



DRM “Science for Policy and Operations”: Challenges

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Talk Structure

- How Science is used in DRM:
 - Policy
 - EWS / Operations
 - Emergency Advice
 - Communications
- What do DRM Decision makers want?
- Challenges to consider during the seminar

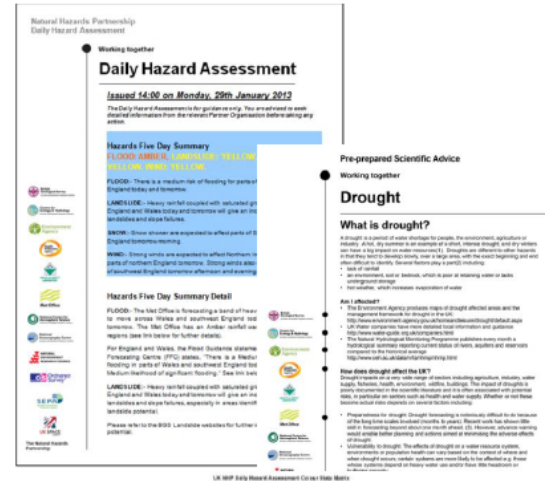


Science input to Policy

- UK Government Chief Scientific Advisor (CSA) signs off the [National Risk Assessment \(NRA\)](#)
- Individual Departmental CSAs own individual hazard risks
- [Risk Owners engage with experts / scientists](#), often through Scientific Advisory Groups or Subject matter Expert Groups
- [Two independent groups are asked to review the NRA](#): NHP (natural) and a CBRN group (man-made)

NHP Priorities: Science in Risk Assessment & Operations

- NRA scientific review and challenge
- Daily Hazard Assessment (DHA) – coordinated overview of natural hazard **impacts** likely to affect UK over next 5-days
- Hazard **Impact** Matrix and Hazard 'Science Notes'
- Longer range multi-hazard outlook and horizon scanning (including climate change **impacts**) advice
- Hazard **Impact** Modelling R&D Framework
- NHP microsite at <http://www.metoffice.gov.uk/nhp/>



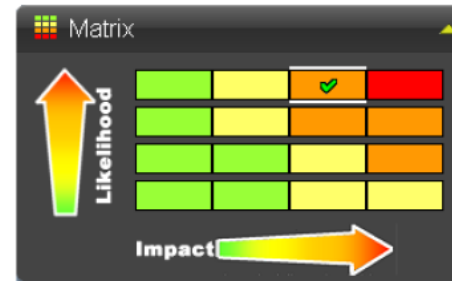
Daily Hazard Assessment
Issued 14:00 on Monday, 29th January 2012

Hazards Five Day Summary
FLOOD: There is a medium risk of flooding for parts of England today and tomorrow.
LANDSLIDE: Heavy rain is forecast for parts of England and Wales today and tomorrow, which may lead to landslides and slope failure.
WIND: Strong winds are expected in the north of England today and tomorrow, which may lead to damage to trees and power lines.
HAIL: There is a low risk of hail in the north of England today and tomorrow.

Prepared Scientific Advice
Drought
What is drought?
A drought is a period of water shortage for crops, the environment, agriculture or industry. It is the result of a lack of rain, which leads to a shortage of water in the ground and in rivers. Drought can be caused by a lack of rain, or by a shortage of water in the ground and in rivers. Drought can be caused by a lack of rain, or by a shortage of water in the ground and in rivers. Drought can be caused by a lack of rain, or by a shortage of water in the ground and in rivers.

UK NHP Daily Hazard Assessment Context Table

Category	Threat	Exposure	Vulnerability	Exposure	Vulnerability	Exposure	Vulnerability	Exposure	Vulnerability	Exposure	Vulnerability	Exposure	Vulnerability	Exposure	Vulnerability
Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
High	High	High	High	High	High	High	High	High	High	High	High	High	High	High	High





