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Developing Guidelines for Flood Risk Mapping – Incorporating Uncertainty

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Science into Practice…

Pitt Review following 2007 floods
- 94 recommendations including taking more account of uncertainties in the flood risk management process because it might change the evaluation of risk and consequent decisions – particularly where damages might be severe

- Suddenly a host of new Environment Agency projects on ensemble forecasting, probabilistic flood forecasting, probabilistic flood risk mapping, probabilistic incident management, ….

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Science into Practice…

- But…… what are appropriate assumptions and what do results mean to users – what should "Good Practice" mean in informing decisions?
- Need for a *translatory discourse* between scientist and practitioners about nature and meaning of uncertainties (Faulkner et al., *Ambio*, 2007)
- CCN Guidelines concept of that discourse as a set of decisions to be agreed ……

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Science into Practice…

from NERC: Policy into Practice

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Evolving the Guidelines

Guidelines as a set of decisions

→ Assumptions to be agreed between analyst and stakeholder(s)……

→ Explicit agreement and record means there is an audit trail for later evaluation and review

→ Default options, or decision tree of potential options

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Evolving the Guidelines

Guidelines as a tool for communication

→ Defining and framing the type of application

→ Communication of sources of uncertainty considered

→ Communication of assumptions used in assessing sources of uncertainty

→ Communication of how uncertainties combined

→ Communication of meaning of probabilistic or possibilistic information

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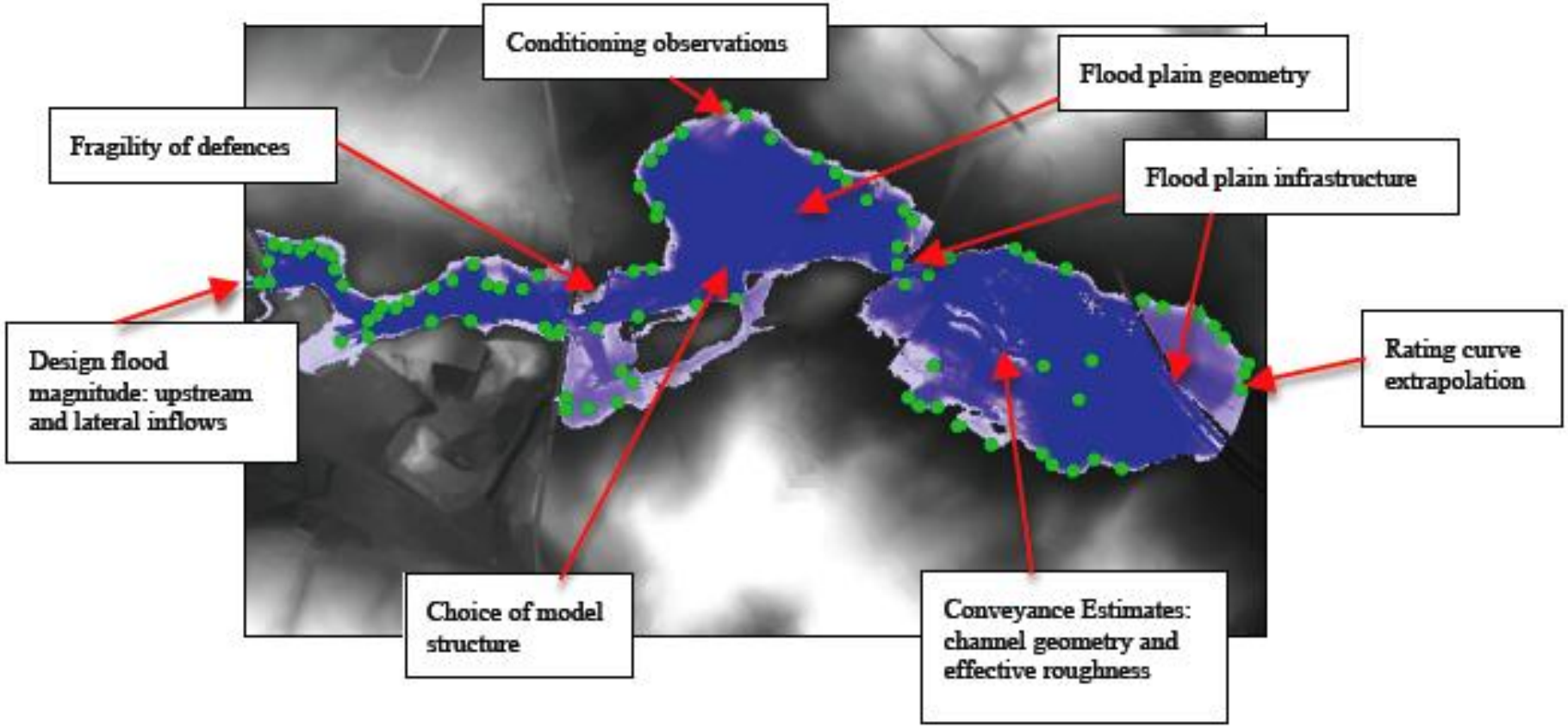
Sources of Uncertainty in Flood Risk Mapping



