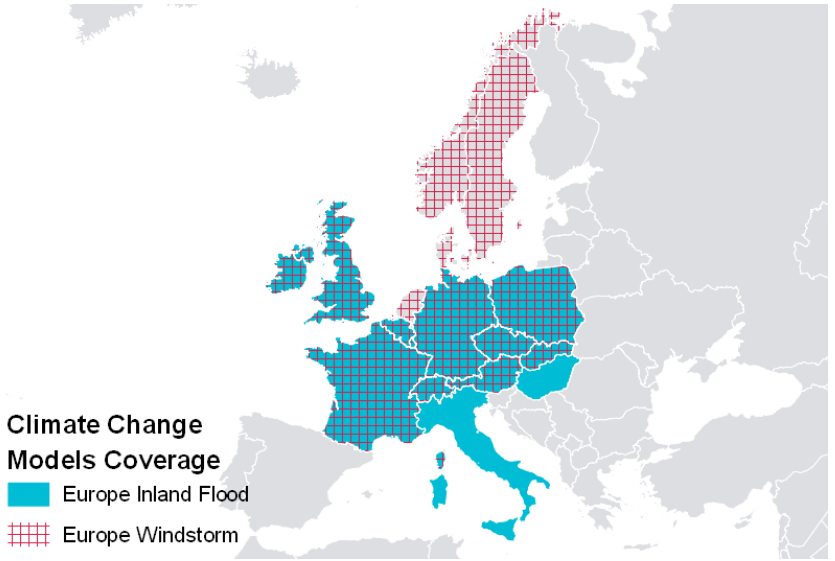
BANK OF ENGLAND PRUDENTIAL REGULATION AUTHORITY

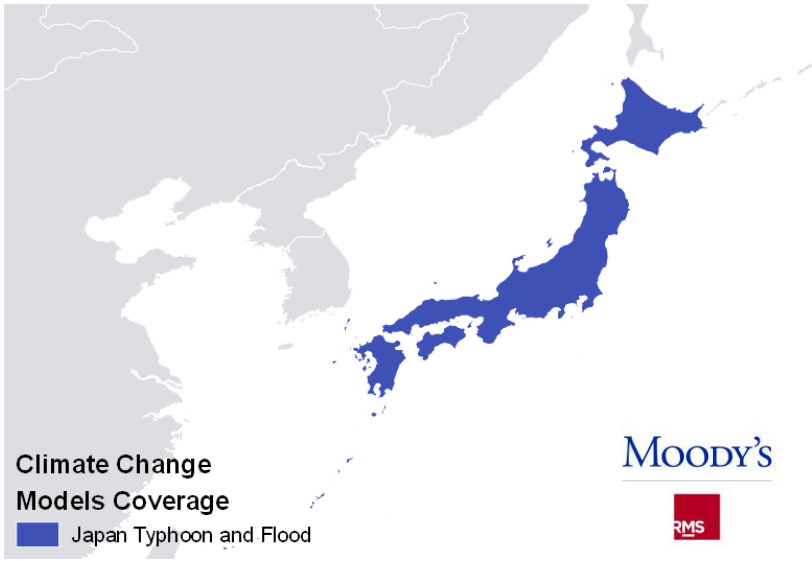
PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

BMA BERMUDA MONETARY AUTHORITY







MOODY'S RMS

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VENDOR CAPABILITIES: KAREN CLARK & COMPANY

Peril	Probabilistic Model	Climate Scenario
US Severe Thunderstorm	✓	X
US Hurricane	✓	✓
US Wildfire	✓	✓
US Winter Storm	✓	X
US Flood	✓	✓

