

Cambridge Judge Business School

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Cambridge Centre for Risk Studies 2017 Risk Summit

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# CAMBRIDGE CENTRE FOR RISK STUDIES RESEARCH OVERVIEW

Professor Daniel Ralph, Academic Director  
Centre for Risk Studies

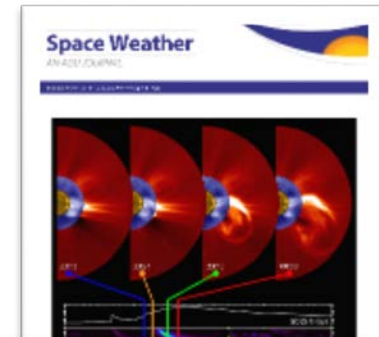
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# CRS Dissemination and Engagement Activities

- 2017 Global Risk Index Launch (London)
- 2017 Cyber Risk Landscape Seminar in collaboration with RMS (London & New York)
- Helios Solar Storm
  - Scenario Launch in collaboration with AIG (London)
  - European Space Weather Week (Belgium)
- Global Exposure Accumulation and Clash Workshop in collaboration with RMS (London)
- Cambridge CRO Council “Leading Ideas in Risk” Roundtable
- Risks and Benefits of Artificial Intelligence and Robotics in collaboration with UN
- UK Cabinet Office Workshops
  - Multi Threat Analysis
  - National Risk Register



# Project Activities in 2016-17



## Cambridge Global Risk Index 2017

Integrated risk assessment to global economy from 22 threats



## Solar Storm Risk

Helios scenario of economic impact of large solar storm on US economy



## Impacts of Terrorism Events on City Economies

Paris attack study



## NatCat FinCat ★

Financial market impacts from extreme natural catastrophe events



## Insurance Growth Opportunity and Risk Assessment

Integrated risk assessment to global economy from 22 threats



## Marine Insurance Risk ★

Extreme scenarios for RDS of vessel loss



## Cyber Risk Landscape 2017

Recent cyber attack trends and implications for business risk



## Cyber Terrorism ★

Assessment of the threat to insurance of cyber attacks from terrorist organisations



