



Adapting to scientific information

An Insurance perspective

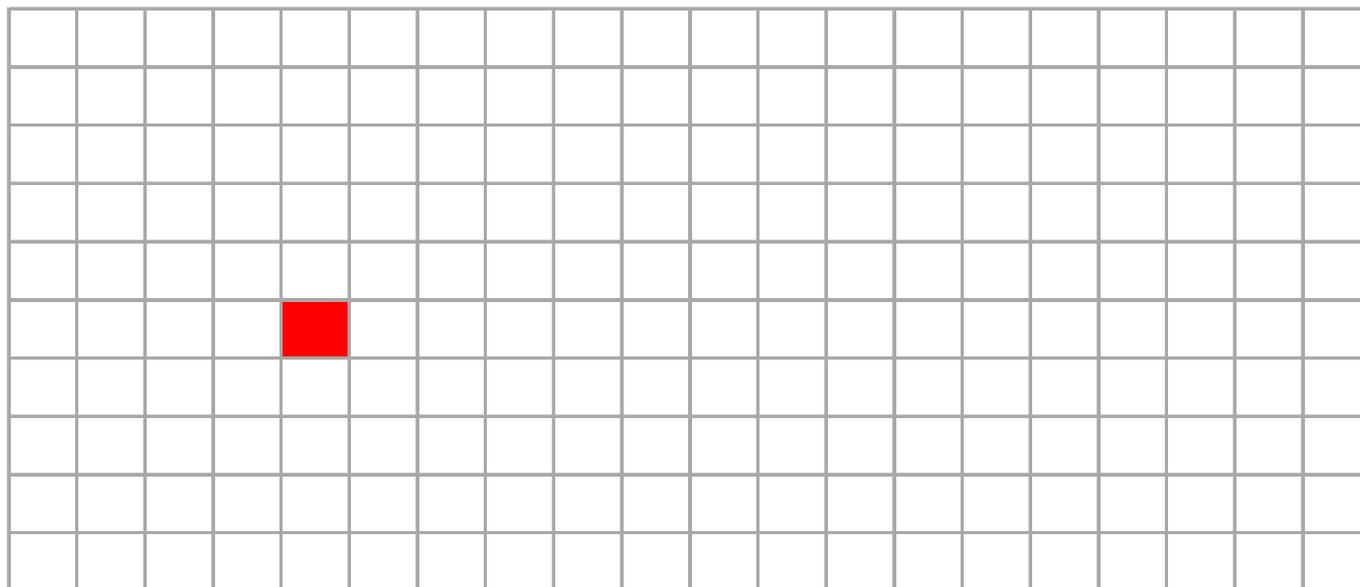
Trevor Maynard,

Head Exposure Management and Reinsurance,
Lloyd's

Agenda

- ▶ Hurricane Andrew
- ▶ 1 in 200
- ▶ Katrina lessons
- ▶ Value of forecasting
- ▶ Impact of climate change
- ▶ Lloyd's UK flood scenario
- ▶ Barriers to change
- ▶ Removing the barriers





1 in 200 Risk assessment
(1970s to 2016)