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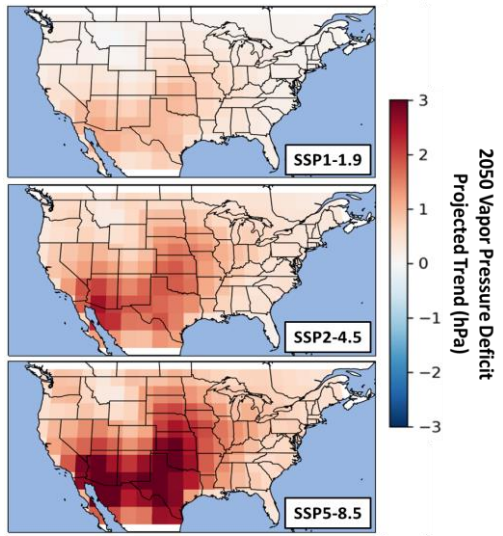
KCC Offers Climate Conditioned Catalogs for Hurricane, Flood, and Wildfire

Slide provided by KCC

- KCC climate conditioned catalogs account for changes in both frequency and severity projections for 2025, 2030, and 2050.
- Projections based on IPCC scenarios where scientific consensus and confidence are high.

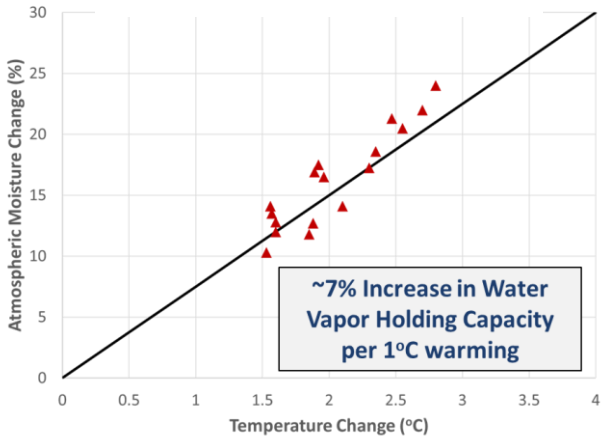
Wildfire

Based on projected increase in VPD which varies regionally



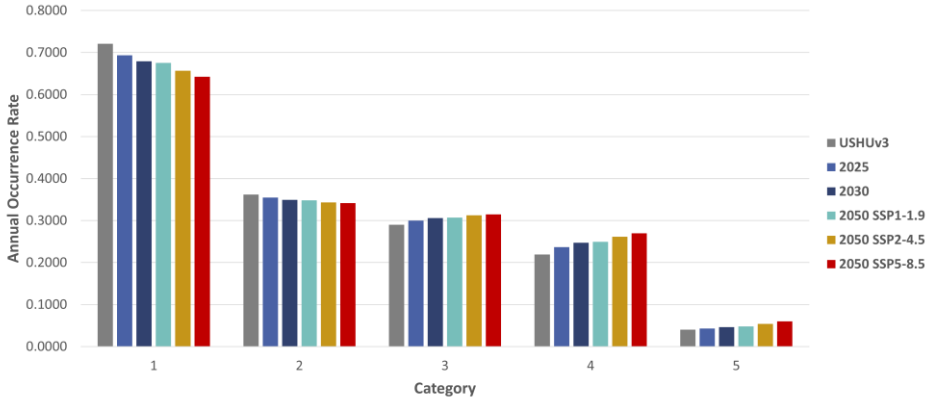
Flood

Based on projected temperature changes and Clausius-Clapeyron relation



Hurricane

Based on projected increase in proportion of major storms



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VENDOR CAPABILITIES: VERISK

Peril	Probabilistic Model	Climate Scenario
US Severe Thunderstorm	✓	X
US Hurricane	✓	✓
US Wildfire	✓	X
US Winter Storm	✓	X
US Flood	✓	X