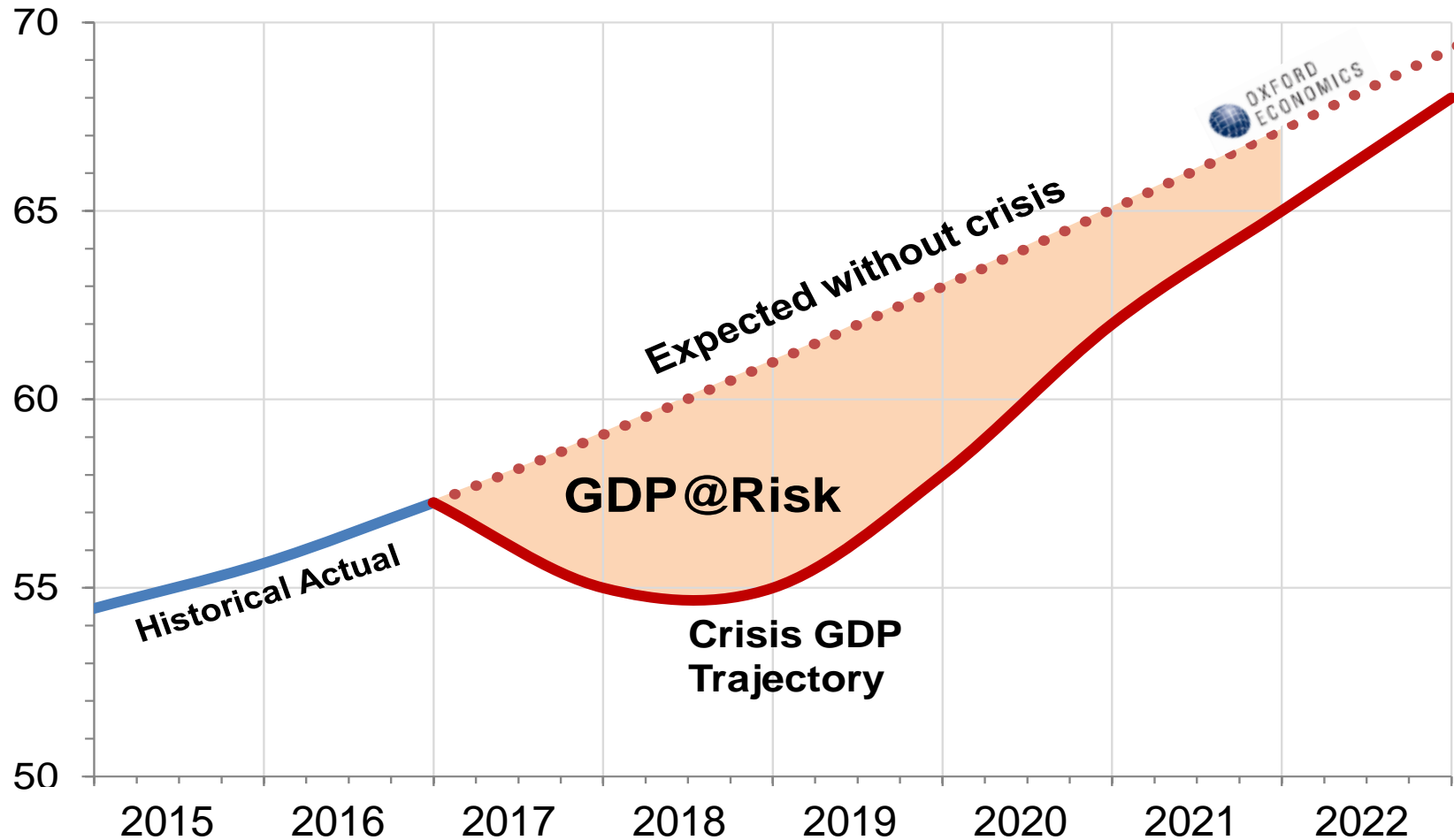
## GEAC Consultation Documents

Development of Multiline Insurance Exposure Data Schema



# Catastromonomics

**GDP@Risk** as a **metric** for comparing impacts



# Current Research Tracks

## A. Emerging and Systemic Risks

Continuing the research into individual threats, developing scenarios, and improving the understanding of emerging and rapidly changing risks.

## B. Integrated Risk Assessment

Updating, improving, and extending the framework, datasets, and analytics of the Cambridge Global Risk Outlook, developing standardized risk metrics for multiple threats to the global economy.

## C. Use Cases of Research

Aligning the research activities and outputs to business decisions and practical applications in improving risk management practices in business and policy-making.

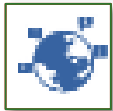
# Cyber Risk Research at CCRS

## Information Technology

### Loss Processes



**Data Exfiltration**  
(‘Leakomania’)



**Denial of Service Attack**  
(‘Mass DDoS’)



**Cloud Service Provider Failure**  
(‘Cloud Compromise’)



**Financial Theft**  
(‘Cyber Heist’)



**Ransomware**  
(‘Extortion Spree’)



**Malware**  
(‘Sybil Logic Bomb’)

## Operations Technology

### Scenarios of Asset Damage



Cyber Attack on **US Power Generation**  
(‘Business Blackout’) \* v1.1



Cyber Attack on **UK Power Distribution**  
(‘Integrated Infrastructure’)



Cyber attack on **Commercial Office Buildings**  
(Laptop batteries fire induction’)



Cyber attack on **Marine Cargo Port**  
(‘Port Management System’)



Cyber Attack on **Industrial Chemical Plant**  
(‘ICS Attack’)



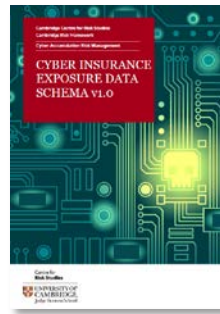
Cyber Attack on **Oil Rigs**  
(‘Phishing-Triggered Explosions’)