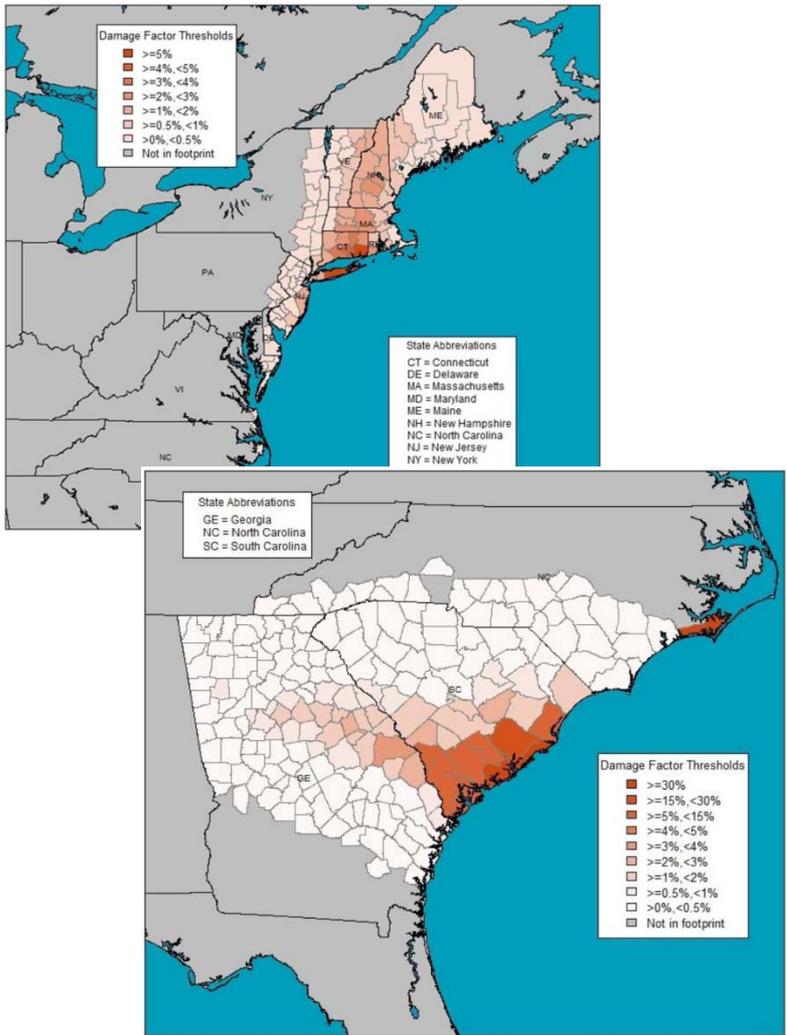
Katrina – more lessons but ultimately strengthened by models



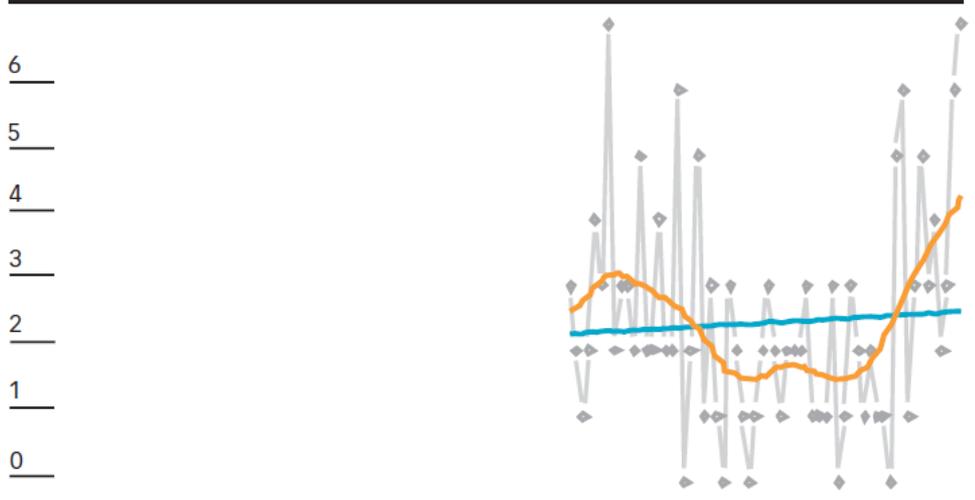
Katrina: Data quality is key



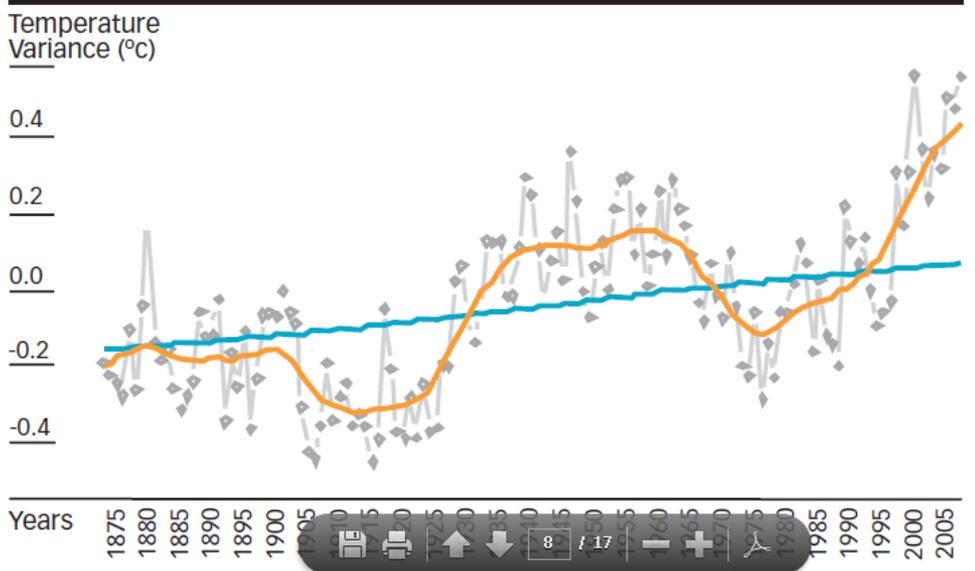
Katrina: Near term views of risk (recognising non-stationarity)



