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PERSPECTIVES FOR THE APPLICATION OF WATER PLANNING TOOLS IN RIVER BASIN ORGANISATIONS

Rui Rodrigues
Portuguese Environment Agency

Tools to support and improve Integrated Water Resources Management
Technical University of Valencia: 20th of September 2012

MINISTÉRIO DA AGRICULTURA, DO MAR, DO AMBIENTE E DO ORDENAMENTO DO TERRITÓRIO

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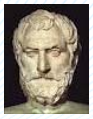
Observation is the beginning of Understanding

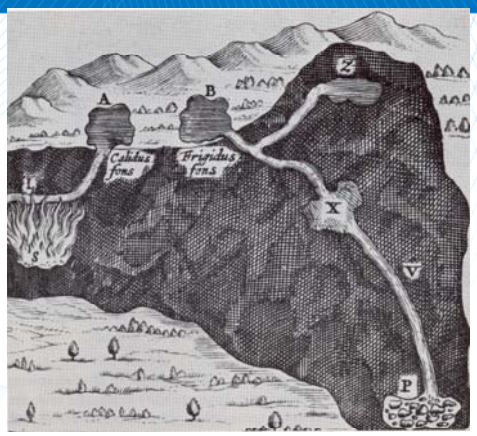
1 kg data »» 1 g information
1 kg information »» 1 g knowledge
1 kg knowledge »» 1 g understanding

Russel Ackoff

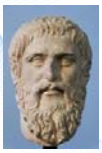
Back to Basics

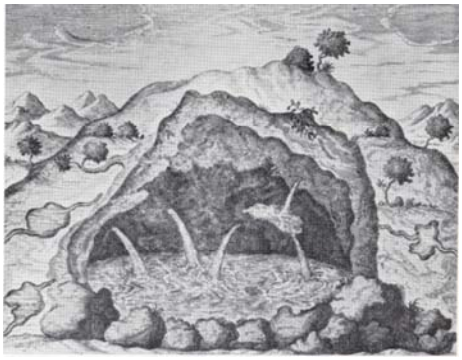
Thales





Plato





Aristotle

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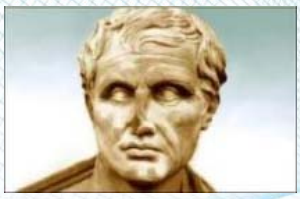
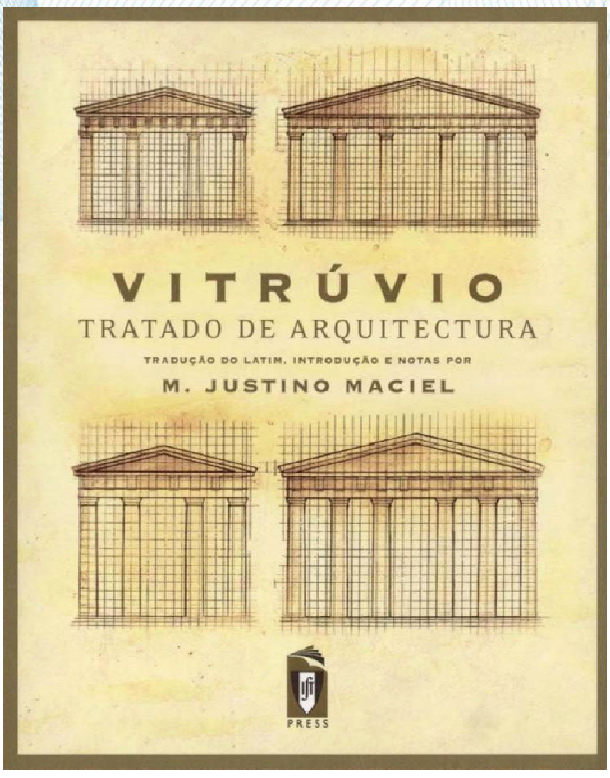
Vitruvius' *De Architectura libri decem (century I, BC)*





LIVRO VIII

Plato/Aristotle theory alive through most of 17th c.

