



User guide to the Flood Risk Management Research Consortium Risk and Uncertainty Wiki

Risk and Uncertainty analysis is a key theme in the Flood Risk Management Research Consortium (FRMRC).

The FRMRC has carried out a large amount of work to catalogue the range of available uncertainty methods, assess and test their applicability and demonstrate their use, with a view to promoting a more widespread and rigorous use of these methods by the practitioner community.

The research has been documented as an internet based Wiki site:

www.floodrisknet.org.uk/methods/Introduction

This booklet provides an introduction and user guide.



Introduction

A Wiki web site provides a data base of information for the user. Importantly however, a Wiki draws on the user's own knowledge and experience by providing a facility that allows the user to contribute to the content of the Wiki. This results in a more dynamic and expansive collection of knowledge driven by the community that the site is designed to serve.

Although the content of the Wiki is intended to be augmented by members of the flood management community, it has not simply been set up as an empty site awaiting content; on the contrary, a considerable amount of key information has been generated and posted by the site moderators (based at the universities of Newcastle and Lancaster) with new information added regularly as part of the remit of the FRMRC.

The Wiki provides the following components:

- background information on a variety of different risk and uncertainty assessment methods;
- a decision tree to help users choose appropriate uncertainty methods;
- a comprehensive glossary of terms;
- a collection of Case Studies that neatly illustrate the use of many of the available uncertainty methods.

Pages 3 and 4 of this booklet provide an overview of the structure and content of the Wiki in its present form; page 5 presents a guide to using the features of the Wiki and finally pages 6 and 7 show tips on how to add content to the Wiki.



The decision tree

The decision tree (based on Figure 1) is one of the most important resources in the Wiki. A practitioner can use the tree as a guide to selecting appropriate uncertainty methods. The elements of the tree are hyperlinked to descriptive pages so the user can quickly build up knowledge of the methods and view associated case studies.

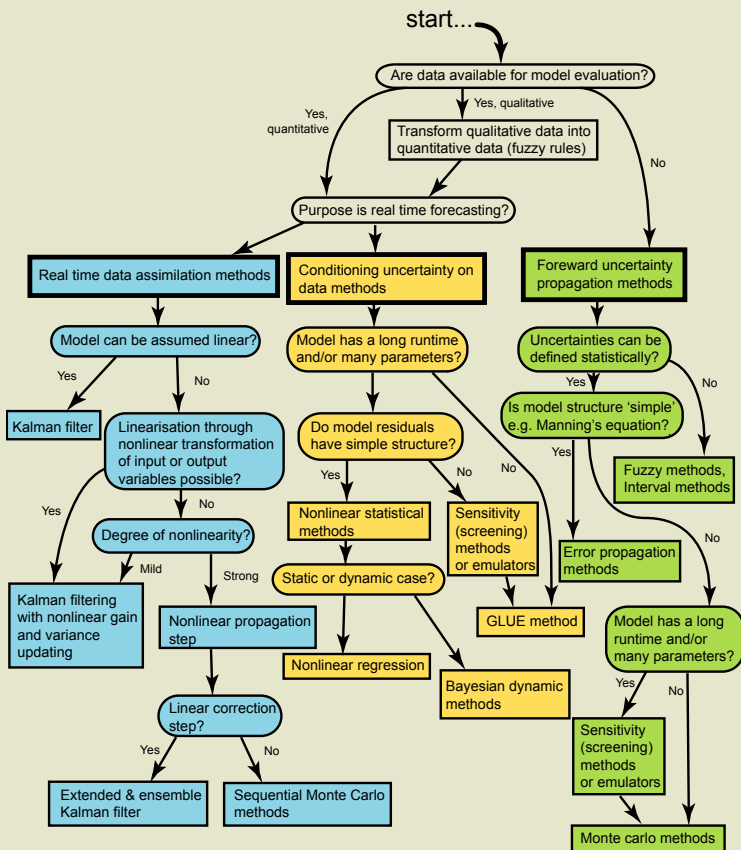


Figure 1. Decision tree for uncertainty analysis. Rounded boxes represent questions to derive a decision for an uncertainty method. Bold boxes show the major classifications of methods. Normal boxes represent small sub-groups of these or individual methods.



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Catalogue of methods and case studies for uncertainty analysis

Each of the methods or classes of method listed in the terminal nodes of the decision tree is described in its own page. These pages can be found by following the link “Methodologies for uncertainty analysis” from the front page of the Wiki. The methods are clustered into categories to match the decision tree.

Each method page contains an outline description, an indication of software available which implements the method, a list of notable advantages and disadvantages and references for further reading.

The following is a list of methods and case studies available at the time of writing:

Method	Case study
Error propagation equations	Sensitivity analysis of satellite rainfall estimation error
Monte Carlo methods	Risk assessment for strategic planning
Fuzzy and Interval methods	Uncertainty in rating curve estimation
Nonlinear regression	Fitting flood frequency distributions
Bayesian methods	Estimating design discharges
Generalise likelihood uncertainty estimation (GLUE)	Flood frequency estimation under climate change (+ other case studies)
Kalman filter and Extended Kalman filter	Data assimilation for real-time runoff forecasting
Sequential Monte Carlo methods including Ensemble Kalman filter and Particle Filter	Data assimilation for state updating within rainfall-runoff models
NUSAP	Analysis of energy sector integrated assessment model



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How to use a Wiki

Figure 2 shows the Wiki home page, with a number of features highlighted.

