International Actuarial Association
Association Actuarielle Internationale

Keynote Address & IAA Climate Initiatives

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Caribbean Actuarial Association
Trinidad Conference

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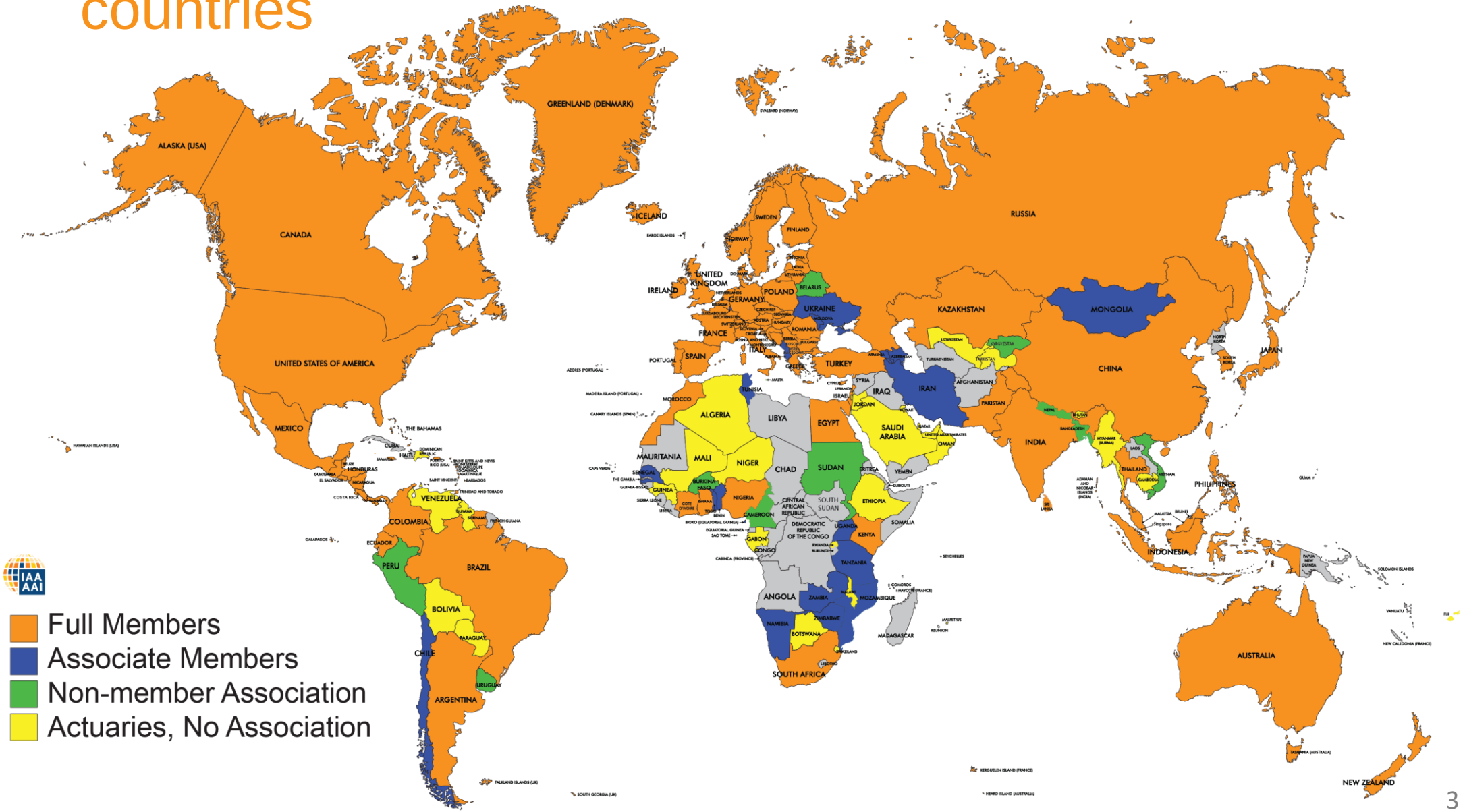
Agenda

- The International Actuarial Association
- Climate Initiatives – why it matters
- More Initiatives
- Question Period

In 2023, the IAA represents 75,000+ actuaries in 115+ countries



The Mission of the IAA

- **I** — Inform and influence global stakeholders
- **A** — Assure the reputation of the profession
- **A** — Advance the competency of the profession

Climate Initiatives – Why it matters

Addressing climate related risks: an IAA strategic initiative

- In 2020, the IAA Council launched a strategic initiative to provide advice to supranational stakeholders, and to the global actuarial profession on climate related risks.