Number of major hurricanes

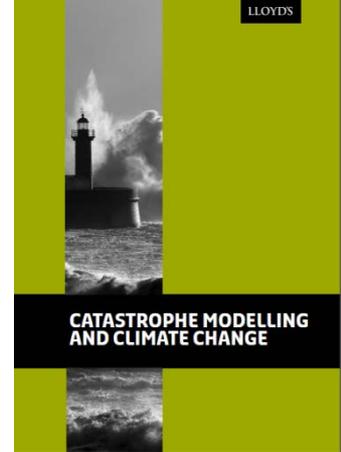


Atlantic multidecadal oscillation (AMO)





The impact of changes in sea-level are shown to be more significant, with changes in Superstorm Sandy's modelled surge losses due to **sea-level rise** at the Battery over the **past 50-years** equating to approximately a **30% increase in the ground-up surge losses** from Sandy's in New York.



We find that **hurricanes are getting stronger worldwide** but especially over the North Atlantic. The upward trend in hurricane strength is **physically and statistically related to the warming seas**. We estimate that the increasing intensity of the strongest hurricanes amounts to about **10 m/s per degree Centigrade (Celsius)** of warming.

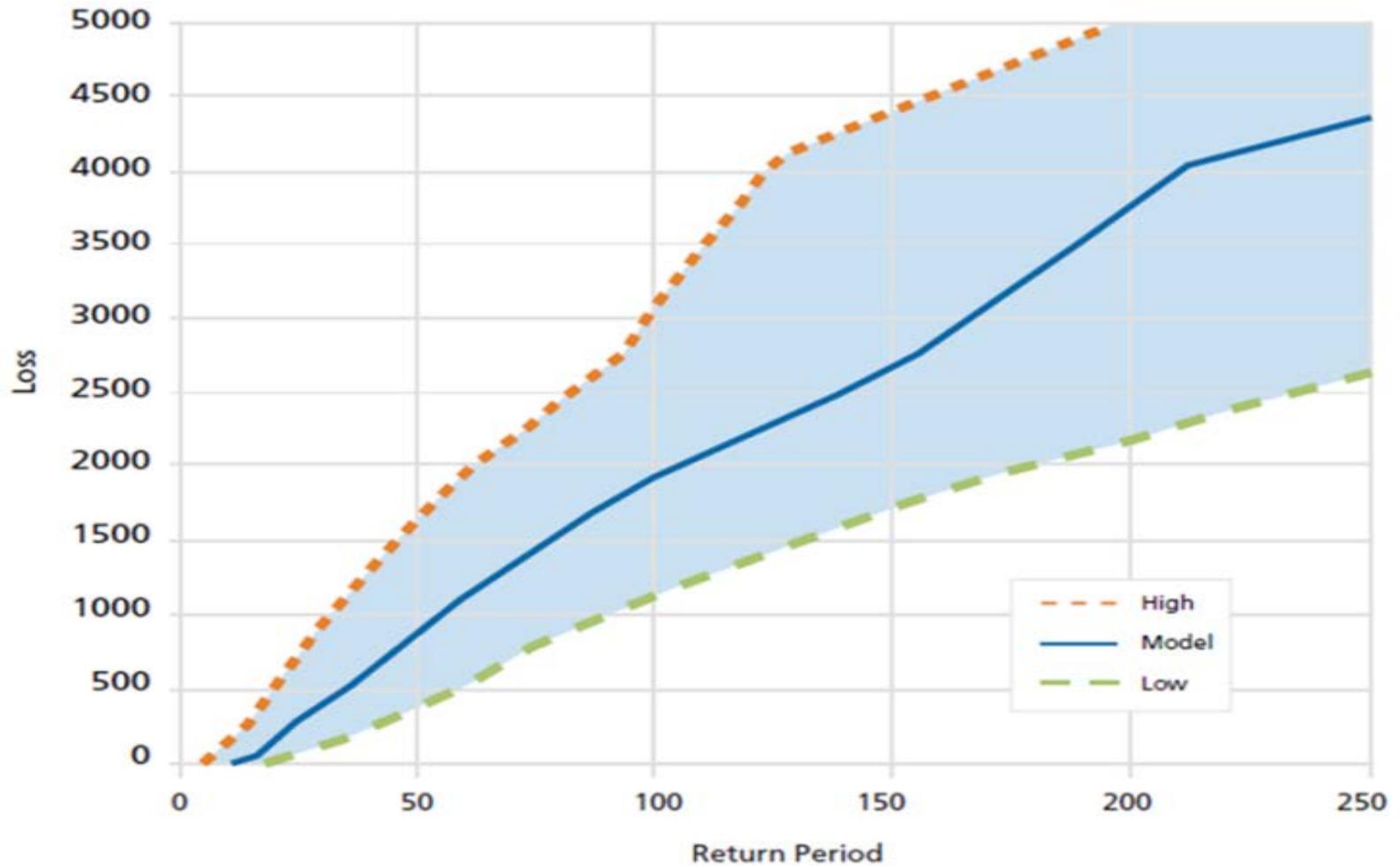
Impact of climate change (Hurricanes)