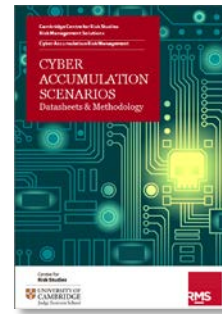
Sybil  
Logic Bomb



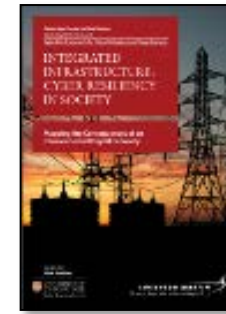
US Cyber  
Blackout



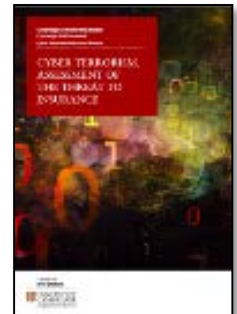
Exposure Data  
Schema



Accumulation  
Scenarios



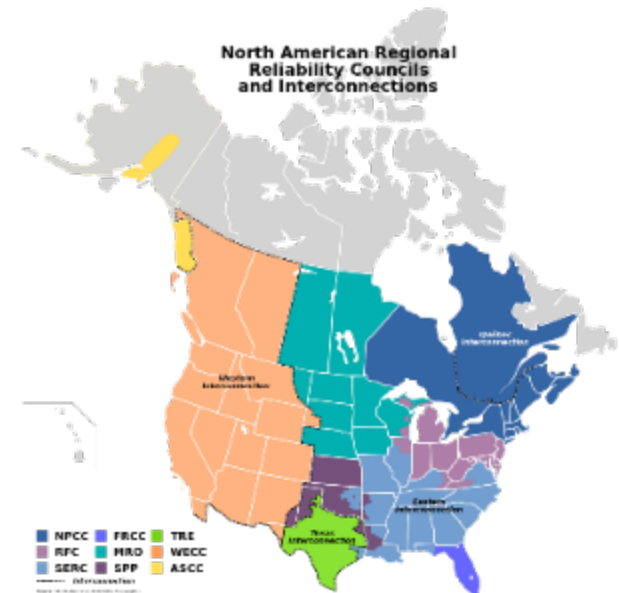
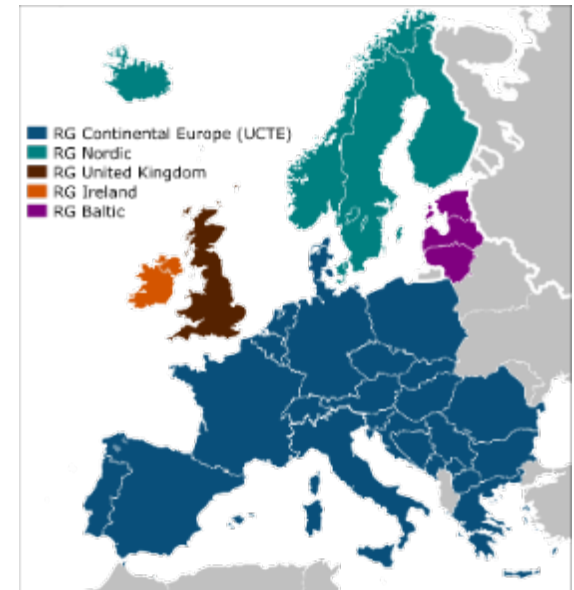
UK Cyber  
Blackout