Science input to Operations

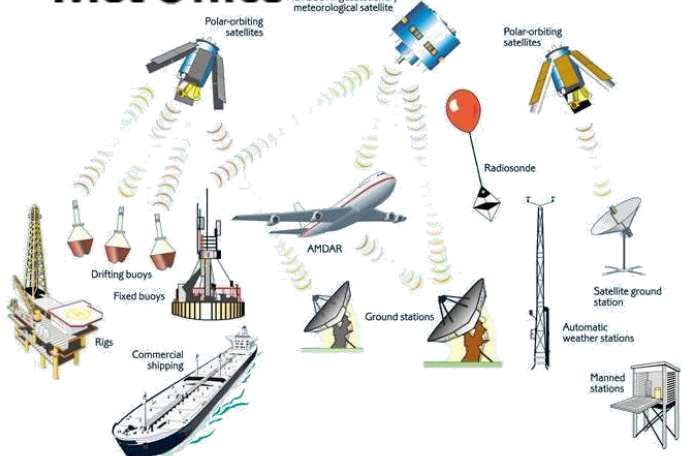
- Improvements in **modelling capability** in the warning institution (and their collaborators)
- Improvements in **observational capability** for:
 - Monitoring of hazards
 - Verification of warnings
 - Process understanding for improvements in models
- Hazard **Impact Model development** – a focus for the Natural Hazards Partnership (NHP)



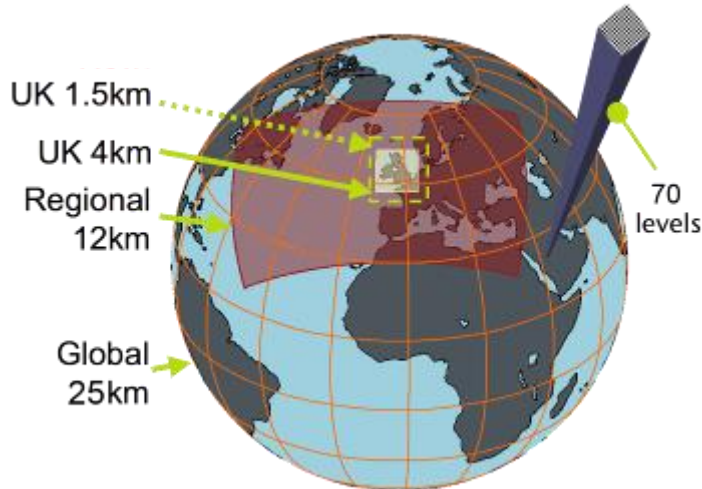
Science in the forecasting process

Met Office

METEOSAT geostationary meteorological satellite



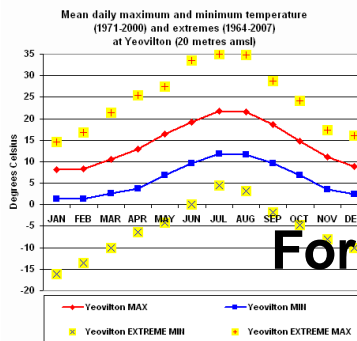
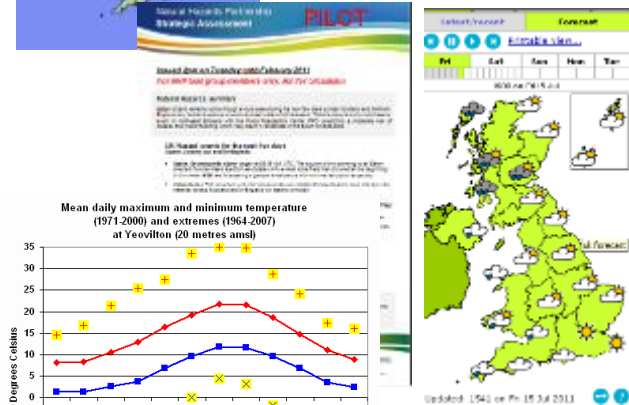
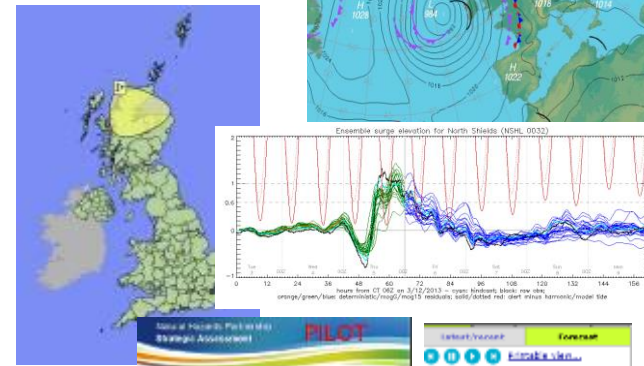
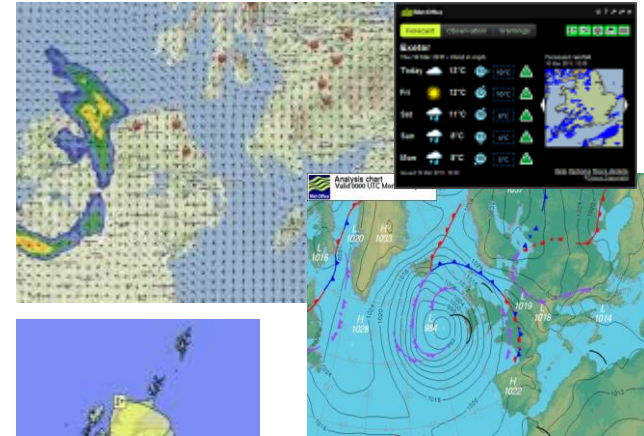
Global observations