 Paul Wilson, Senior Director, Model Development at RMS

 Professor James B. Elsner, President of Climatek

Uncertainty within models

FIGURE 1: CATASTROPHE MODELING: AN IMPRECISE SCIENCE



GUY CARPENTER

Source: RMS and Guy Carpenter

Lloyd's minimum standards

- there are formal processes to communicate material uncertainty to nominated committees and the board;

UW 1.5.3 - EXPOSURE MANAGEMENT METHODOLOGIES FOR LOSS ESTIMATION AND ASSESSMENT

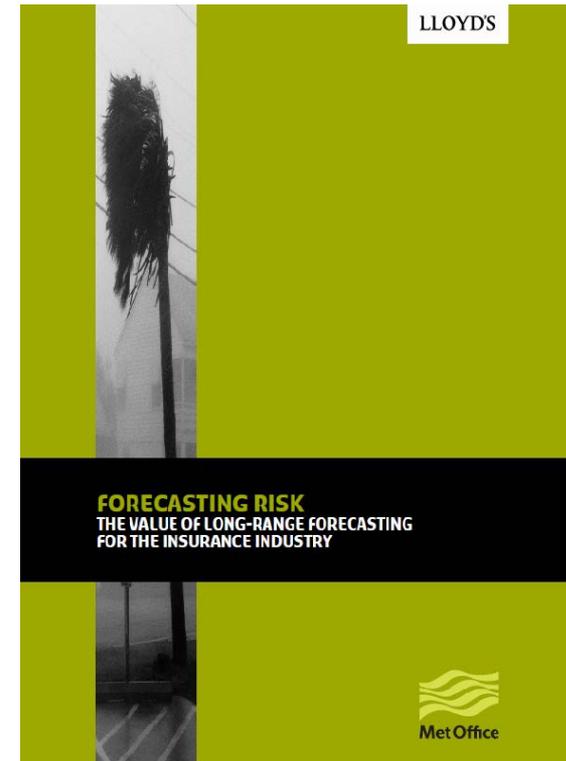
Managing Agents shall use appropriate loss estimation techniques for each managed syndicate.

Managing agents shall ensure that:

- exposure and loss potential are assessed using one or more documented, validated methodologies or models;
- the assessment / modelling is carried out by appropriately skilled and experienced personnel;
- there are formal processes to communicate material uncertainty to nominated committees and the board;
- following a material event, they review and adjust their existing models and underlying assumptions as appropriate;
- any external model used meets generally accepted and regulatory requirements for an internal model; and
- when outsourcing the operation of a catastrophe model (or other loss-estimation technique) responsibility for understanding the model, including selection, validation and change, remains with the managing agent.