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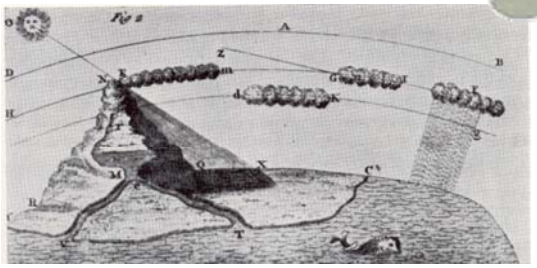
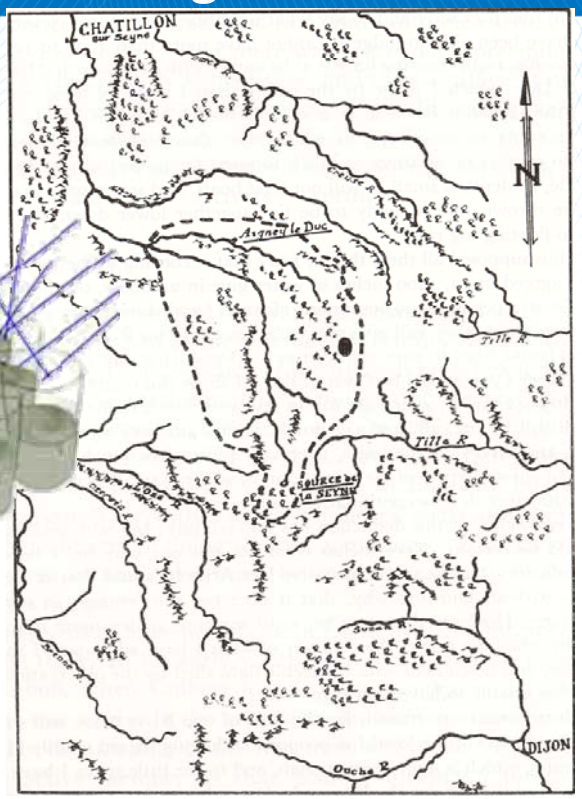
l'Origine des fontaines (On the Origin of Fountains)

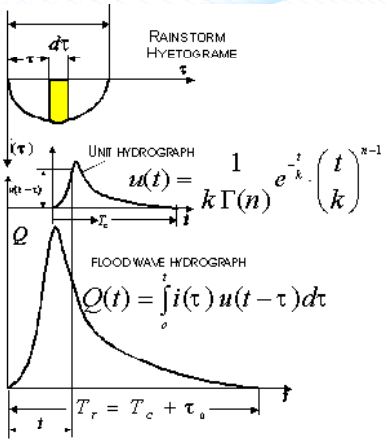
$$Q = \frac{P}{6}$$

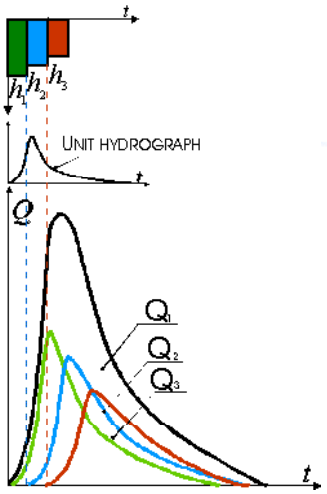




Make way to Simulation

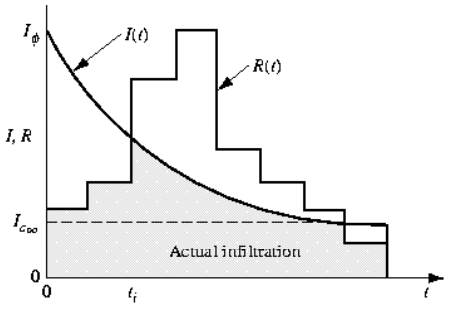
1932 - Sherman





1933 - Horton

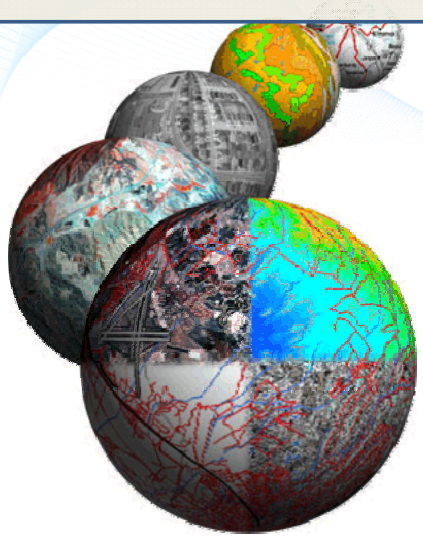
$$I_c = I_{c\infty} + (I_0 - I_{c\infty})e^{-\alpha t}$$