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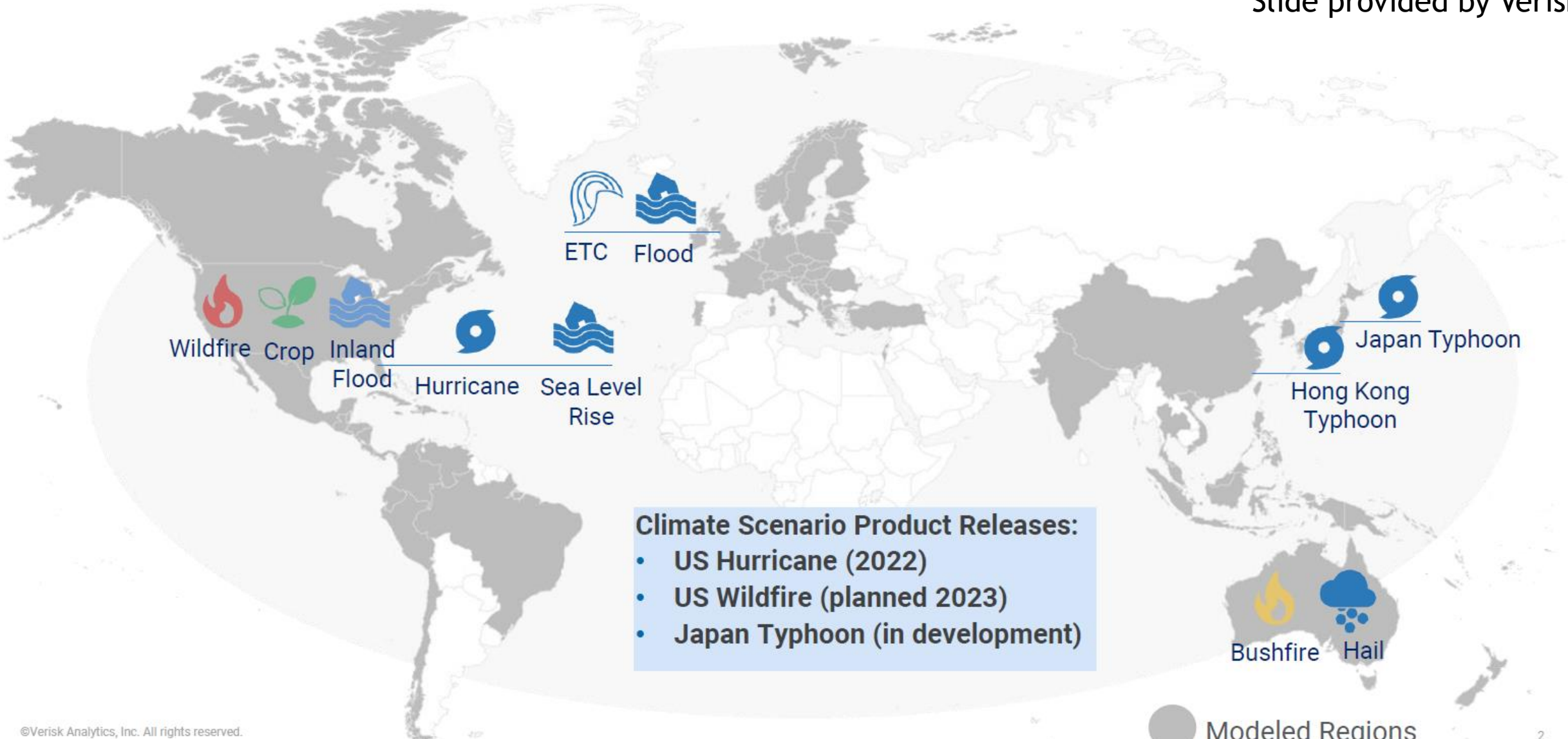
Verisk Global Climate Research Leads to Product Releases

Slide provided by Verisk



Climate Scenario Product Releases:

- **US Hurricane (2022)**
- **US Wildfire (planned 2023)**
- **Japan Typhoon (in development)**

