

26-27 FEBRUARY 2020

**QW
MN**
FORUM 2020

WATER MODELLING FOR THE FUTURE
science | data | tools | decisions

Data Wrangling to enable water models

HydroNumerics

Introduction

What are the elements of the “Pipeline”

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graph LR; A[Scientific understanding] --> B[Monitoring of and data on issues and problems]; B --> C[Water modelling and information support tools]; C --> D[Decision Making];
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Scientific understanding Monitoring of and data on issues and problems Water modelling and information support tools Decision Making

Communication and consultation

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Data Wrangling?

Obtaining, processing and manipulating heterogeneous data streams into formats suitable for model simulations.

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A Word of Warning

- A model is only a representation of reality
- A model will only ever be as good as the forcing data
- Validation of a model for a particular site or period requires good validation data

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Data Sources

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Routine Monitoring Samples



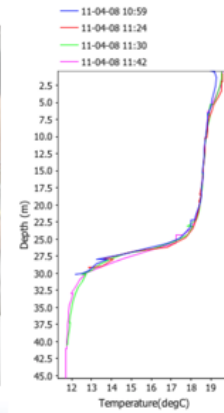
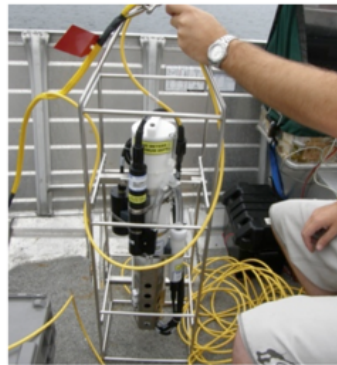
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Routine Monitoring Samples



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Field Measurements



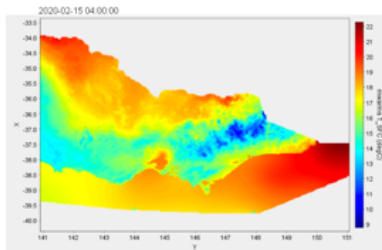
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SCADA Networks



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External Model Forecast



- Weather models
- Catchment models
- River models
- Operational models

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Data Transfer

More heterogeneity...

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Data Transfer

More heterogeneity...

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Data Storage

More heterogeneity...

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The collage features the following logos: OSIsoft, Aquatic Informatics, Oracle, MySQL, EnviroSys, PostgreSQL, Microsoft SQL Server, Microsoft Access 2016, and Excel. The text "Data Storage" is prominently displayed in the center.

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Data Processing

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Data Processing Pipeline

A typical data processing task list:

- Obtain data files
- Import raw data to database
- Quality check data using 1 or more algorithms
- Down-sample data to interval suitable for models
- Fill missing data using a list of filling algorithms
- Average data
- Create model input files

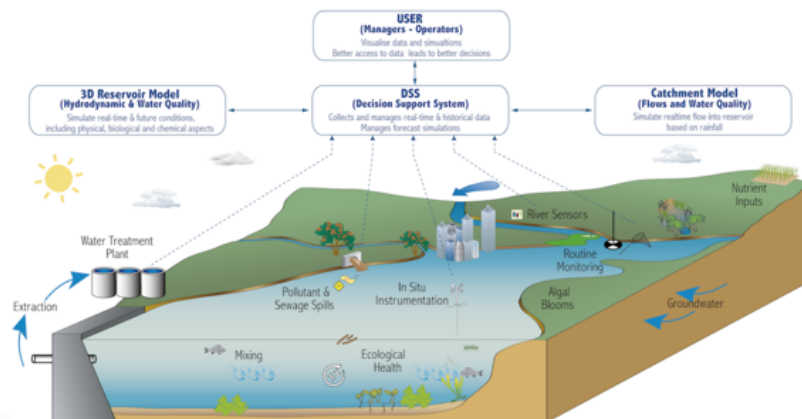
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Decision Support Systems

- Information systems that support decision making activities.
- Provide a tool to optimise water resource management.
- Allow forecasting of environmental and operational change impacts

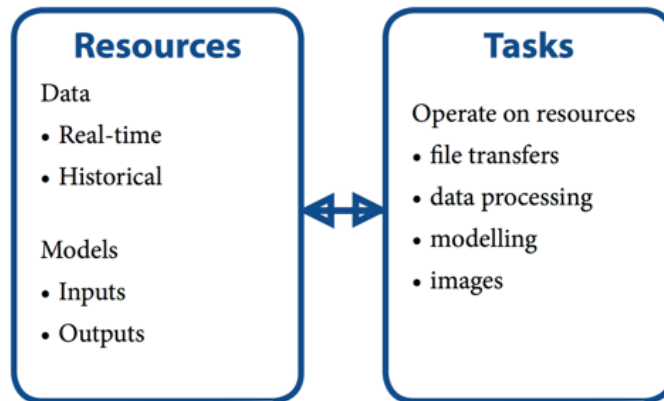
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Decision Support Systems



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Resource Task Framework



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Example

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Upper Yarra Bushfire Scenario Modelling

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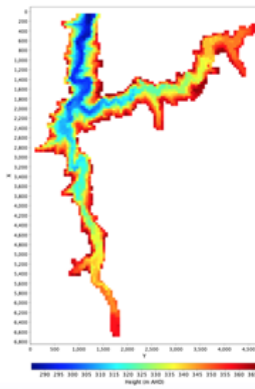
Upper Yarra Reservoir



- Crucial link in Melbourne Supply Network
- 200GL capacity
- Yarra river inflow
- Piped inflow opened from Thomson reservoir
- Forested catchment

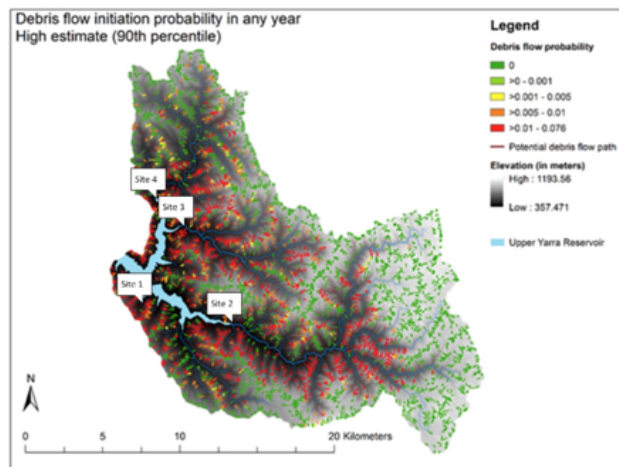
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Upper Yarra Reservoir



- AEM3D (Aquatic Ecosystem Model)
- 50m x 50m x 0.5m
- Fine vertical resolution needed for simulation of intrusion
- Uni. of Melbourne provided post bushfire rainfall event scenario inflows

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Datasources

- XYLEM VPS - Seabird Profiler + Met Station
- SCADA Inflow and Outflow data
- BoM ACCESS + ADFD Forecast models
- Catchment bushfire scenarios

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<http://upperyarra.hydronumerics.com.au>

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