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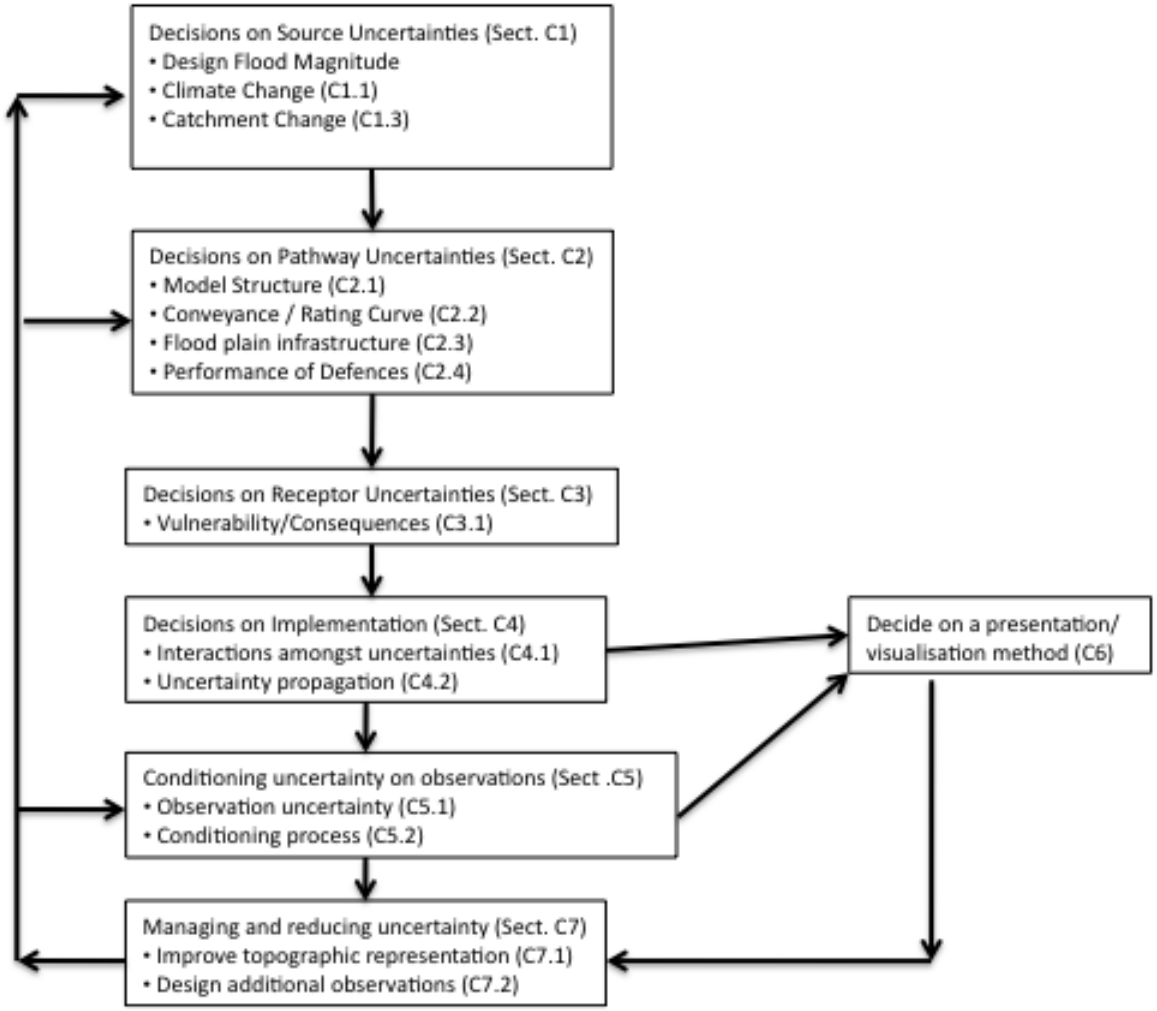
Flood Risk Mapping: Decision Tree



