

## The IPCC context and risk assessment methodologies

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in the context of climate change and extreme weather events  
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## Overview

- **High level risk assessment methodology**  
-particularly hazard and exposure
- **IPCC guidance ( if any)**  
-focussed on hazard, but very limited

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## Six Steps to Risk Assessment

**Scope** - area, purpose, timeframe, etc  
**Hazard analysis** - computer models of weather  
**Exposure** - geographical information systems (GIS)  
**Vulnerability** - robustness of materials and processes  
**Recovery** - contingency plans  
**Financing** - culture/ third party agreements

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## Timeframe for an “insurance” risk assessment

**Contract of insurance**  
- annual duration

**Disaster management system**  
- decades

**Infrastructure**  
- generations

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## Hazards Estimation

**Natural variability** - climate system is chaotic ("butterfly wings")  
- we will not be able to attribute causation

**Climate Models** - too "coarse" to depict extreme weather  
- often inconsistent

**Event Models** - rare events are the costly ones (50:1 gearing)  
- insufficient historical data (return period x 10)  
- very few events have been modelled

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## IPCC Big Picture

### *WG I*

By 2100 +1.4 to 5.8 C, changed rainfall  
sea level + 50 cm, continuing for millenia  
weather - altered frequencies, intensities?

### *WG II*

"emerging evidence of damage from flood and drought"  
Up to 5.5 billion people in water stress by 2025.  
Tens of millions face displacement in megacities.  
Many regional impacts eg crops, tundra, forests

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## IPCC Beijing 2002 workshop

### Flood, drought, heatwaves

Return period was 100 yrs, is 40 yrs now, will be 4yrs midcentury.

### Convective activity

Lightning +30 to 50%, more wildfire, hail, flashflood

### Tropical cyclones?

maybe.. frequency +5%, intensity +5%, rain +23%

### Midlatitude storms (European winter)?

More frequent, up to 20% stronger

### Surprises

Quickthaw, icestorm, joint events ( eg inland and coastal flood)

## UK Climate Change & Extremes

### Extreme months per year ( 1.2 expected)

	Hot	Cold	Wet	Dry
1960's	1.0	0.5	1.3	0.9
1970's	1.7	0.7	1.1	1.5
1980's	1.8	0.8	1.7	1.1
1990's	3.4	0.3	1.3	1.5
2000's	2.8	0.0	2.8	0.0

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## Implications for risk: an Example

Event type	Normal	Extreme	Catastrophe
Event cost	0	1	5

Period	% of Time			Expected Cost
Now	99	0.9	0.1	0.014
2050	95	4	1	0.090

540% rise in risk premium in 50 years (approx 4% per year)

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## Exposure

### Asset types

Property ( by function), infrastructure, crops, economic production  
People, ecological, cultural

### Location

Often not recorded or not fixed

### Value

Various bases

### Time horizon

Exposure can change rapidly for socio-economic reasons  
IPCC presented four very different "world-views"

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## Other Aspects

<b>Vulnerability</b>	<i>may alter significantly in future</i>
<b>Recovery system</b>	<i>can have a major effect on costs</i>
<b>Culture</b>	<i>may determine viability of insurance</i>
<b>Contracts</b>	<i>key to distribution of costs</i>
<b>Operational</b>	<i>public/private; integrated/standalone</i>

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## Summary

<b>Scope</b>	- take the long view
<b>Hazards</b>	- allow for wide uncertainty - do not plan for the past!
<b>Exposure</b>	- create databases - be forward-looking

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