- To contribute to the valuable global efforts to further identify, measure and manage climate related risks, thereby serving the public interest and contributing to the well-being of society.

- The Climate Risk Task Force (CRTF) was created and produce 6 papers so far with a 7th one on its way on the impact on Social Security.

Before we begin, a note on learning the language…

ANNEX.II Glossary

All definitions listed below, unless stated otherwise, come from the Working Group I Sixth Assessment Report Annex.VII Glossary.

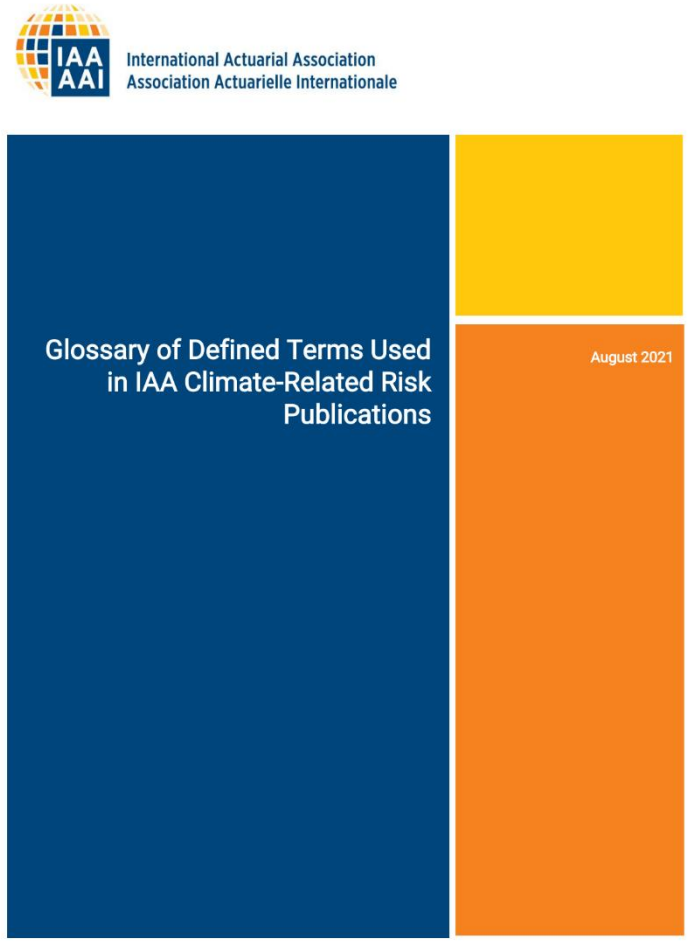
Adaptation: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.

Aerosol A suspension of airborne solid or liquid particles, with typical particle size in the range of a few nanometres to several tens of micrometres and atmospheric lifetimes of up to several days in the troposphere and up to years in the stratosphere. The term aerosol, which includes both the particles and the suspending gas, is often used in this report in its plural form to mean 'aerosol particles'. Aerosols may be of either natural or anthropogenic origin in the troposphere; stratospheric aerosols mostly stem from volcanic eruptions. Aerosols can cause an effective radiative forcing directly through scattering and absorbing radiation (aerosol–radiation interaction), and indirectly by acting as cloud condensation nuclei or ice nucleating particles that affect the properties of clouds (aerosol–cloud interaction), and upon deposition on snow- or ice-covered surfaces. Atmospheric aerosols may be either emitted as primary particulate matter or formed within the atmosphere from gaseous precursors (secondary production). Aerosols may be composed of sea salt, organic carbon, black carbon (BC), mineral species (mainly desert dust), sulphate, nitrate and ammonium or their mixtures.

AR6 (Sixth Assessment Report): An IPCC assessment report is published once every 8-10 years. Since its establishment in 1988, the IPCC has completed five Assessment Reports and is now on its sixth (AR6). The Sixth Assessment Report consists of contributions from each of the three IPCC Working Groups, three Special Reports, and a Synthesis Report (SYR), which integrates the Working Group contributions and the Special Reports produced in the cycle.