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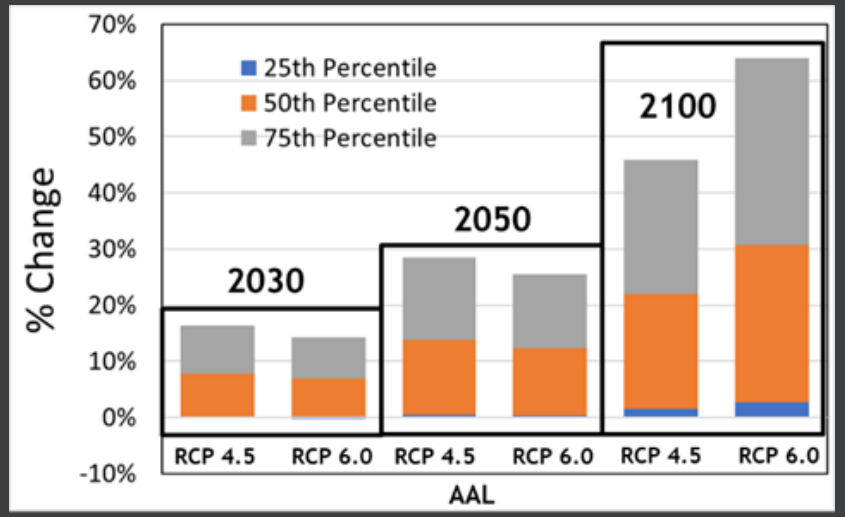
SAMPLE COMPANY TCFD DISCLOSURE

Attachment C

Component	Scope
Emission Scenarios	RCP 4.5 (< 2.5°C by 2100) RCP 6.0 (< 3.0°C by 2100)
Years	2020, 2030, 2050, 2100
Storm Parameters	Intensity, Size, Track



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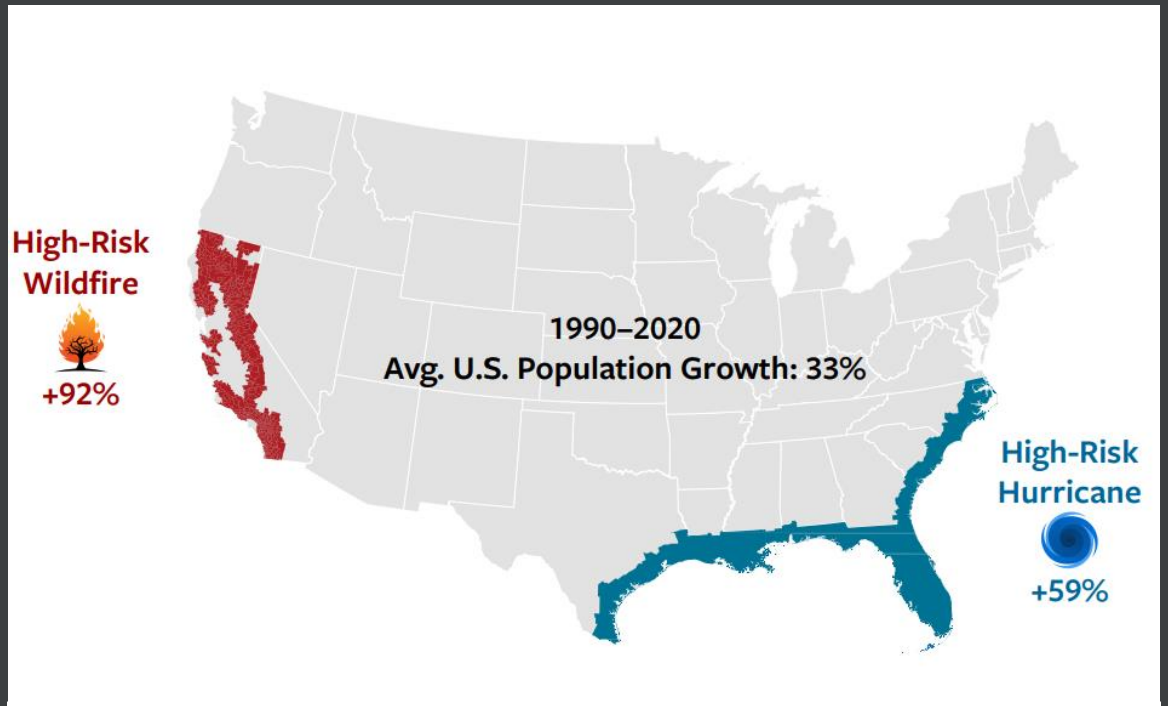
NON-WEATHER TRENDS