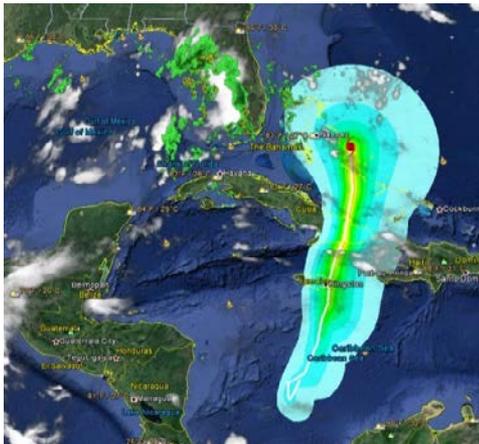
Value of forecasting

- ▶ There is skill above climatology for several relevant risks
- ▶ Climate change (and other causes of non-stationarity) invalidates traditional “climatology pricing” methods
- ▶ Prospective levels of risks should be used – not long term averages
- ▶ First adopters of forecasts risks “standing out” – herd behaviours are significant barrier
- ▶ Deep uncertainty in risk chains reduces forecast efficacy – particularly if only one link is forecast well

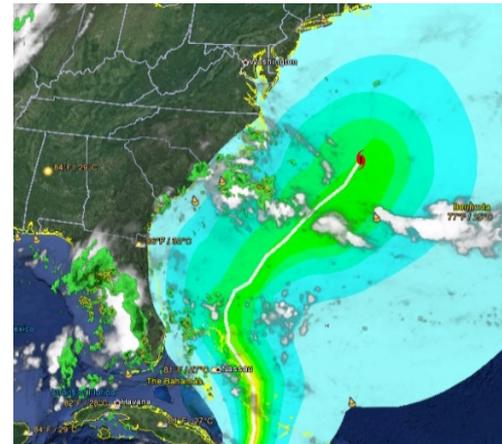




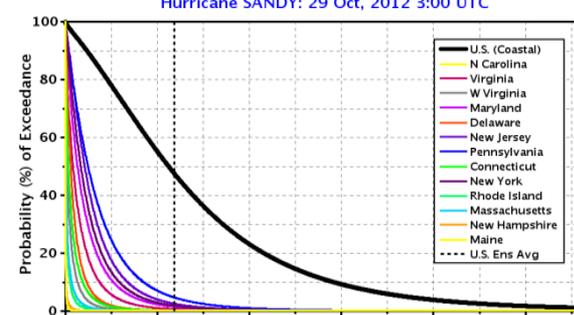
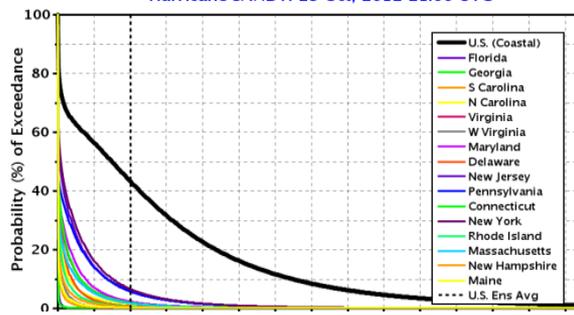
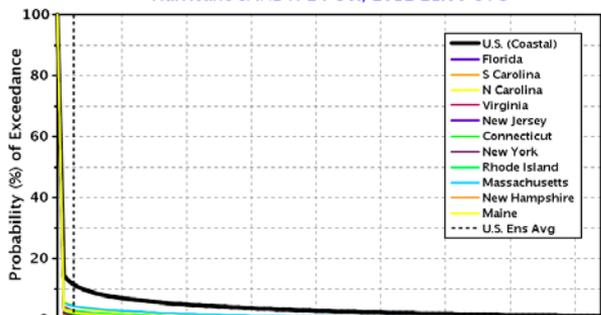
Insured Loss Probability of Exceedance
Hurricane SANDY: 24 Oct, 2012 21:00 UTC