Breadbaskets: Breadbaskets are the part of a country or region that produces large amounts of food, especially grain, for the rest of the country or region. (Definition from the Oxford Advanced American Dictionary)

Climate extreme (extreme weather or climate event): The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. When a pattern of extreme weather persists for some time, such as a season, it may be classified as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., high temperature, drought, or heavy rainfall over a season). For simplicity, both extreme weather events and extreme climate events are referred to collectively as 'climate extremes'.



Glossary of Defined Terms Used in IAA Climate-Related Risk Publications

This glossary is the single repository of all defined terms used in IAA climate-related risk publications.

ACPR: French Prudential Supervisory Authority

Adaptation: the process of adjustment to actual or expected climate and its effects.

Anthropogenic global warming: global warming caused by human greenhouse gas emissions.

ARn: n^{th} Assessment Report of the Intergovernmental Panel on Climate Change. The first assessment report is confusingly called FAR.

BAU: Business as Usual, a scenario where no actions to lower greenhouse gas emissions are being taken. It is equivalent to a pathway with radiative forcing of 8.5 W/m² by 2100 (Representative Concentration Pathway 8.5).

Biosphere: the sum of all ecosystems of the Earth, or the zone of life.

BP: British Petroleum

Carbon footprint: the amount of greenhouse gases – primarily carbon dioxide – released into the atmosphere by a particular human activity.

Carbon footprint per capita: A measure of the carbon dioxide emission per person. Values range from 50 tons in Qatar to approximately 16 tons in Canada and the US, 8.6 tons in the European Union and close to zero in sub-Saharan Africa. (Data from Emissions Database for Global Atmospheric Research (EDGAR) for 2018.)

Carbon footprint per GDP: A measure of carbon dioxide emission per GDP. It is measured by kg per GDP at Purchasing Power Parity and ranges from 0.5 for China to 0.3 for the US and Canada and 0.1 for Switzerland. (Data from the World Bank for 2016.)

CBES: Climate Biennial Exploratory Scenario (Bank of England)

CCS: Carbon Capture and Storage are technologies for capturing carbon dioxide and storing it so that it will not enter the atmosphere.

CFRF: Climate Financial Risk Forum, a forum set up in 2019 and co-chaired by the UK prudential and conduct regulators PRA and FCA.

Climate: the long-term average and variability of weather, typically averaged over a period of 30 years.

Climate Action 100+: Investor initiative launched in 2017 to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change.

Climate change: the statistically defined change in the average and/or variability of the climate system, which includes the atmosphere, the water cycle, the land surface, the cryosphere, the biosphere and their interactions.

Climate refugees: people fleeing the effects of climate change. The United Nations Human Rights Committee ruled that "refugees fleeing the effects of the climate crisis cannot be forced to return home by their adoptive countries".