Forecast model output



Interpretation, Risk Analysis & Communication



Forecasts and advice



Science advice during Emergencies

- Convening **Science Advisory groups**:
 - **Regional Level**: Science and Technical Advisory Cells
 - **National Level**: Scientific Advisory Group for Emergencies

Be Aware: Access to “out of hours” science advice can be an issue

- **Operational 24/7 Advisors** (from operational institutions) working closely with the Emergency Responders

Expert Advisor responsibilities

- To provide a **consistent and familiar face to responders** there are 17 Civil Contingencies Advisors spread across the United Kingdom.
- Day to day role – **assist with risk assessments and planning** for severe weather, helping to build working relationships
- In the **event of an emergency, they provide detailed local guidance on expected impacts**. Advice is trusted and acted upon.

Clear communication is key!

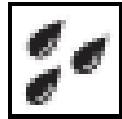




Communication: Impact and likelihood

- **Impact based** system – no thresholds!
- Flexible service complements the complexity of meteorology
- Two factors
 - **Likelihood** of impacts occurring NOT the weather happening
 - The level of **impacts** expected
 - $\text{impact} \times \text{likelihood} = \text{RISK}$

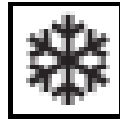
Communication: Impact and likelihood



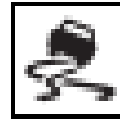
Rain



Wind



Snow



Ice



Fog

- Impact

- Time of day
- Time of year
- Antecedent conditions
- Rural vs Urban
- Non-weather factors

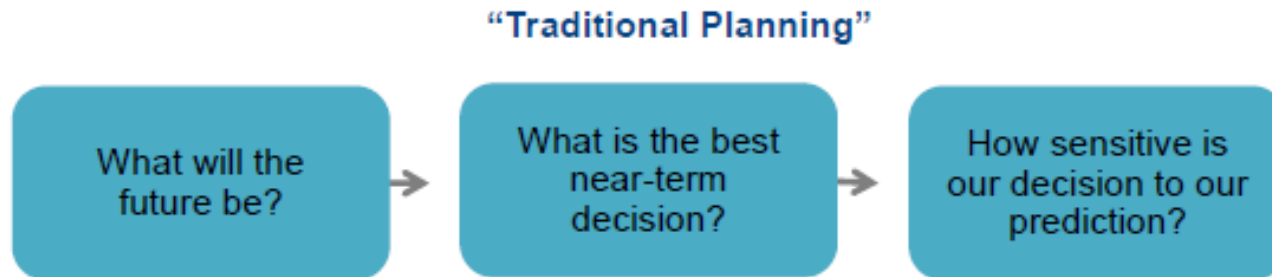
- Likelihood

- Forecast uncertainty
- Most likely scenario
- Reasonable worst case scenario

What do Decision makers want?

DRM: Planning phase

Traditional Planning Asks “What Will The Future Bring?”