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River Eden: January 2005 event

Upstream at Appleby

Emergency Centre at Carlisle

Public response at Carlisle

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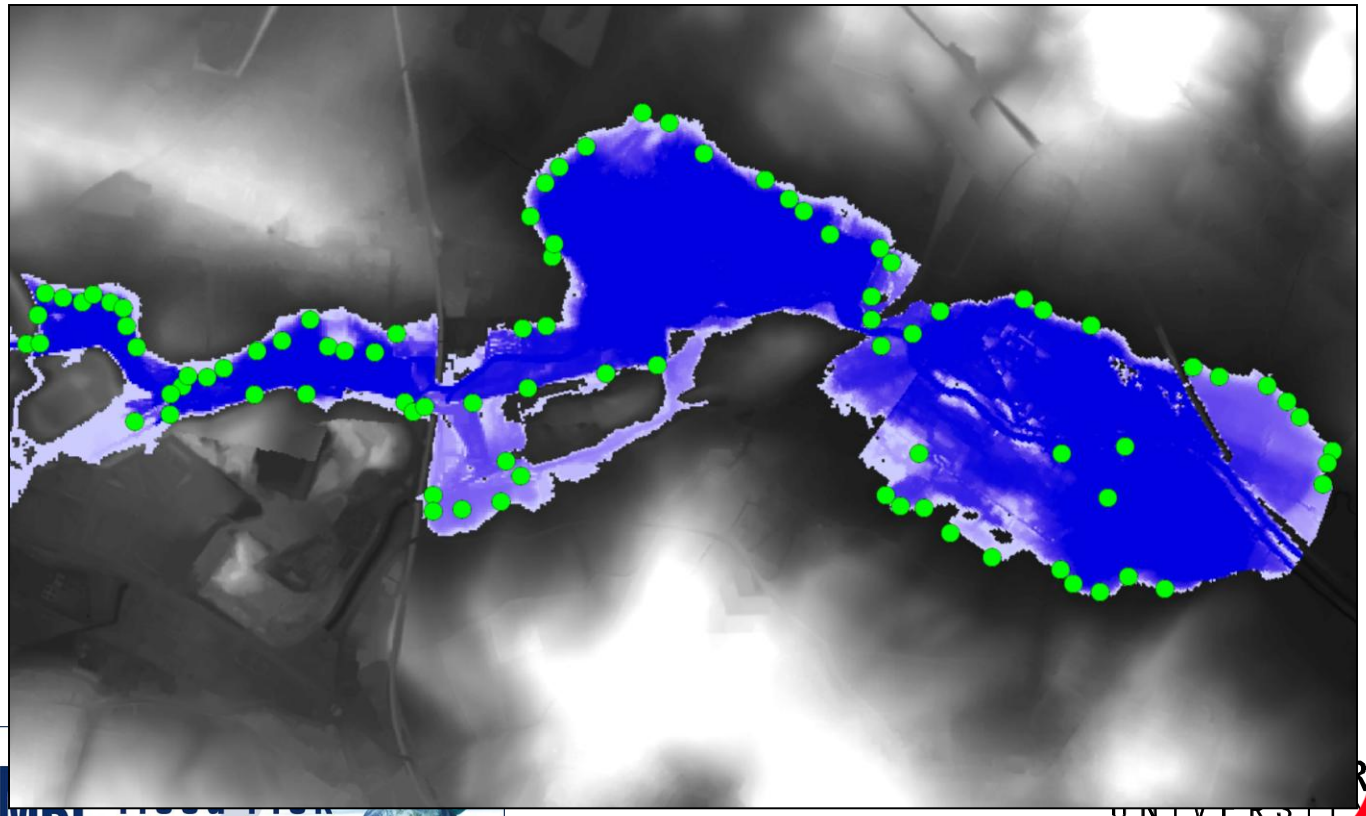
Mexborough: Summer 2007