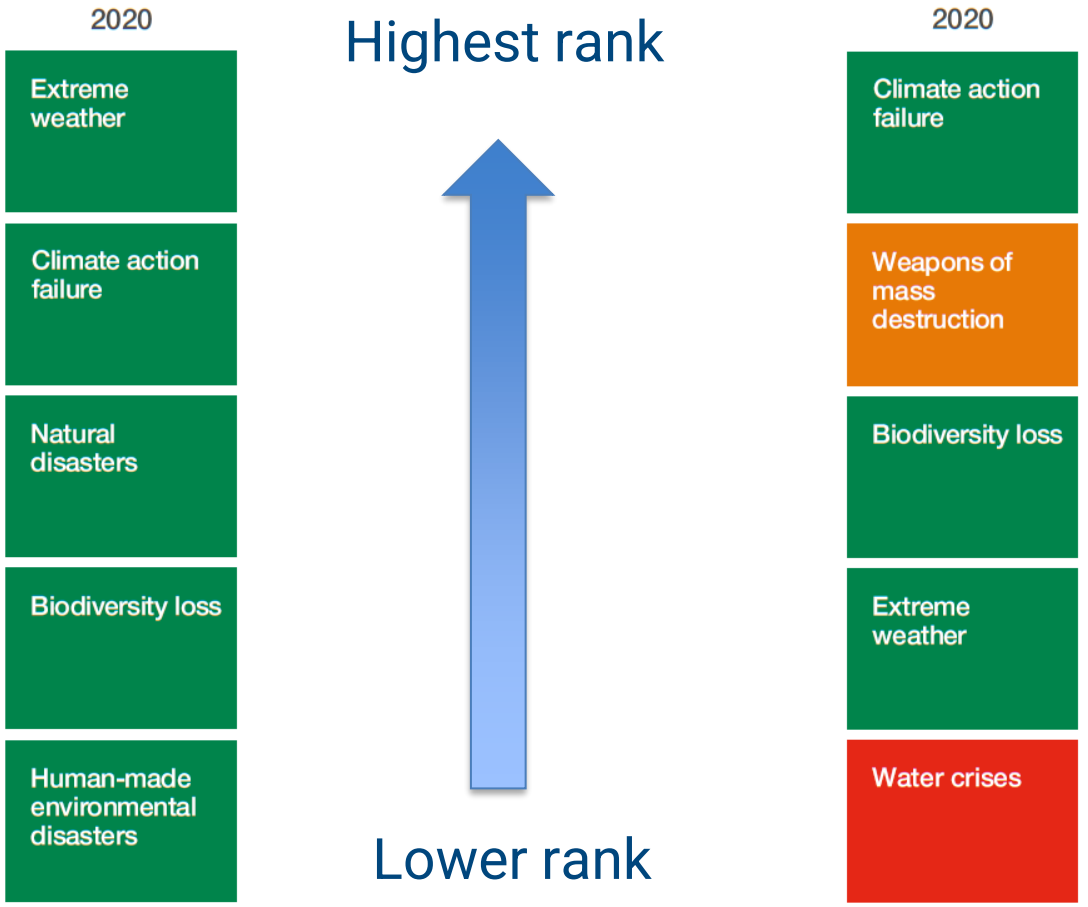
Climate-related risk: the potential negative impacts of climate change on an entity.

Paper 1:
Importance of Climate-Related Risks for Actuaries

Stuart Wason (Lead), FSA, FCIA, HonFIA, CERA (Canada)
Nicholas Dexter, FIA (UK)
Tim Furlan, FIAA (Australia)
Dr. Tatjana Miljkovic, Assistant Professor and Actuarial Science Advisor, Miami University (USA)
Philip Shier, FIA, FSAI (Ireland)

