Local flood forecasting – From data collection to communicating forecasts

Paul Smith & Keith Beven
(p.j.smith@lancaster.ac.uk)

Local Flood Forecasting?

- Aim:
  - Provide forecasts at specific sites
- Why:
  - Complement existing systems
  - Provide forecasts in data poor areas
- Requirements:
  - Construct models from limited data
  - Quick, simple model construction
  - Present forecasts/warnings with minimal oversight

Local Forecasting on the River Caldew

- Stead McAlpin Factory – flooded in Jan 2005 (almost in 2009 & 2010)
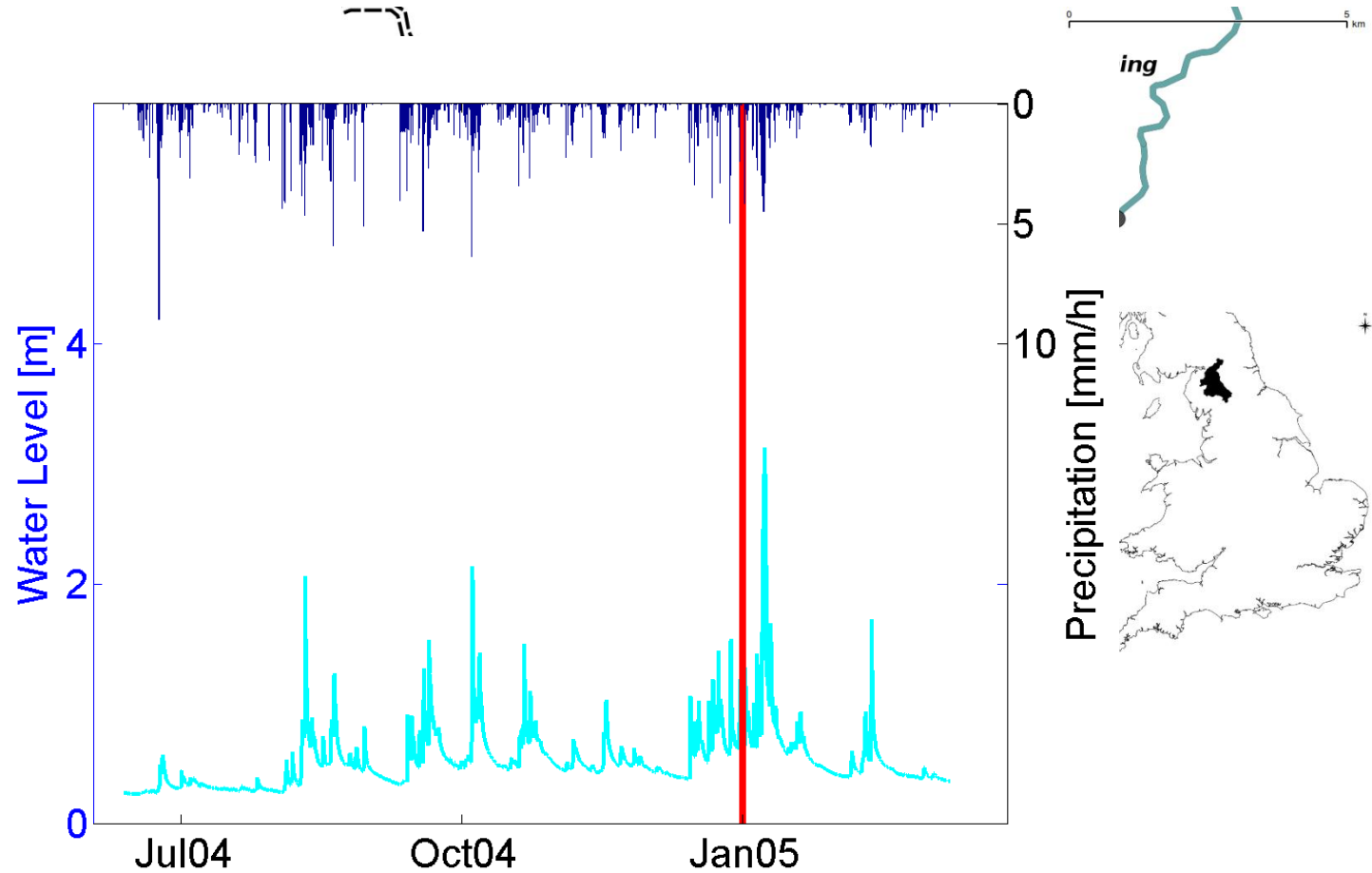