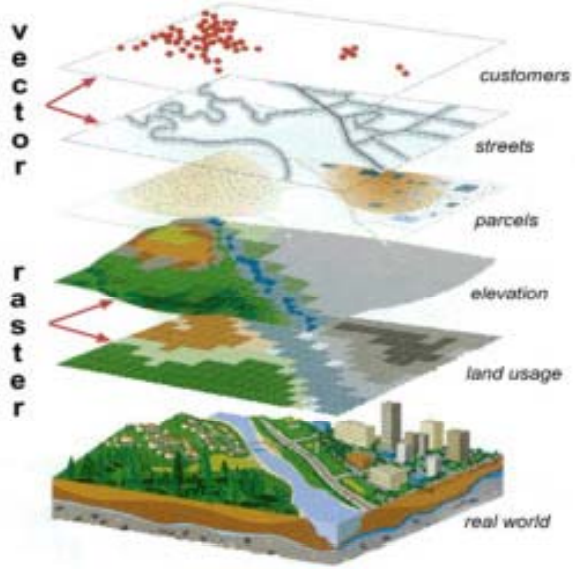


21st century

INFORMATION SYSTEMS

- Data Bases
- Geographic Information
- Expert Systems





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Data Driven Science

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Rough Calibration/Validation Targets

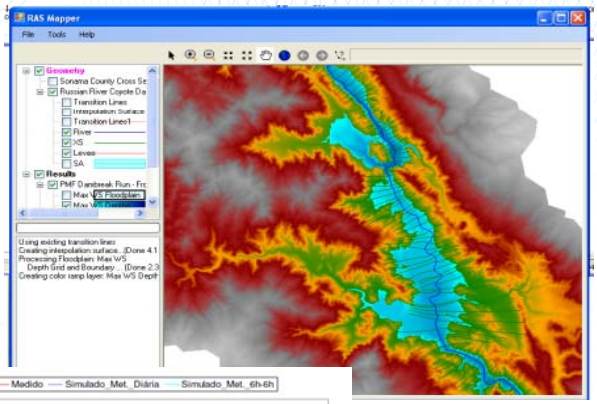
	% of difference between simulated & recorded values		
	VERY GOOD	GOOD	FAIR
Hydrology/Flow	<10	10-15	15-25
Sediment	<20	20-30	30-45
Water Temperature	<7	8-12	13-18
Water Quality/Nutrients	<15	15-25	25-35
Pesticides/Toxics	<20	20-30	30-40

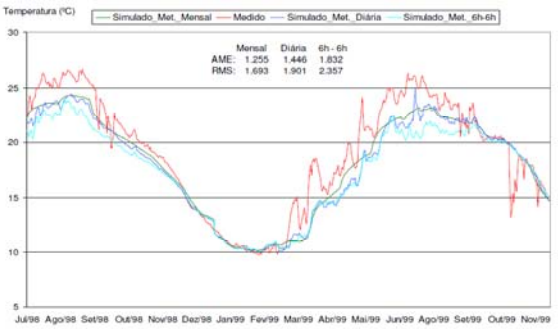
CAVEATS: 1) Relevant to monthly and annual values; storm peaks may differ more;
2) Quality and detail of input and calibration data;
3) Purpose of model application;
4) Availability of alternative assessment procedures;
5) Resource availability (i.e. time, money, personnel).

Source: Donigian, 2000 – HSPF experience

"....the best water quality simulation model is the simplest one that will adequately predict the water quality impacts within a particular water body associated with a particular water quality management policy."