Top global risks

Top 5 Global Risks in Terms of Likelihood *



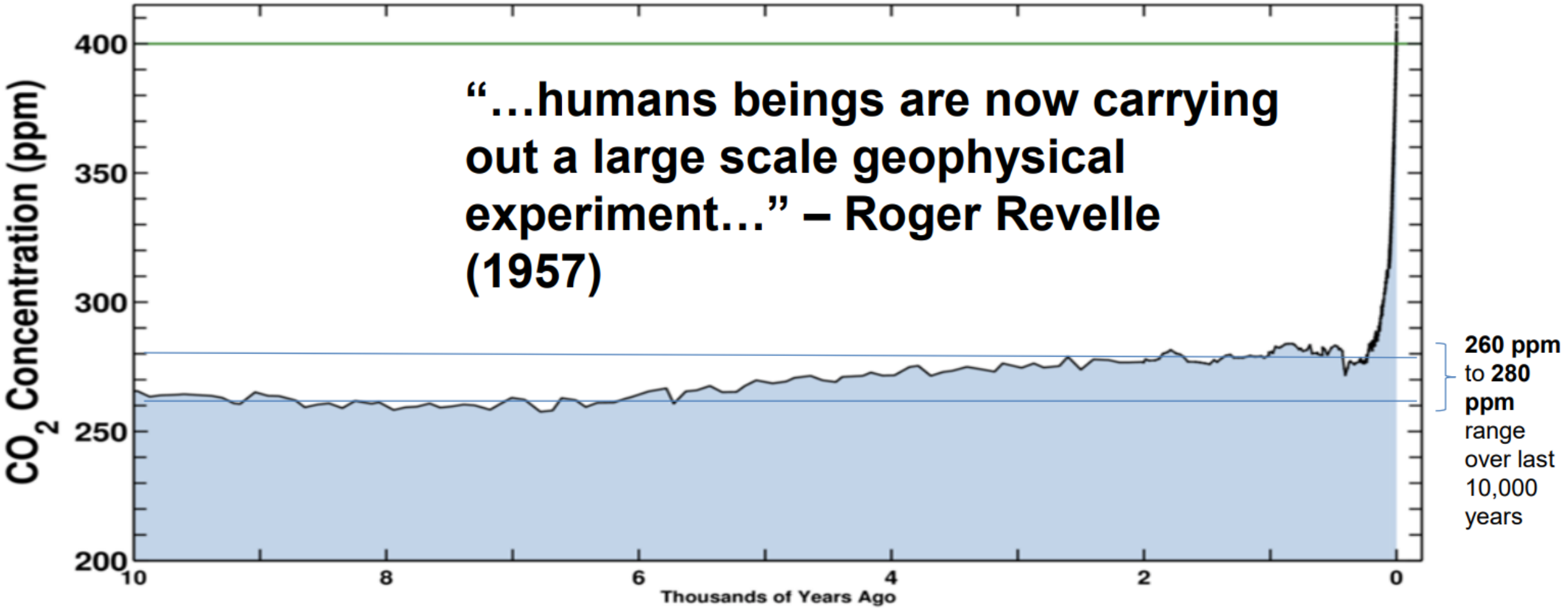
Top 5 Global Risks in Terms of Impact*

Economic Environmental Geopolitical Societal Technological

* Global Risks Report, World Economic Forum

Atmospheric Concentrations of CO2

Stable atmospheric conditions enabling life on earth



scripps.ucsd.edu/programs/keelingcurve

Climate-related Risks

Risk	Description	Impact
Physical Risk	Can be event-driven (acute) or longer-term (chronic) shifts in climate patterns	Extreme weather events eg windstorm, sea-level rises Social conditions eg droughts, wildfires
Transition Risk	Transitioning to a lower-carbon economy may entail extensive policy, technology and market changes	Policy risk Technology risk Market risk
Legal / Reputation Risk	An increase in climate-related claims being brought before the courts by eg property owners	Failure to mitigate Failure to adapt Insufficiency of disclosure

Actuarial modelling

Investment Assumptions	Mortality and Morbidity Assumptions	GI Claims Assumptions
Impact of physical and transition risks Stranded assets Reduction in investment returns, impact differs by eg segment and geography	Food and water security Temp change and volatility Pandemics and vector-borne diseases Social impacts	Uncertain trends and potential for step-changes in eg: • Weather - related • Decarbonisation effects • Liability risks • Nat cats

Paper 2:
Introduction to Climate-Related Scenarios

Micheline Dionne (Lead), FCIA (Canada)
Loubna Benkirane, member of the IFoA (UK) and l'Institut des actuaires (France)
Yves Guérard, FSA, FICA, HonFIA, PhD(hc) (Canada)
Philipp Keller, PhD math, member of the Association Suisse des Actuaires

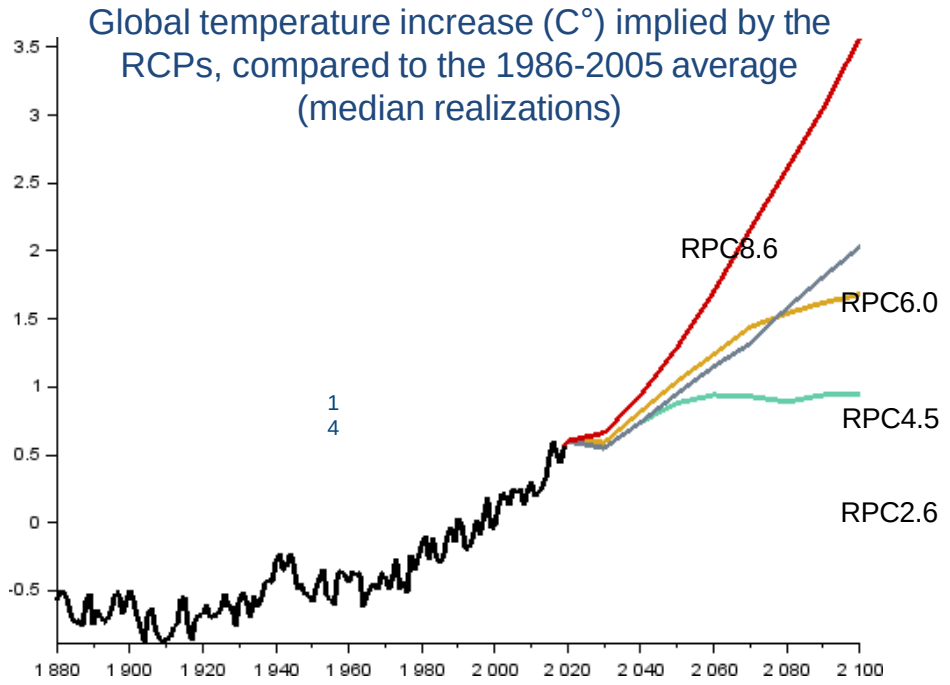
The Representative Concentration Pathways