Mapped maximum inundation and model predicted flow depths for Summer 2007 floods at Mexborough, Yorkshire using 2D JFLOW model



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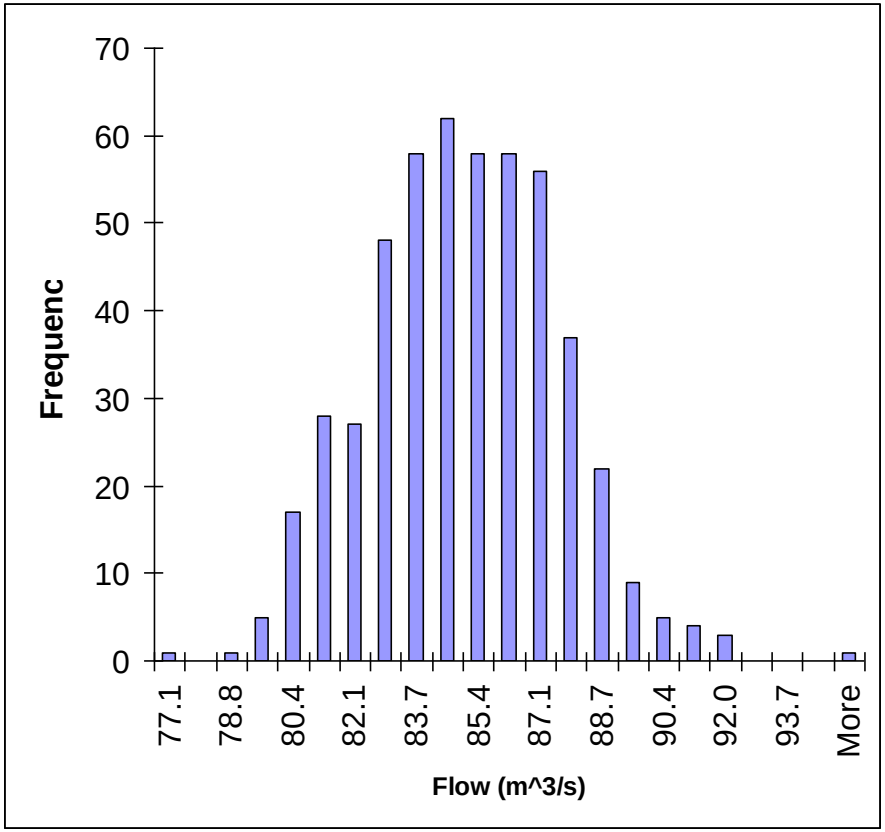
Mexborough Risk Mapping: Defining Input Uncertainties

WinFAP estimate of 0.01 AEP (T100) flood peak at Adwick



Mean: 86.6 (m^3s^{-1})

Var: 6.25 (m^3s^{-1})

