



Book V Chapter 1 Catchment Modelling Concepts

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Introduction

- Focus of Chapter
- Modelling Concepts



Focus of Chapter

Provide an introduction to the estimation of hydrographs at a point or in a system using catchment modelling systems.

Introduce the systems approach.

Indicate a linkage between the rainfall analysis and the hydrologic analysis and the hydraulic analysis.



Focus of Chapter

While concerned with numerical models, the distinction between the process model and the software is fundamental.

An important aspect of this Chapter and Book V is

- Process models are recommended
- No software is recommended



Introduction

- What is a catchment modelling system ?
- Conceptual components of catchment modelling systems
- Impacts of individual models within a single conceptual component
- Information flow in the system



Catchment Modelling Systems

Catchment modelling systems are not replications of the real catchments but rather are a simplification of the real system.

In general, the simplification takes the form of a mathematical representation of the process.



Catchment Modelling System

Different problems will require different simplifications – same complexity is not required for all problems.

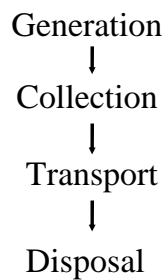
A catchment modelling system implemented for one problem may not be suitable for a different problem.



Conceptual Components

One conceptualisation is

- Generation
- Collection
- Transport
- Disposal





Generation Component

Concerned with the many models required to develop appropriate input data to the collection component of the system inclusive of

- Rainfall distribution in space and time.
- Loss model parameters.
- Constituent mass availability.



Collection Component

Concerned with the process models necessary for the estimation of the hydrographs (and pollutographs / loadographs) entering the channel network.

Usually referred to as the hydrologic component of the system.



Hydrologic Models

Process Model	Type	Complexity	Software Example
Rational	Peak Q	Simple	
Time-Area	Hydrograph	Medium	Drains
Non-linear Reservoir	Hydrograph	Medium	RORB, RAFTS, WBNM, SWMM
Kinematic	Hydrograph	Medium	SWMM, MIDUSS, KWIRM, KINEROS



Transport Component

Concern is the models necessary for the movement of the water and constituents within the channel network.

Usually referred to as the hydraulic component of the system.



Hydraulic Models

Process Model	Complexity	Software Examples
Individual link, steady flow	Simple	
Connected link, steady flow (peaks occur simultaneously)	Simple – Medium	RatHGL
Individual link, unsteady flow	Medium – Complex	Kineros, SWMM
Connected link, unsteady flow	Complex	MIKE-11, SWMM, Sobek
2-dimensional	Complex	MIKE-21, Tuflow, Sobek