Insured Loss Probability of Exceedance
Hurricane SANDY: 25 Oct, 2012 21:00 UTC



Insured Loss Probability of Exceedance
Hurricane SANDY: 29 Oct, 2012 3:00 UTC

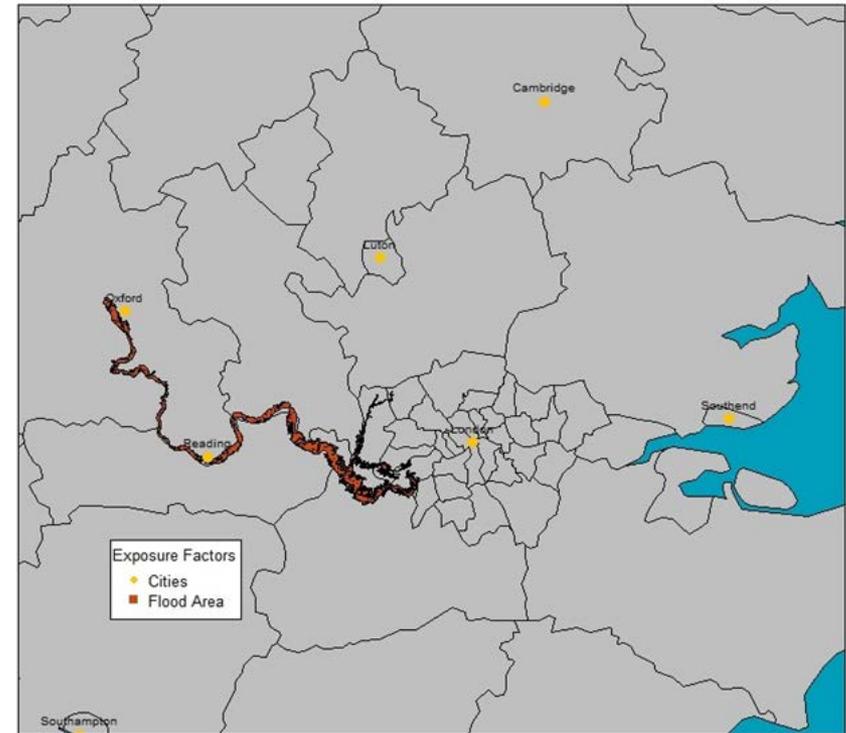


Live forecasts help us prepare

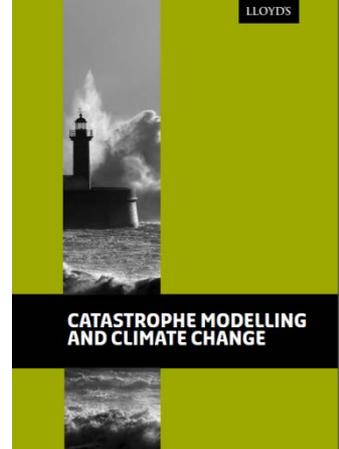
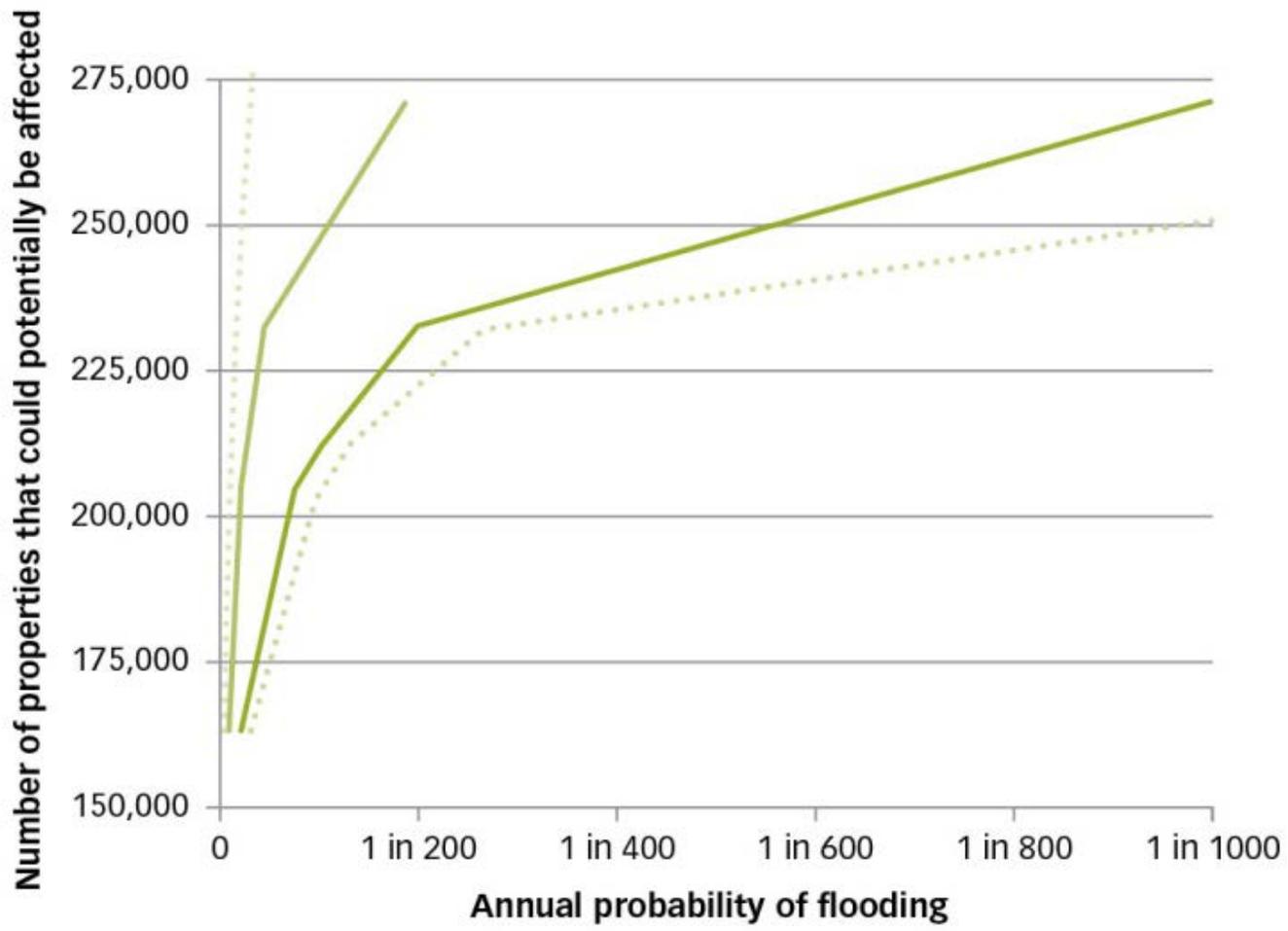
<http://www.tropicalstormrisk.com/business/>