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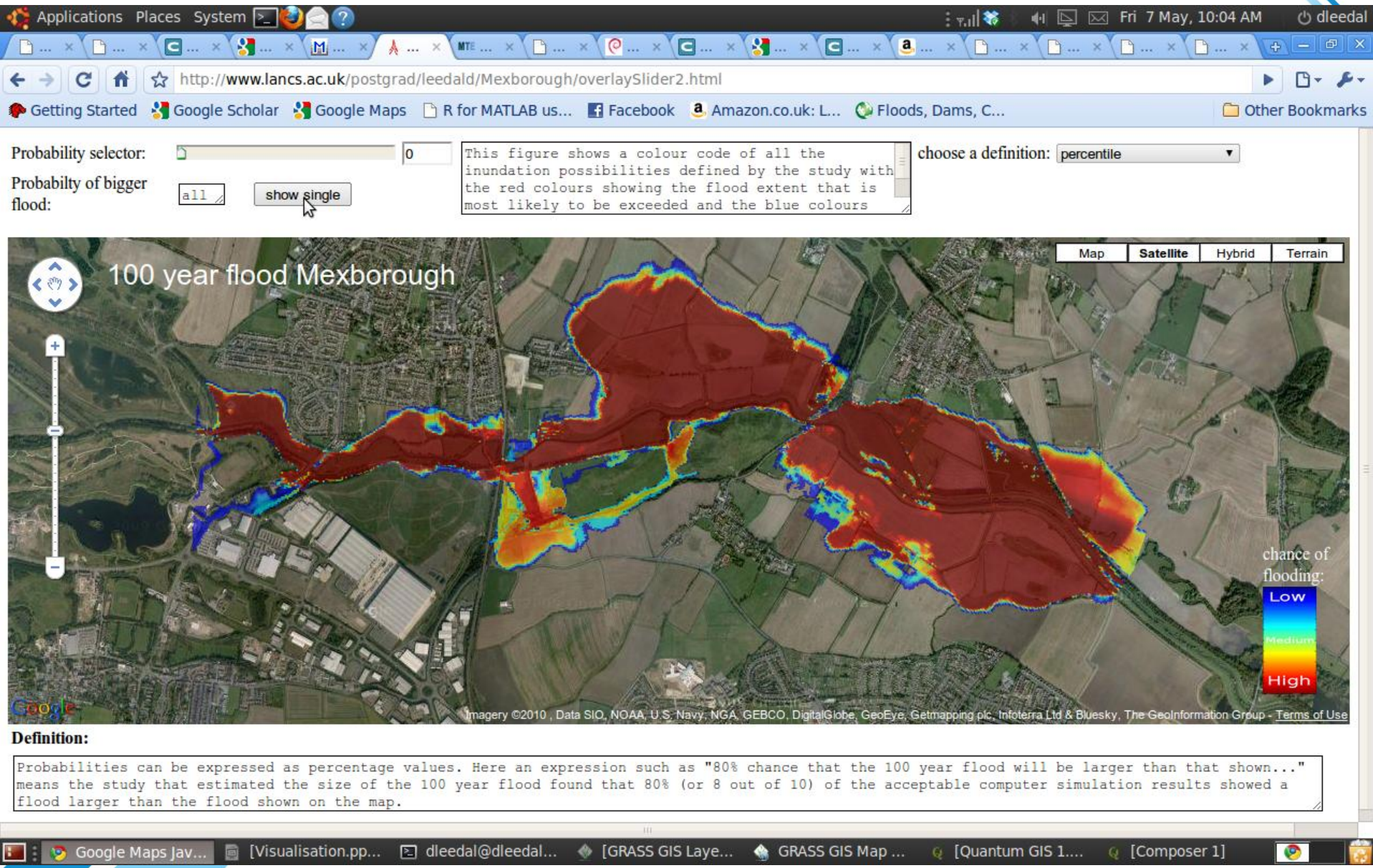
Google maps API