The IPCC publishes Representative Concentration Pathways (RCP) that describe different climate change scenarios. The RCP are labelled according to the assumed radiative forcing values in the year 2100 (the difference between solar influx and radiated heat, expressed in W/m2).

The fifth Assessment Report AR5 of 2014 defined four main RCPs: RCP2.6, RCP4.5, RCP6.0 and RCP8.5.

- **RPC2.6** is a very stringent pathway, with CO2 emissions declining by 2020 and going to zero by 2100. It assumes negative emissions via Carbon Capture and Storage.
- **RPC4.5** is an intermediate scenario with emissions peaking in 2040
- **RPC6.0** is a more pessimistic scenario with emissions peaking only in 2080
- **RPC8.6** is a business-as-usual, high-emission – but not the worst-case scenario

All RPCn except RPC8.6 assume future technological change.



Example variables to be defined in scenario development

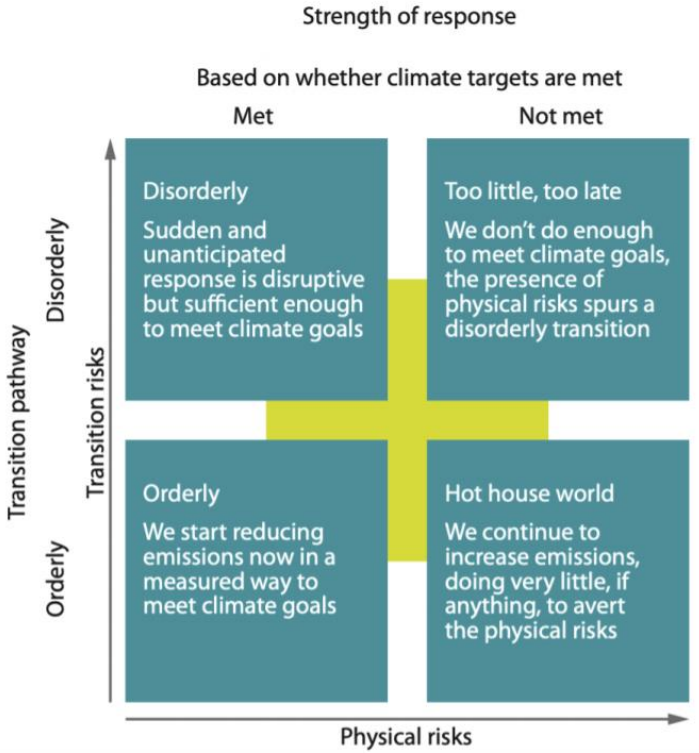
- Translating climate risk variables into financial market variables is one of the greatest challenges in implementing climate related scenarios and will require a multidisciplinary team

Climate risk variables		Macrofinancial variables	
Physical variables	Transition variables	Macroeconomic variables	Financial market variables
• Global and regional temperature pathways. • Frequency and severity of specific climate-related perils in regions with material exposure (including UK flood, subsidence and freeze). • Longevity. • Agricultural productivity.	• Carbon price pathways. • Emissions pathways (aggregate, and decomposed into world regions and sectors). • Commodity and energy prices (including renewables), by fuel type. • Energy mix.	• Real GDP (aggregate and decomposed by sector). • Unemployment. • Inflation. • Central bank rates. • Corporate profits (aggregate and decomposed by sector). • Household income • Residential and commercial property prices.	• Government bond yields for major economies. • Corporate bond yields for major economies (investment grade and high yield). • Equity indices. • Exchange rates. • Bank Rate.