River Caldew and installed level sensor
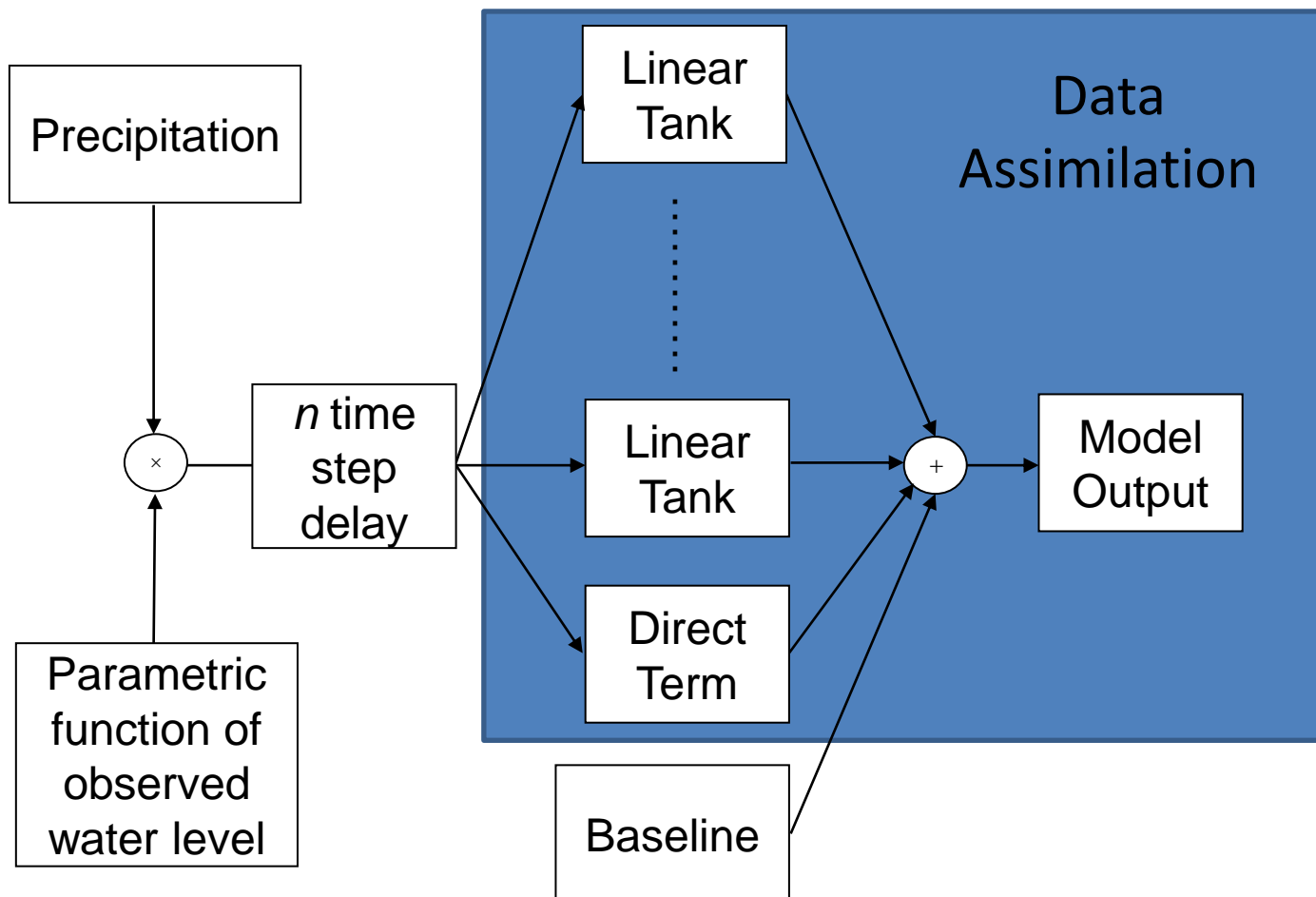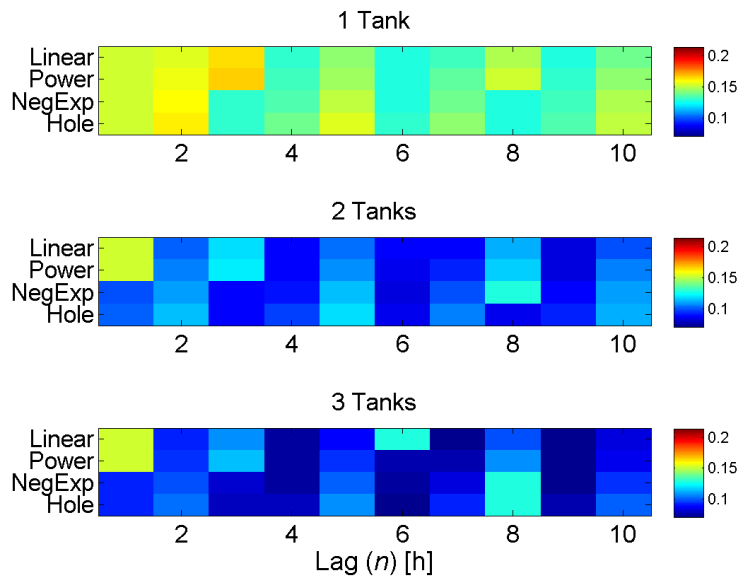
Case Study: River Caldew