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Applications Places System Fri 7 May, 10:02 AM dleedal

http://www.lancs.ac.uk/postgrad/leedald/Mexborough/overlaySlider2.html

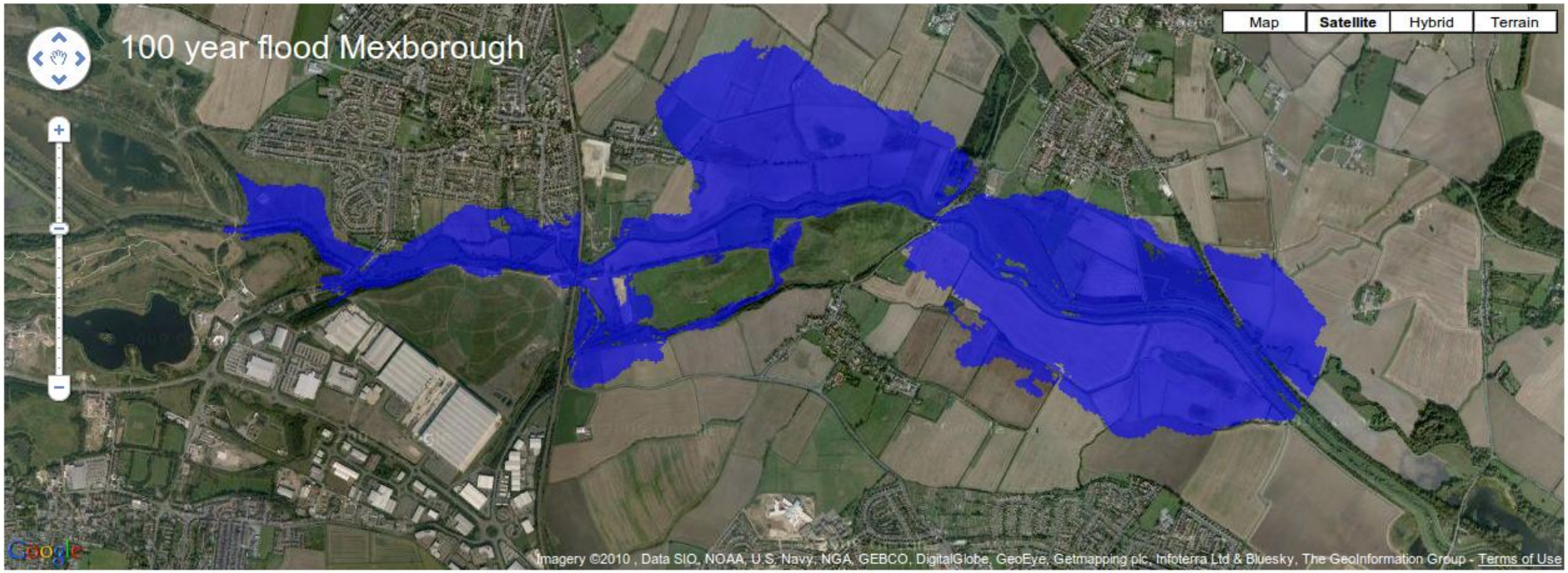
Getting Started | Google Scholar | Google Maps | R for MATLAB us... | Facebook | Amazon.co.uk: L... | Floods, Dams, C... | Other Bookmarks

Probability selector: 50

Probabilty of bigger flood: 50% show all

50% chance that the 100 year flood will be larger than the extent shown. Therefore there is an even chance for the 100 year flood to be smaller or larger than this size

choose a definition: return period



Definition:

The return period is the average amount of time in years that you would expect a flood of a particular size to occur once. For example a flood with a return period of 100 years would be expected to occur 10 times in a century. It is very important to realise that this does not mean that if a flood with a return period has just happened that there will definitely not be another one for 100 years. Also the accuracy with which the return period can