Desirable characteristics of scenarios

Key features	Plausible	Distinctive	Consistent	Relevant	Challenging	Transparent

- Scenarios are typically defined by the following components:
  - **Emissions pathway:** sets the timeline and extent of the degree of warming experienced by 2100
  - **Socio-economic context:** provides the narrative which drives/emerges as a result of the emission pathway
  - **Technological evolution:** the rate of technological efficiency/improvements which influences energy costs and use
  - **Climate policy landscape:** assumptions about climate policy and ambition which has an influence on emissions directly(e.g., through a carbon tax) or indirectly (e.g., through regulations on material use)



Example of the NGFS scenario.

(Source: NGFS Climate Scenarios for central banks and supervisors, 2020 https://www.ngfs.net/sites/default/files/medias/documents/820184_ngfs_scenarios_final_version_v6.pdf)

Paper 3:
Climate-Related Scenarios Applied to Insurers and Other Financial Institutions

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Eric Dal Moro, CERA, Member of the Association Suisse des Actuaires (Switzerland)
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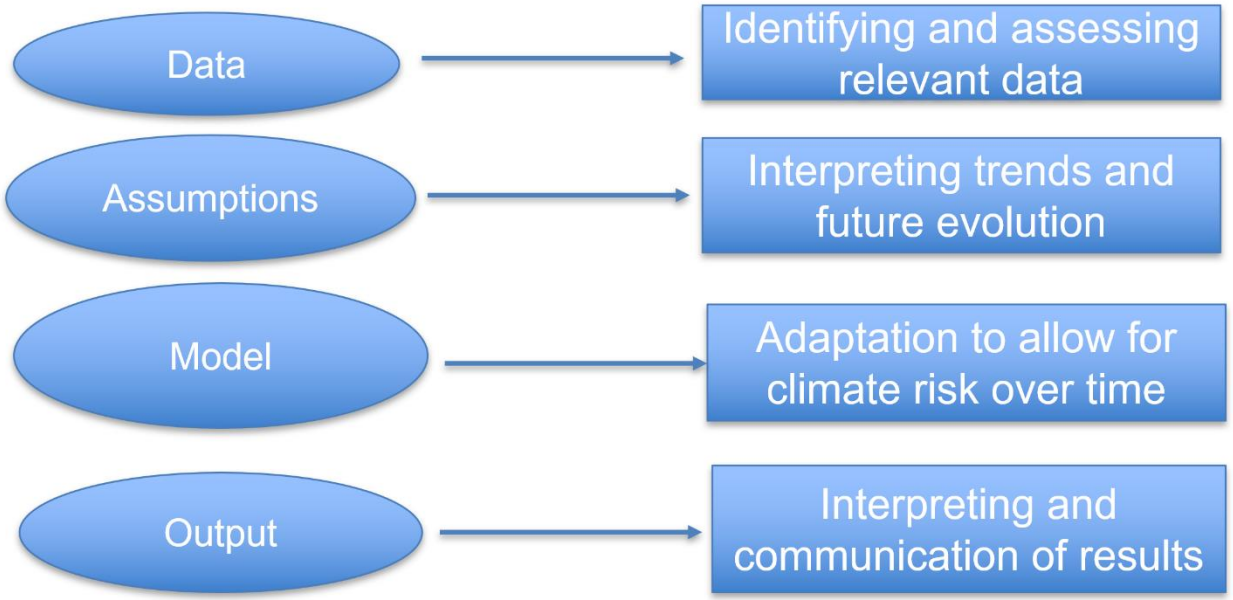
Tracey Zalk, Qualified Actuary (United Kingdom)

Actuarial modeling



Investment Assumptions	Mortality and Morbidity Assumptions	GI Claims Assumptions
Impact of physical and transition risks Stranded assets Reduction in investment returns, impact differs by eg segment and geography	Food and water security Temperature change and volatility Pandemics and vector-borne diseases Social impacts	Uncertain trends and potential for step-changes in e.g.: ● Weather related ● Decarbonisation effects ● Liability risks ● Nat cats