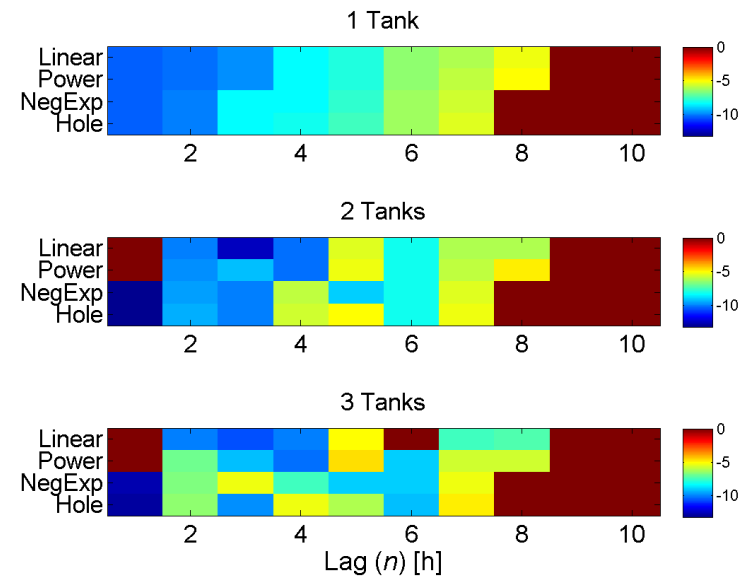# Producing Forecasts

Data Based Mechanistic (DBM) Modelling

Selecting a Model – Initial Screening
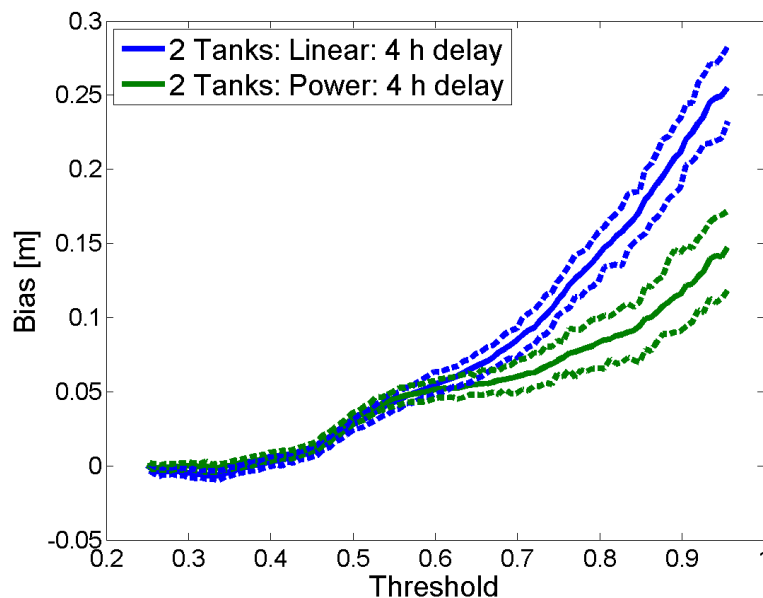
Global Error Characteristics