Lloyd's Flood RDS

- ▶ Scenario based on heavy rainfall event moving west to east across south-east England
- ▶ GBP 6.2bn (USD 9.7bn) industry insured loss
- ▶ Flood extent covers 194km² with impact on Oxford, Reading, Slough, and Henley
- ▶ Event duration will not exceed 168 hours
- ▶ Consider:
 - Pollution (e.g. Carlisle 2005)
 - Road/Rail/Airport disruption
 - CBI – supplier extensions



Residential	£4.50bn
Commercial/Industrial	£1.60bn
Agriculture	£0.05bn
Motor	£0.05bn

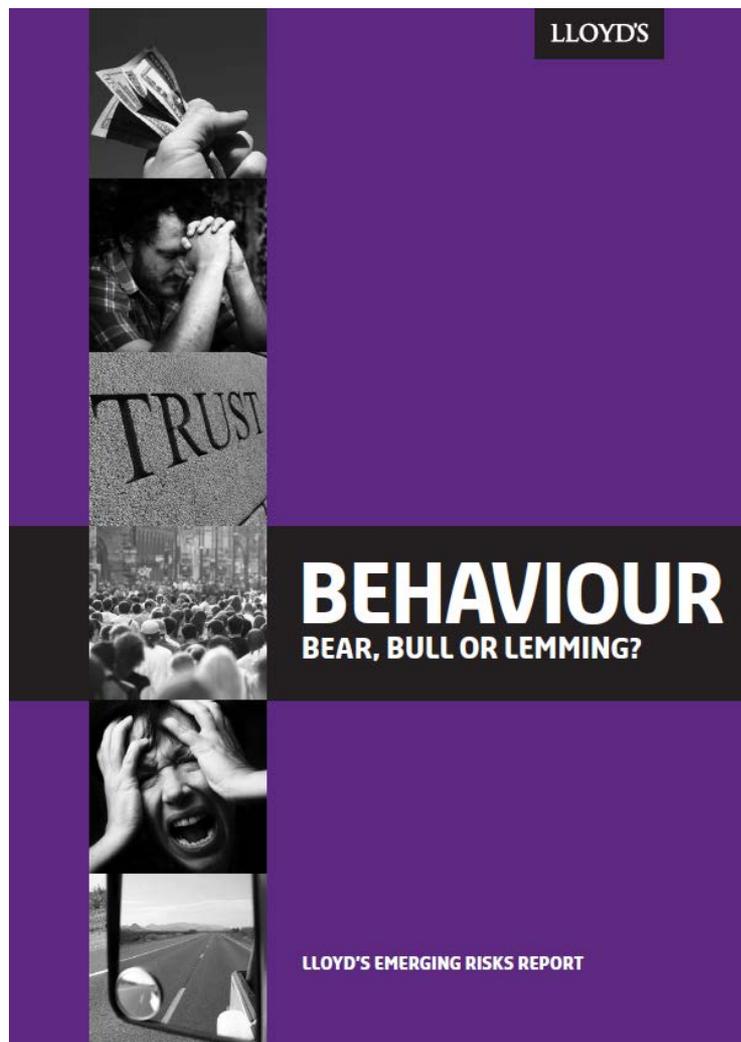


- Range of uncertainty
- Projected climate for the 2080s
- Present day



Impact of climate change (Thames flood)