Cyber  
Terrorism

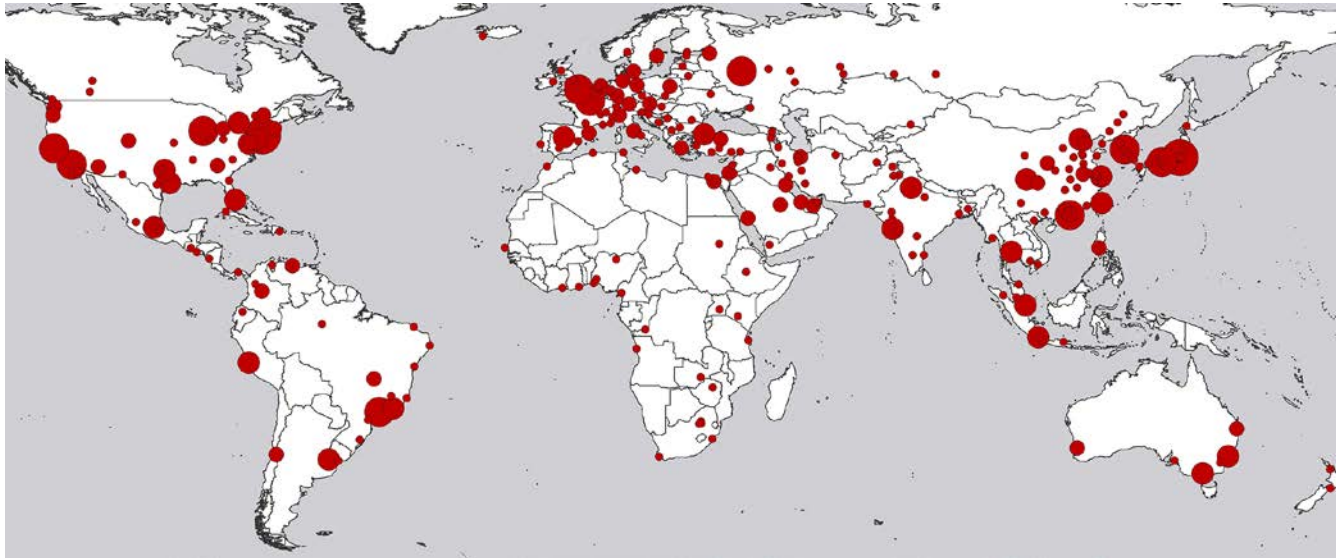
# Research into Critical National Infrastructure Risk

- A major systemic risk is the failure of the infrastructure on which modern businesses depend
- This has been a key focus for our research over the past few years
- Current research includes:
  - Mapping the Wide Area Synchronous Grids of the world
  - Interdependencies of infrastructure layers
  - Vulnerabilities and potential failures