1990-2020 population growth in high-risk areas for hurricane and wildfire (Source: US Census Bureau)

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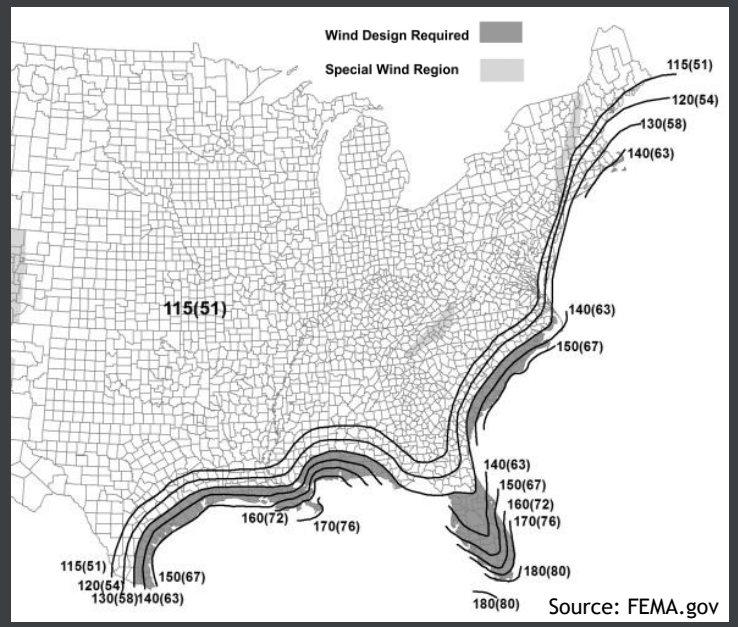
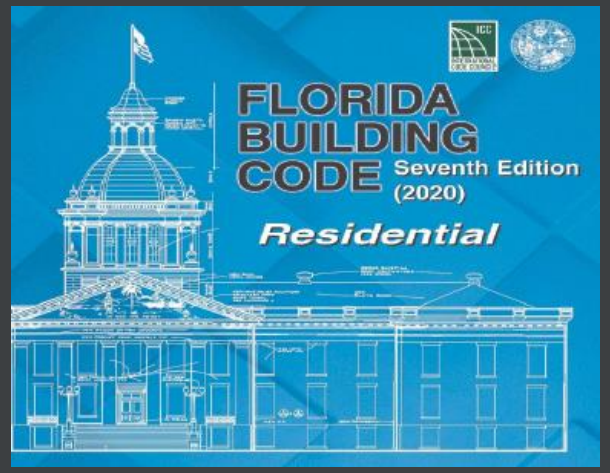
BENDING THE RISK CURVE DOWN: MITIGATION

2021 International Building Code



3-second Gust Design Wind Speed (mph (meters per second in parentheses))
(7% probability of exceedance in 50 years)



Dade/Broward Counties

- "High Velocity Hurricane Zone" (higher standards than the rest of the FBC)
- Entire building envelope (windows, doors) must incorporate lab-tested, wind-resistant, design and materials

Other Code Change – Adaptation for Changing Climate

- "High Velocity Hurricane Zone" Required sealed roof deck

- Coastal building codes protect against hurricane wind risk
- Over time, these standards will have to increase and be applied further inland
- Aging/Degrading infrastructure likely to present additional challenges
- 2019 Govt. Report: Adopting building codes saves $11 per $1 spent

For Exclusive Use of NAIC Spring 2023 National Meeting Attendees; Do Not Distribute

WRAP-UP

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