Daniel P. Loucks, Cornell University





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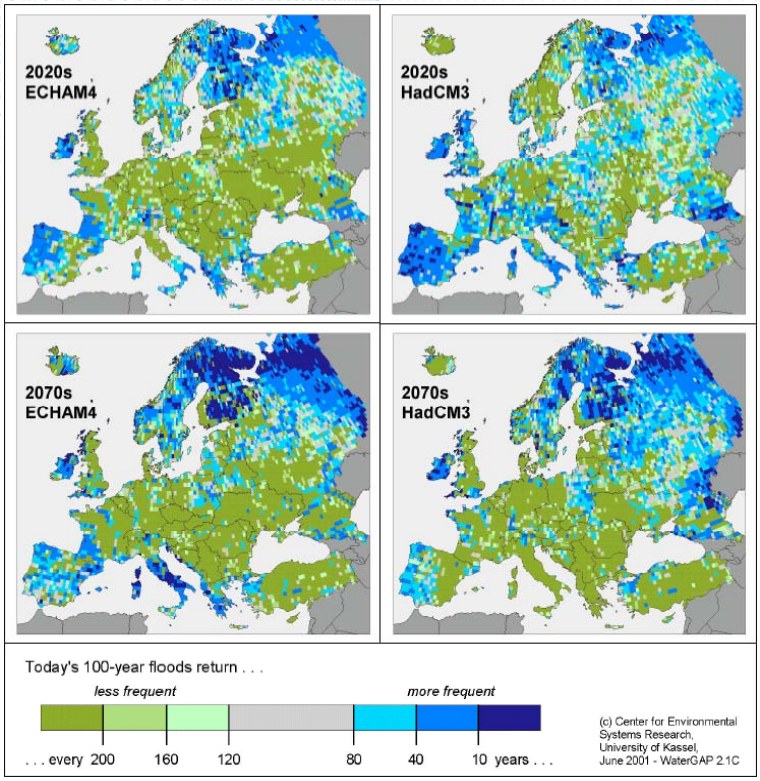
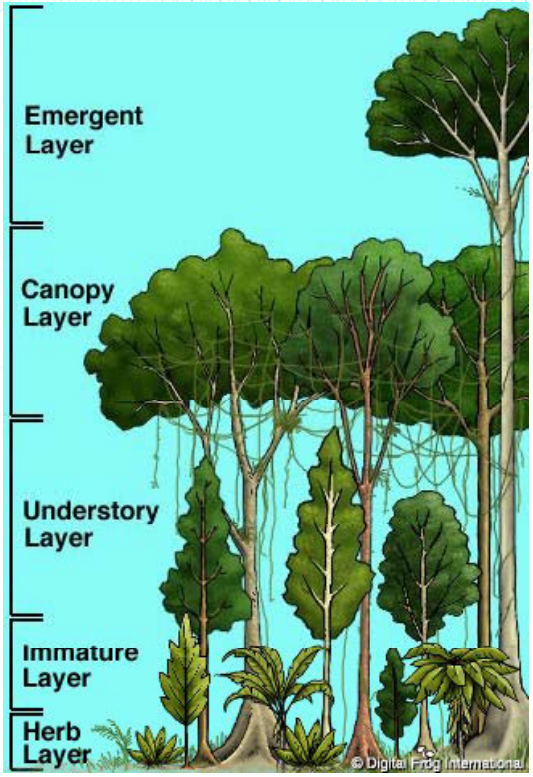
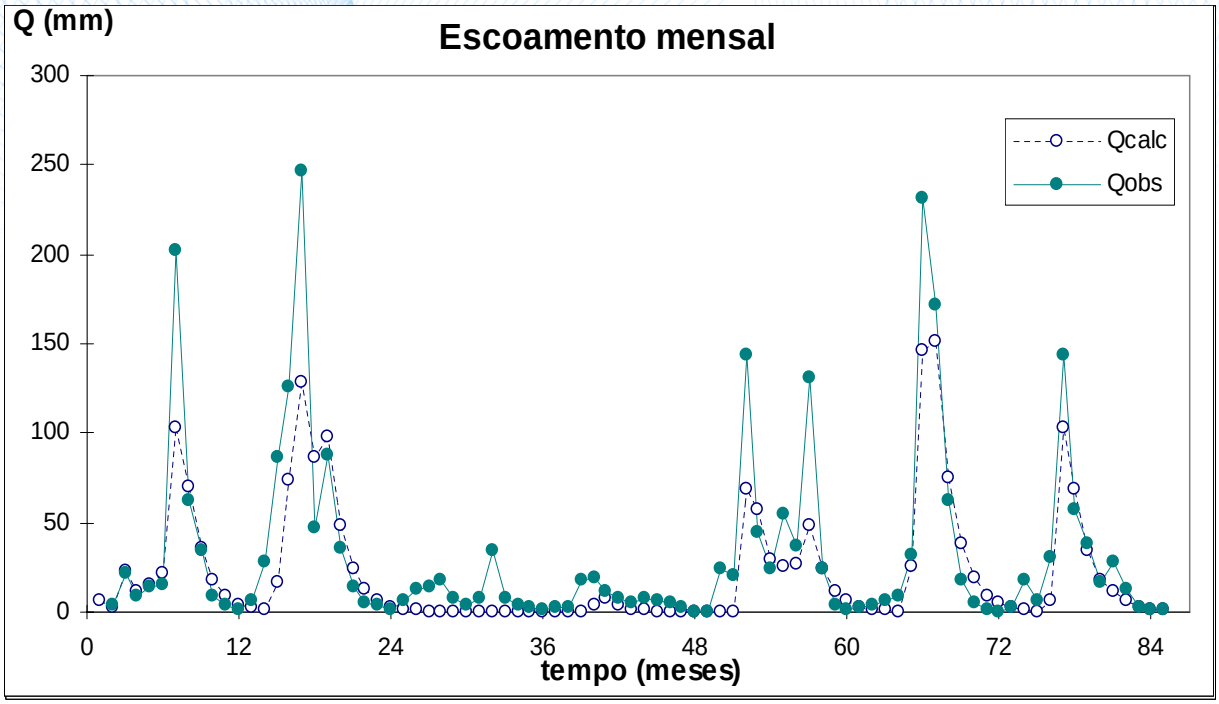
Importance of SVAT schemes fully representative of adaptation







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- **With poor assumptions, a man can make more mistakes with a computer in a milli-second, than he could in a lifetime of common sense.**

Crucial role of Monitoring