# Cambridge Global Risk Index for Top 300 Cities



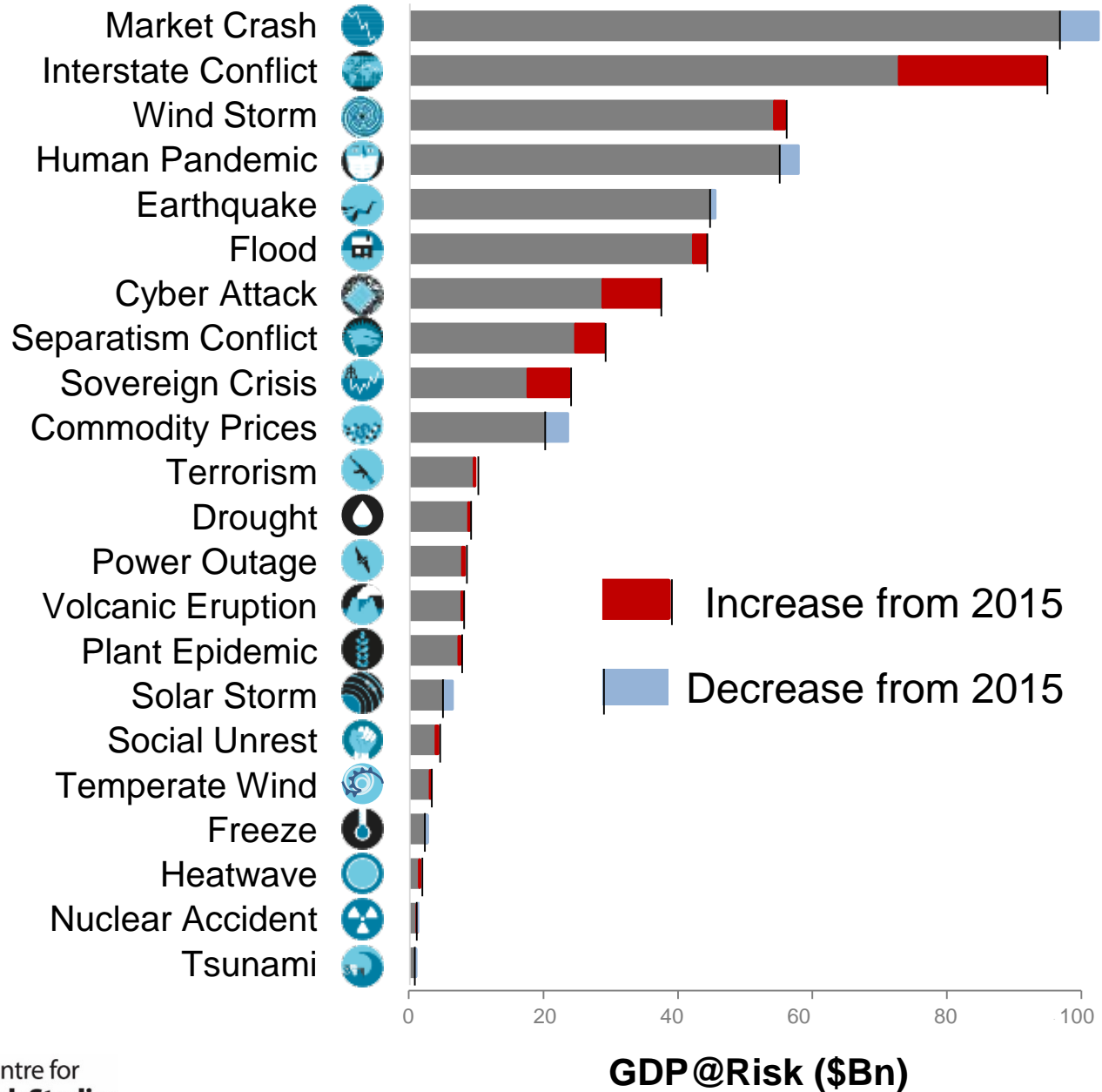
- Market Crash
- Sovereign Crisis
- Commodity Prices
- Interstate Conflict
- Terrorism
- Separatism Conflict
- Social Unrest
- Earthquake
- Tropical Windstorm
- Windstorm
- Tsunami
- Flood
- Volcanic Eruption
- Drought
- Freeze
- Heatwave
- Nuclear Accident
- Power Outage
- Cyber Attack
- Solar Storm
- Human Pandemic
- Plant Epidemic

