

Regional Hydrological Modelling

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Aim: keep it simple





Contents

- Aim of modelling and project goal
- Hydrological processes
- Model applications





- Physically based (white box)
 sub-processes conceptual ('grey box')
- Simulate processes as accurately as possible
- Not too much input data
- Modular set-up

sub-modules standalone

select sub-modules best suited for project goal

• For practical problems and hydrological research



Project goal

Ideal schematisation (hydrological processes)

- Study area
- Available data
- Time and money

Acceptable schematisation

Select type of model (check calculation time not too much)



Groundwater and surface water flow





Overview of hydrological processes considered in the regional models (marked with x)

Model	Saturated zone			Unsat. zone	Surface water		
	regional (multi-layer)		phreatic	pseudo steady	constant	unsteady state	
	steady	unsteady	level	State	level	reservoir	network
FEMSATS	X				X		
FEMSAT		X			X		
SIMGRO		X		X		Х	
SIMFLOW			Х	X	X		
SIMWAT							Х
SIMPRO*			Х	X			Х
MOGROW**		Х		Х			x

- * SIMPRO = SIMWAT + SIMFLOW
- ** MOGROW = SIMWAT + SIMGRO



Schematisation in SIMGRO





Finite element network





Unsaturated zone









Storage coefficient





Processes unsaturated zone

- Perched water tables
- Hysteresis
- Preferential flow
- Surface runoff





Urban areas





Modelling instruments

- SimGro Model
- AlterrAqua (GIS interface)
 Building the model application

Presentation of input data and results



Example input data





Model applications





Pantanal, Taquari













Regions nearly permanent flooded





Watercourses and subcatchments (from DTM)



Nodal network



Is this the challenge ?