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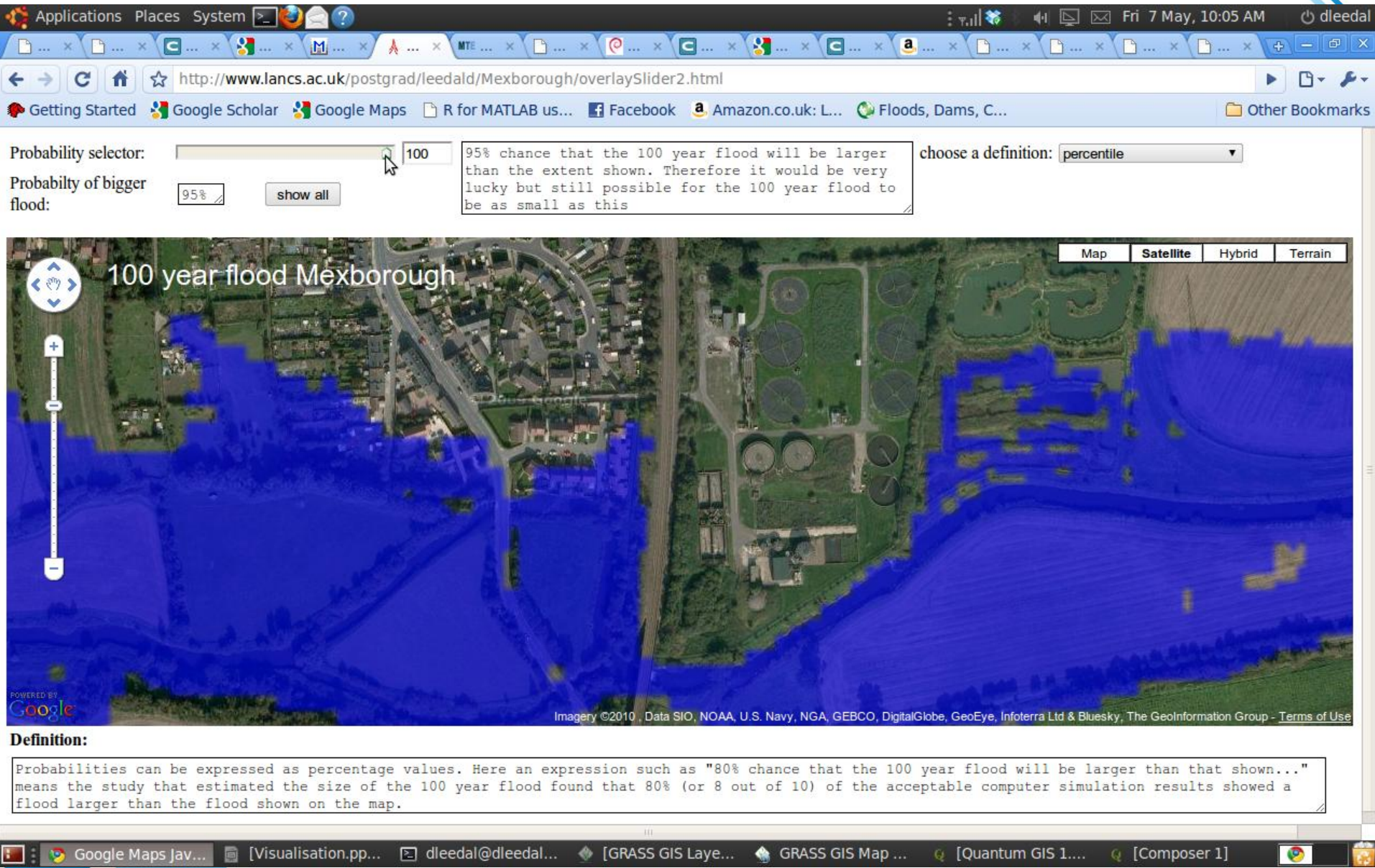