300 Cities

22 Threats

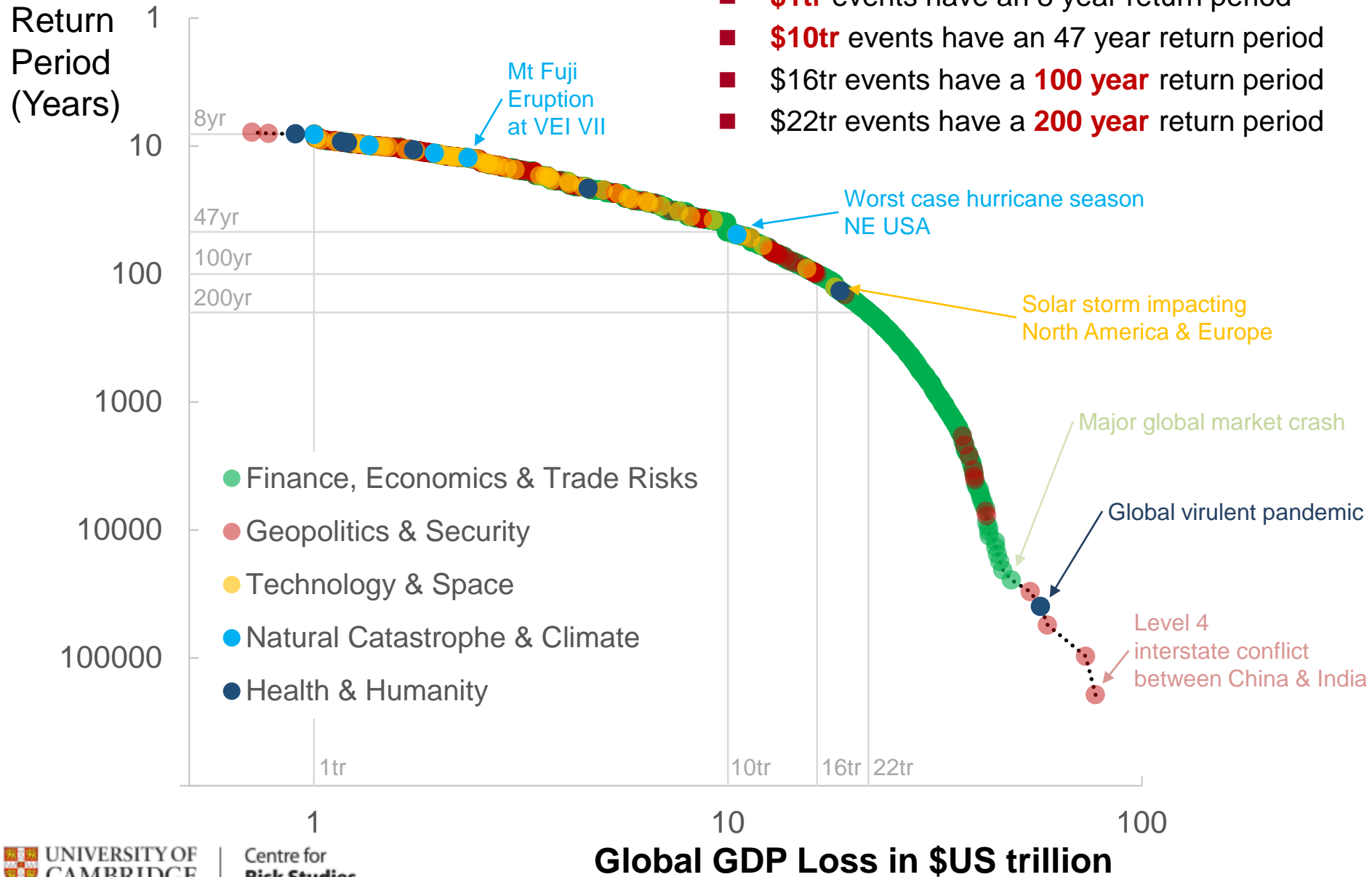
\$1.17 Trillion of GDP@Risk a year

**Annual Average Cost of Catastrophe is 1-2% of GDP: 2017 Risk Index**



# Risk of Ruin:

## Impact of Trillion Dollar Scenarios on Global Economy



# Application of Key Use Cases for a Range of Audiences



**Geopolitical Conflict**  
Emerging Risk Scenario



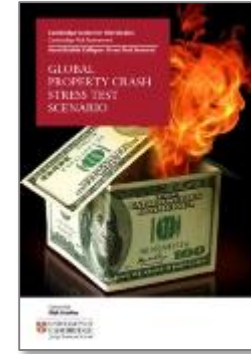
**Pandemic**  
Emerging Risk Scenario



**Cyber Catastrophe**  
Emerging Risk Scenario



**Social Unrest**  
Emerging Risk Scenario



**Global Property Crash**  
Financial Risk Scenario



**Eurozone Meltdown**  
Financial Risk Scenario

- Private sector companies and corporations
- Financial services, investors, insurers, and bankers
- Public sector authorities, governments, regulators

- Enterprise-wide risk monitoring
- Annual & Regulatory reporting
  - 10K and Viability statements
- Insurance purchasing strategy
- Crisis and continuity management
  - Management stress tests
- Emerging risk monitoring and stress test design
- Monitoring risk for business units

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