Transition risk (and opportunity) scenario considerations

- **Identify potential actions** by governments, regulators, shareholders, and other stakeholders
- **Designate timeframes** over which the actions may materialize
- Recognize high level of **correlation** between climate change risks
- **Identify demographic and macroeconomic shifts**, such as population movements reflecting drought, changes in manufacturing, or different tourism patterns
- **Translate these overall goals into specific actions**, such as changing underwriting practices, developing new products, or adjusting investments
- **Mitigate systemic risks and risk of groupthink** by collaborating with other non-actuarial professionals, getting multiple views

Paper 4:
Application of Climate-Related Risk Scenarios to Asset Portfolios

André Choquet (Lead), FCIA, FSA, CIM (Canada)
Loudina Erasmus, AAG, FASSA (Netherlands)
R. Dale Hall, FSA, MAAA (USA)
Paul Meins, FIA (UK)
Eileen Tay, FIA, FSAS (Singapore)

Green Asset Classes

- Most commonly available types are green bonds, green infrastructure and green real estate
- Main challenge is to assess whether investment qualifies as “green”
- Risk of greenwashing
- To build a common definition, EU created a Taxonomy for Sustainable Activities
- Other taxonomies from China, UK

Portfolio-Level Risk Measures & Metrics

Overall Portfolio Alignment

- % of portfolio that is committed to “net zero by 2050”, or invested in carbon-related sectors

Portfolio Emissions

- GHG emissions generated by investee companies, reduced according to portfolio’s shareholdings

Implied Temperature Rise

- Estimate of global temperature rise, as if every company operates with same carbon intensity as a particular asset and experiences same emissions pathway

Climate Value-at-Risk (Climate VaR)

- Size of loss attributable to climate-related financial risks by comparing value of assets in a world with climate change relative to same world without climate change

Paper 5: Climate-Related Disclosures and Risk Management: Standards and Leading Practices

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Santiago Fiallos, Certified Actuary (France)
Darren Fleming, FNZSA, FIA (New Zealand)
Amanda Latham (United Kingdom)
Xi Cynthia Yuan FIA (China)

Paper 5 Key Points

- Long-term targets (e.g. 2050 net-zero commitments) vs. immediate action.
- Greenwashing and reputation risks
- Leading reporting standards include **double materiality**
- Recent development - International Sustainability Standards Board (ISSB)
  - Standards S1 and S2 for 2024

Paper 6:
The Climate Change Adaptation Gap: An Actuarial Perspective

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Perspectives on adaptation

- **Both mitigation and adaptation are needed** to reduce the impact of climate risk. Focus on adaptation needed now before advancing climate change reduces the possibilities for adaptation.
- **Adaptation requires short- and long-term thinking**.
- Requires integration into a broader risk management context, **involving governance and strategy.**
- **Managing uncertainty is a major actuarial activity.**
- Consider **evolving role of insurance** including risk solutions, **protection gaps**, affordability, inequalities, vulnerabilities, etc.

Paper 7:
Actuarial considerations around climate-related risks on Social Security

More Initiatives

IAA Climate Action Plan

- Actuarial Standards Committee – Development of ISAP 8 to support Disclosure of risks ISSB S1 and S2 standards from the IASB
- Insurance Accounting Committee – Development of International Actuarial Note accompanying ISAP8
- Develop Road Map (2023-2026) including potentially broader Sustainability topics according to identified needs

International Standard of Actuarial Practice 8

- ISAP 8 aims to: “**support actuaries** performing work related to **IFRS S2 disclosure requirements for identifying, measuring and disclosing climate-related risks and opportunities**.

Time Limited Task Forces

Other key current topics the profession is addressing:

- Future Actuary Task Force
  - Risk and Opportunities for the profession – report published in April 2023
  - New tasks to be undertaken – Gap Analysis/Skill Development; supply and demand
- Pandemics Task Force
  - Drafting in progress for the first paper on Lessons Learned
  - Podcasts, webinars and other papers will follow
- Addressing Sustainable Development Goals *(work to begin shortly)*
- Water-Related Risks *(work to begin shortly)*
- Artificial Intelligence (*work to begin in 2024*)

Questions ?

International Actuarial Association
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Thank you!

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