e.g. RMSE
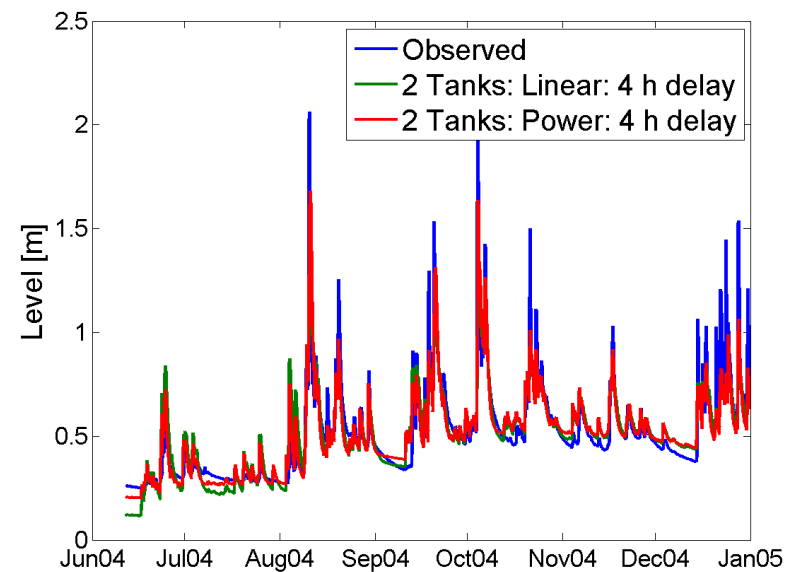
Information Criteria

e.g. YIC

Selecting a Model – Detailed Analysis

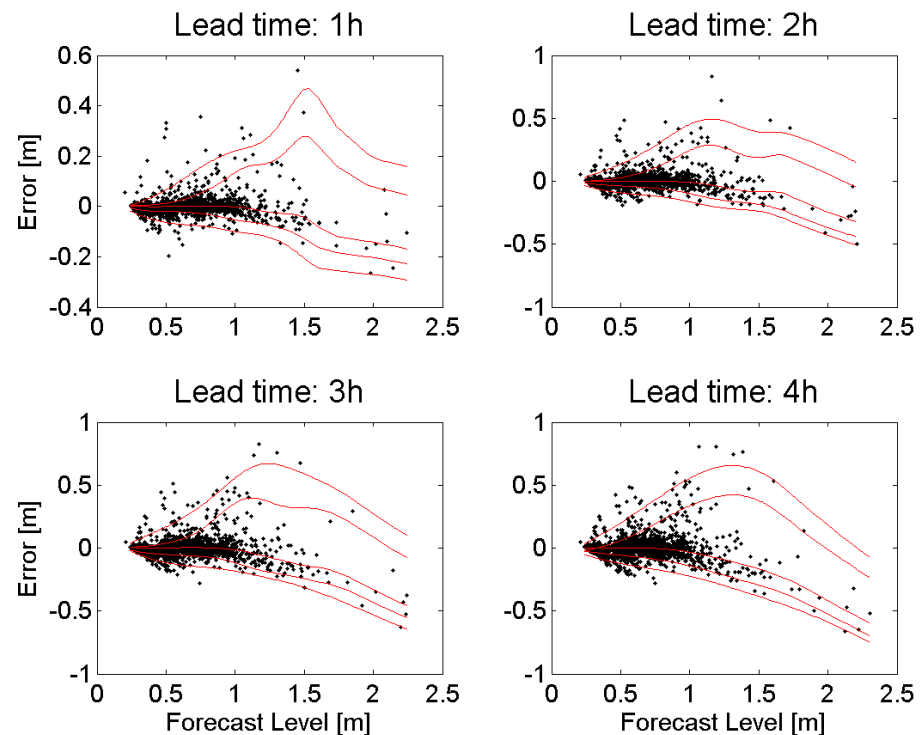*Character of conditional errors*   *Hydrographs*