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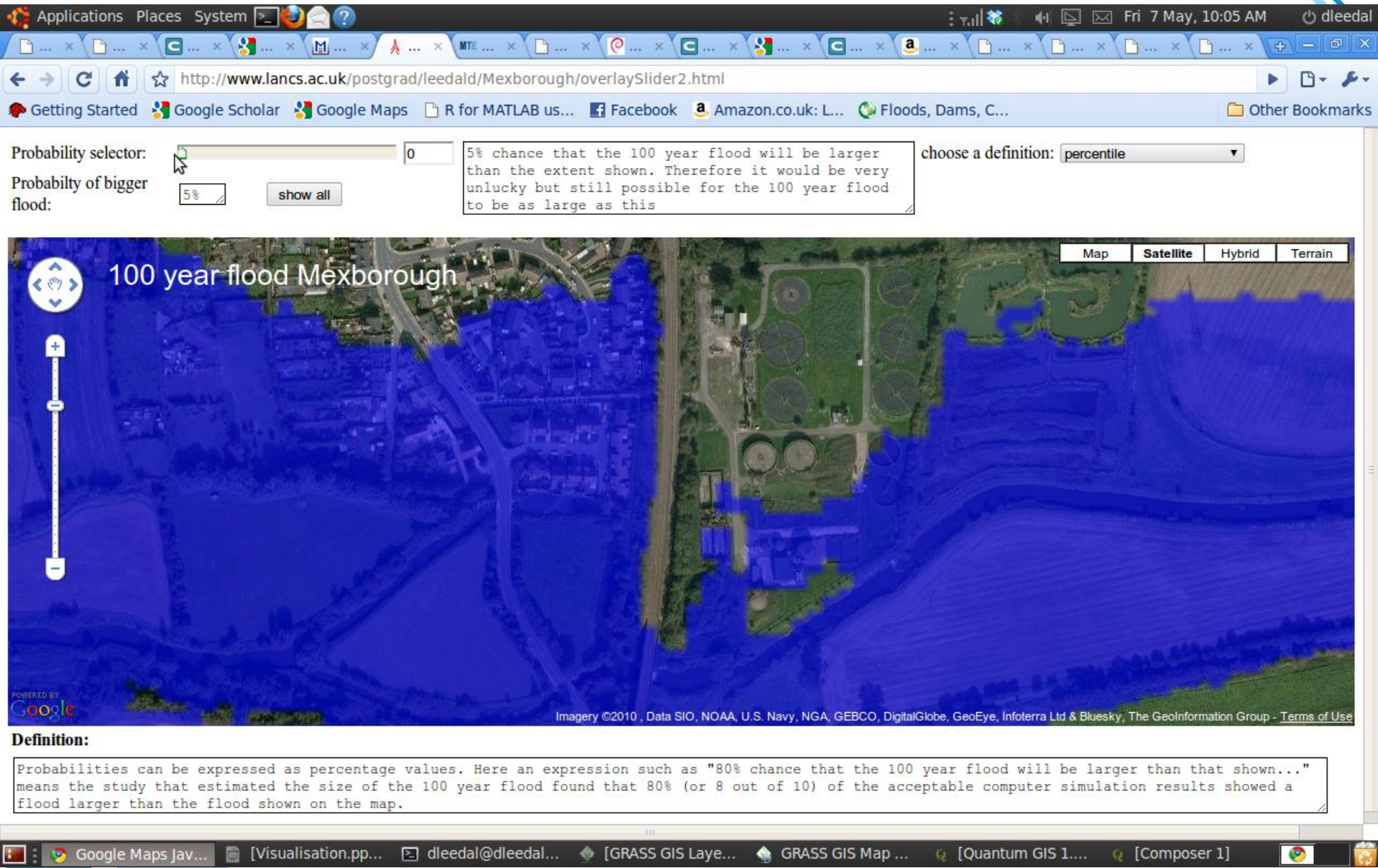

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Concluding Comments

- Taking account of uncertainty might make a difference to risk
- Uncertainty estimation as a means of maintaining integrity (and avoiding being wrong)
- But needs a translationary discourse between science and stakeholders
- One framework for doing so is to evolve Guidelines for Good Practice within which assumptions and means of communication/visualisation must be agreed (and recorded for later evaluation)
- Guidelines as a decision framework (perhaps with default options)

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