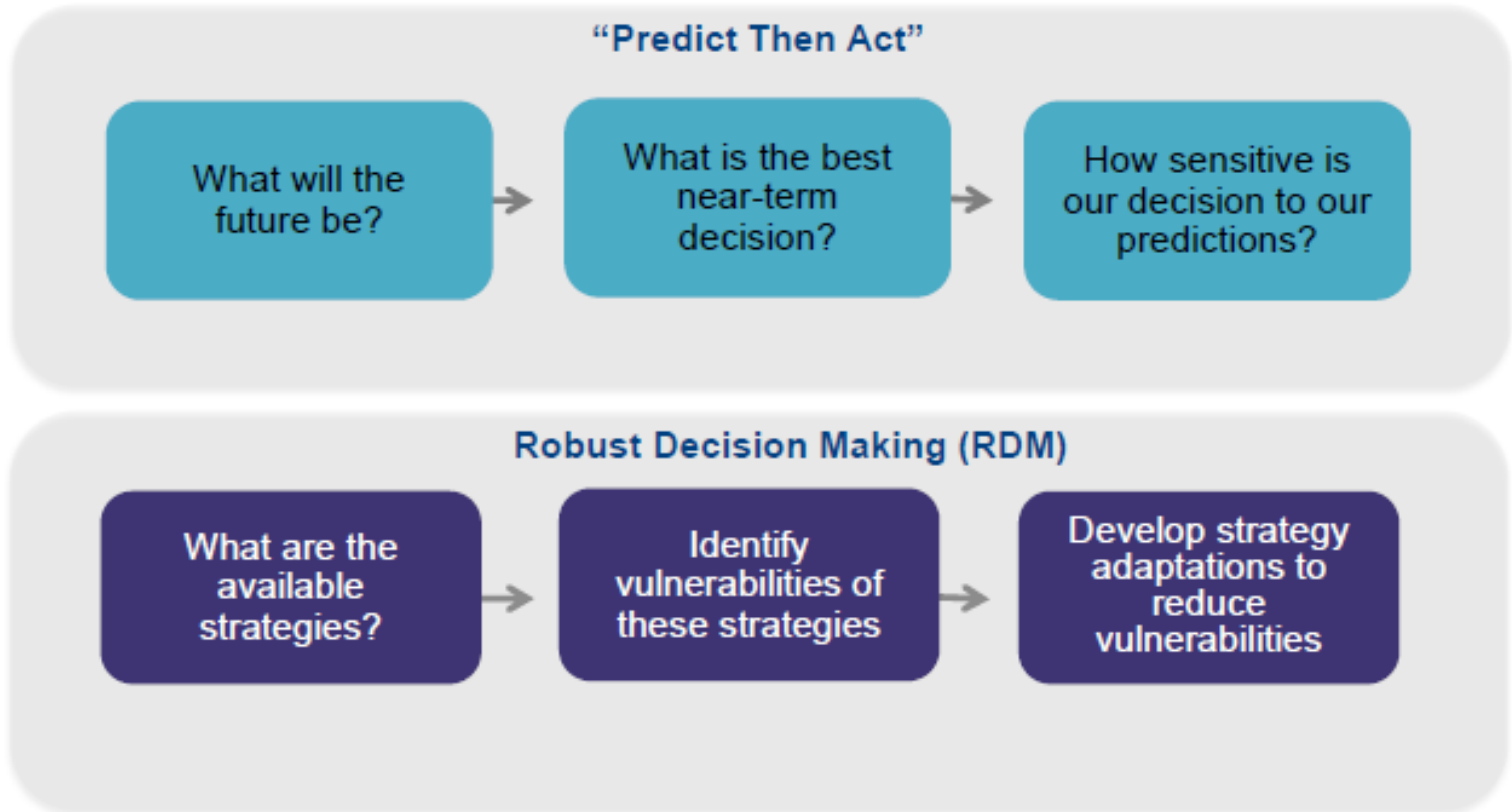
Works well when:

- Conditions are stable or easy to predict
- There is consensus among stakeholders

What do Decision makers want?

DRM: Planning phase

Robust Decision Making (RDM) Works Better Under Deeply Uncertain Conditions by Running the Analysis Backwards



What do Decision makers want?

DRM: Operational phase

- Improved content to inform decisions on resource planning and deployment:
 - Communicate complex information simply
 - Timeliness of information (impact not threshold)
 - Reliable / trusted interpretation of information
 - Increasingly access to multi-hazard, multi-impact information
 - Improved communication and coordination between national and regional / international response (where requested)





Challenges / objectives of the seminar

- Enhance the knowledge base to support DRM at National, multi-national / regional, European and UN humanitarian levels:
 - Improving science based services and risk analyses
 - Improving the exchange, use and uptake of research and operational knowledge
 - How to best harness science and technology in DRM
- Make recommendations to the UNISDR S&T Conference in Geneva: January 2016
- Please complete the seminar Questionnaire