Forecast Uncertainty & Confidence

- Uncertainty
  - Probability Statement about observed water level given forecast

- Confidence
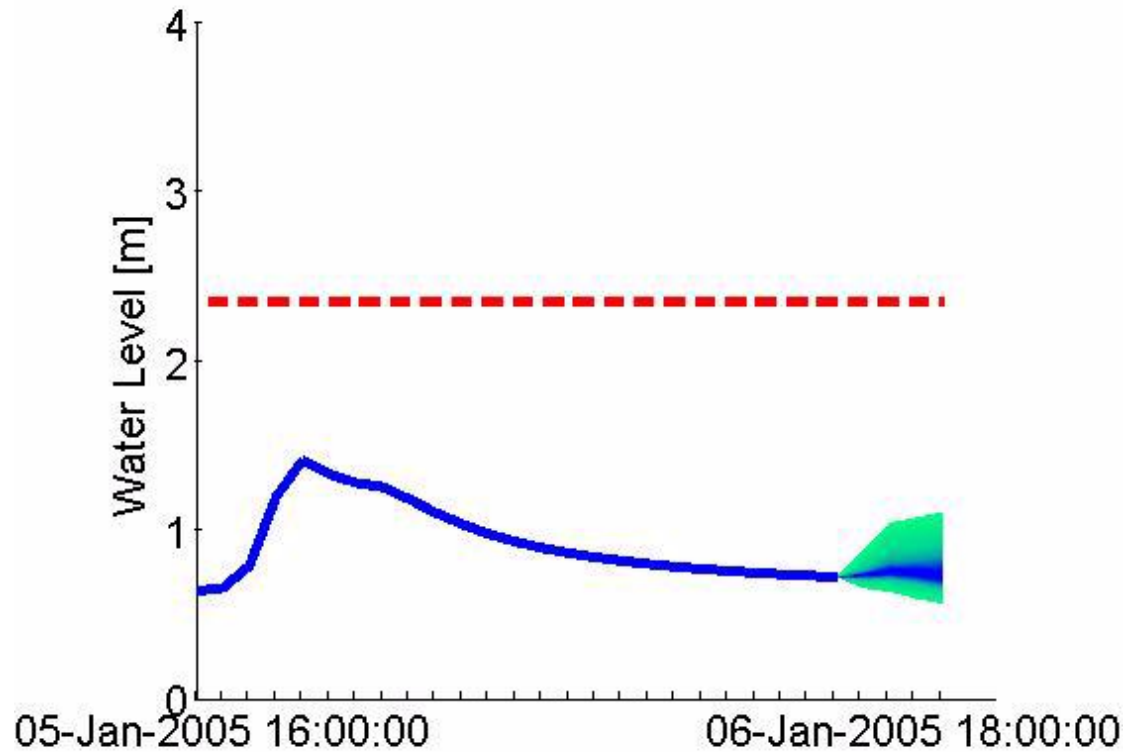 - Qualitative summary of faith in the Uncertainty assessment

Communicating Uncertainty & Confidence

Hydrograph

- Shading indicates probability

- Transparency indicates confidence

- User calibration
  - Show past events
  - Examples of what might be likely/unlikely

Summary

- Local forecasting introduces challenges
  - Data collection
  - Appropriate modelling
  - Data assimilation
  - Communicating forecasts
- Can address these
  - "Off the shelf" technology
  - DBM modelling
  - Careful visualisation
- Details, experience, tools
  - http://flood.lancs.ac.uk/