The screenshot shows the Wiki home page for 'Catalogue of methods ...'. The page includes a navigation menu on the left with 'related terms' (Sensitivity, Flood risk management, Sensitivity Analysis, Uncertainty, Risk, Risk management, Uncertainty Analysis) and 'navigation' (Home, News, Events, Opportunities, Catalogue of methods, Glossary). The main content area lists 'Site contents' with numbered items: 1. [Risk and Uncertainty](#) (Description and Definition), 2. [Methodologies for uncertainty analysis](#), 3. [Decision trees for choosing an uncertainty analysis method](#), 4. [Case Studies of the application of uncertainty analysis methods](#), 5. [Code of Practice for uncertainty analysis](#), and 7. [Software issues relating to uncertainty handling](#). A 'roll-over' glossary entry for 'uncertainty' is visible, defining it as a 'general concept that reflects the lack of assurance about something, ranging from just a sort of complete assurance to an almost complete lack of conviction about an outcome' (Bayar et al., 2002) and providing a link to a 'more in depth discussion of the term'. A 'navigation panels' label points to the left sidebar. An 'additional functions and navigation' label points to the top right area containing 'actions', 'add to folder', 'history', 'related pages', 'wiki contents', and 'wiki changes'. A 'roll-over glossary' label points to the 'uncertainty' entry in the main content.

Figure 2. Screenshot showing the standard format of a floodrisknet Wiki page. The usual features of standard web pages are present (menus, rollovers and hyperlinks). Additional features such as the **edit** tab are used when adding content to the site. The **history** function lists recent edits to the page, along with the person who made them if they were logged in at the time; **related pages** lists, among other things, backlinks to other pages in the Wiki which link to this one; **Wiki changes** provides a list of the latest changes across the whole Wiki. Freshly added pages are clearly marked "new".

The Wiki is easy to use; it does not require the user to register and log in. Much of the interaction with the site is the same as that found on a standard webpage. Many users may just want to use the Wiki as a useful source of information; however, for users who would like to contribute to the site content, the following section provides a guide.



Adding and modifying text

All Wiki content can be edited by anyone at any time. At the top of the main area of each page in the Wiki you will find a pair of tabs labelled “view” and “edit” (1 & 2 in Figure 3). The solid green tab indicates the current “mode” (view by default). A click on the “edit” tab will enable you to modify the content of the page. A complete history of page edits is recorded, to keep the site safe (3 in Figure 3).

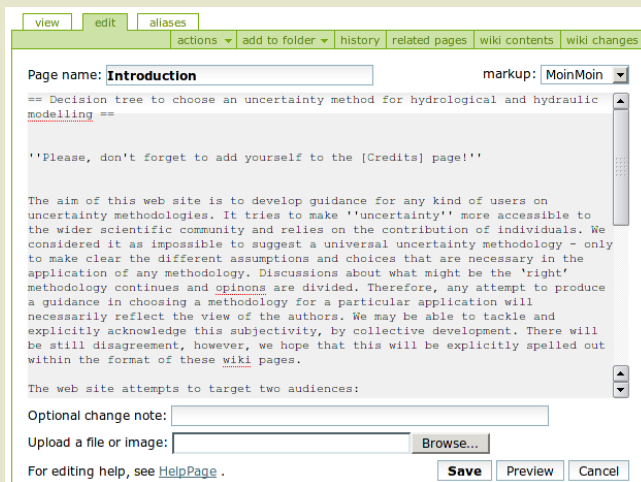
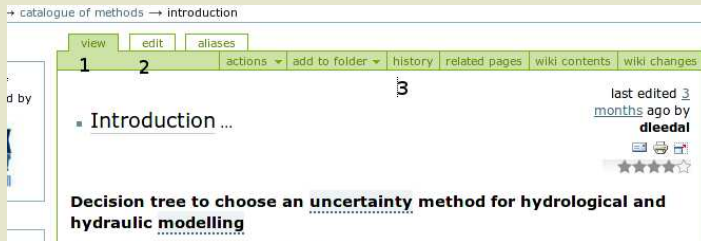


Figure 3. Screenshot showing the view and edit versions of the same page. Note: for users who are logged in, files and images can be uploaded for inclusion in the page.



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Adding and modifying text cont...

Pages are written in plain text supplemented with simple mark-up conventions (for example: "italic" produces *italic*, H,,2,,O produces H₂O, and [a page title] generates a hyperlink to a page with that title). Help on these conventions can be reached by following the link at the bottom of the edit view.

Users registered with floodrisknet.org.uk and logged in will also be able to upload supporting files and images. When a file or image is uploaded, a link is automatically added to the bottom of the page. Return to the edit view to move this link to the appropriate place in the page.

New pages can be added to the Wiki very easily. Any links included in existing pages, to pages which do not exist, are displayed followed by a question mark link. Clicking this will create a page with that title and take you directly to its edit view.

The **methods** and **case study** pages follow a format that the site moderators believe is most useful for the flood management community. It is suggested that user-added content in these categories should follow a similar structure. It is particularly useful if pages provide references and web links wherever possible.

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Thanks and credits

Thank you for taking the time to look at this guide, it was prepared by David Leedal from material originally submitted as UFMO2 for research priority area 9 (risk and uncertainty) of the FRMRC. The UFMO2 was written by Keith Beven¹, Hamish Harvey², Florian Pappenberger^{1,3}, David Leedal¹ and Jim Hall²

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