JBA group Professor Rob Lamb, Chief Scientist, Richard Wylde, Meteorologist, and Jessica Skeggs, Hazard Mapping Specialist at JBA Group



Barriers to change

Representation Bias



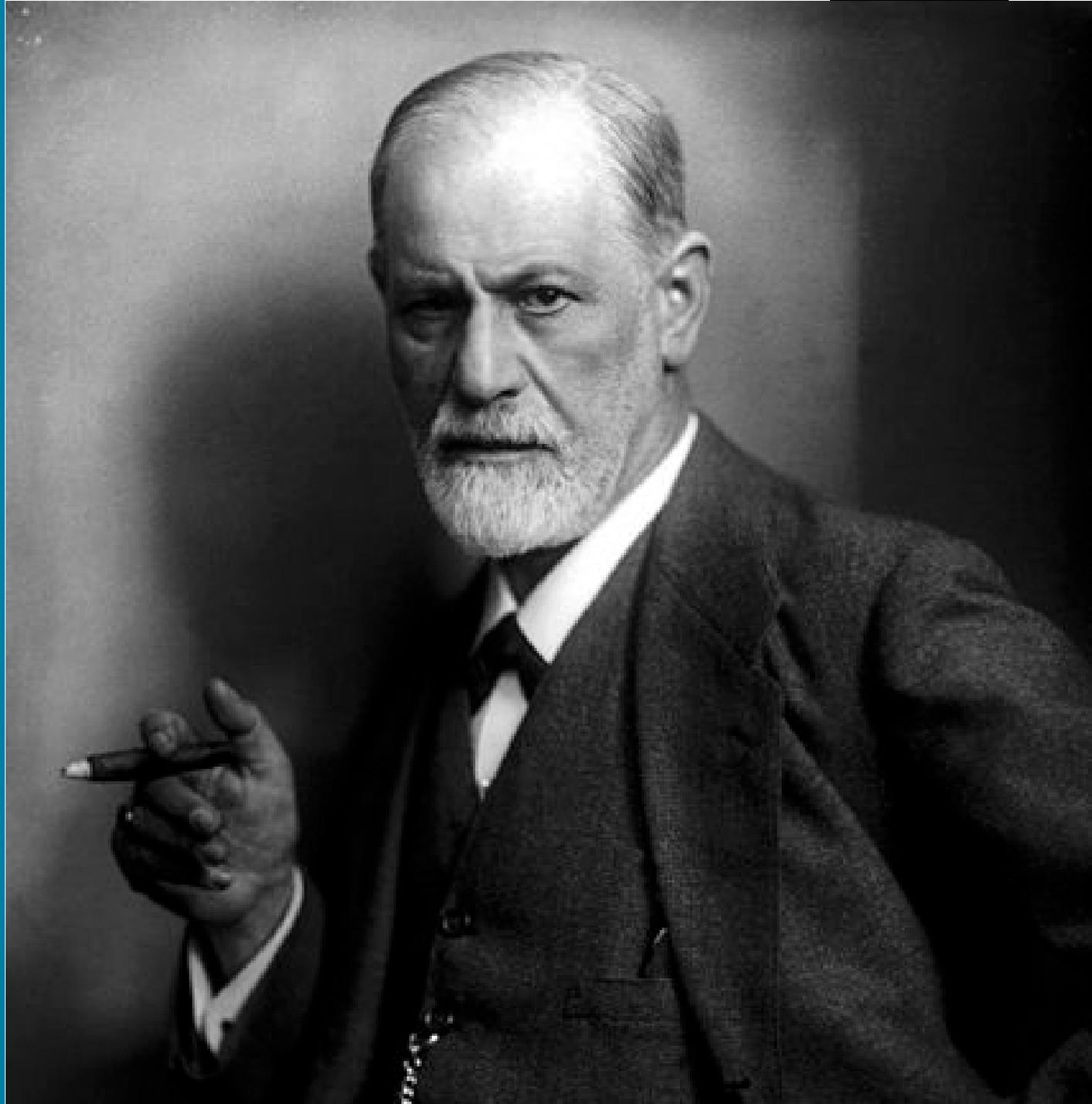
Availability Bias



Anchoring



Cognitive Dissonance



Removing the barriers...



