

Modelling of Sub-Grid Processes in a meso-scale hydrological model

by

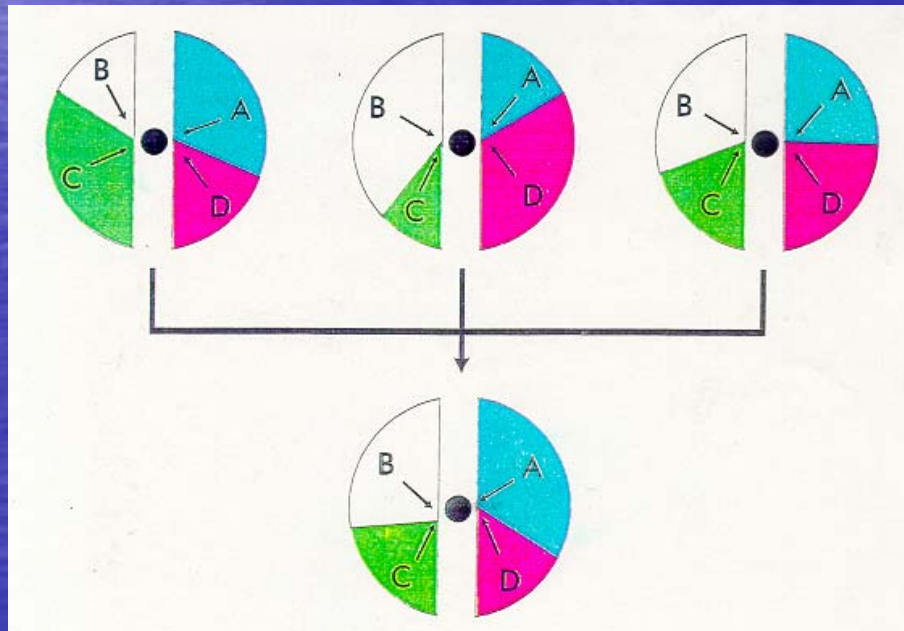
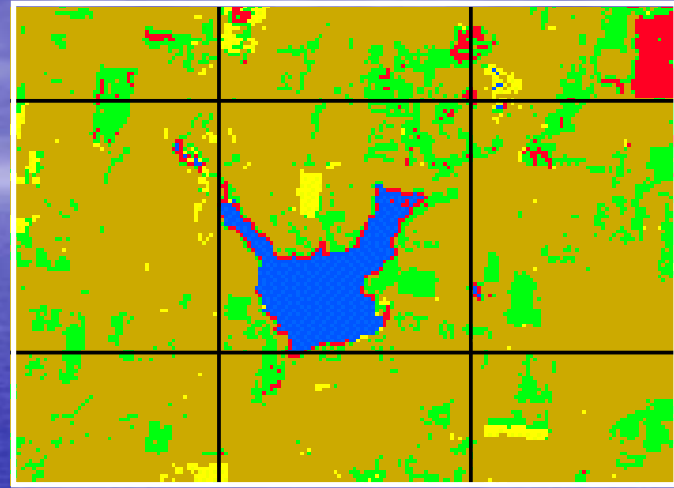
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Objectives for IP3

- Integrate process studies
- Parameterize sub-grid processes for MESH
- Establish a common framework for the microscale hydrology
- Develop physically based parameters that are transferable to ungauged basins

Modelling Strategy



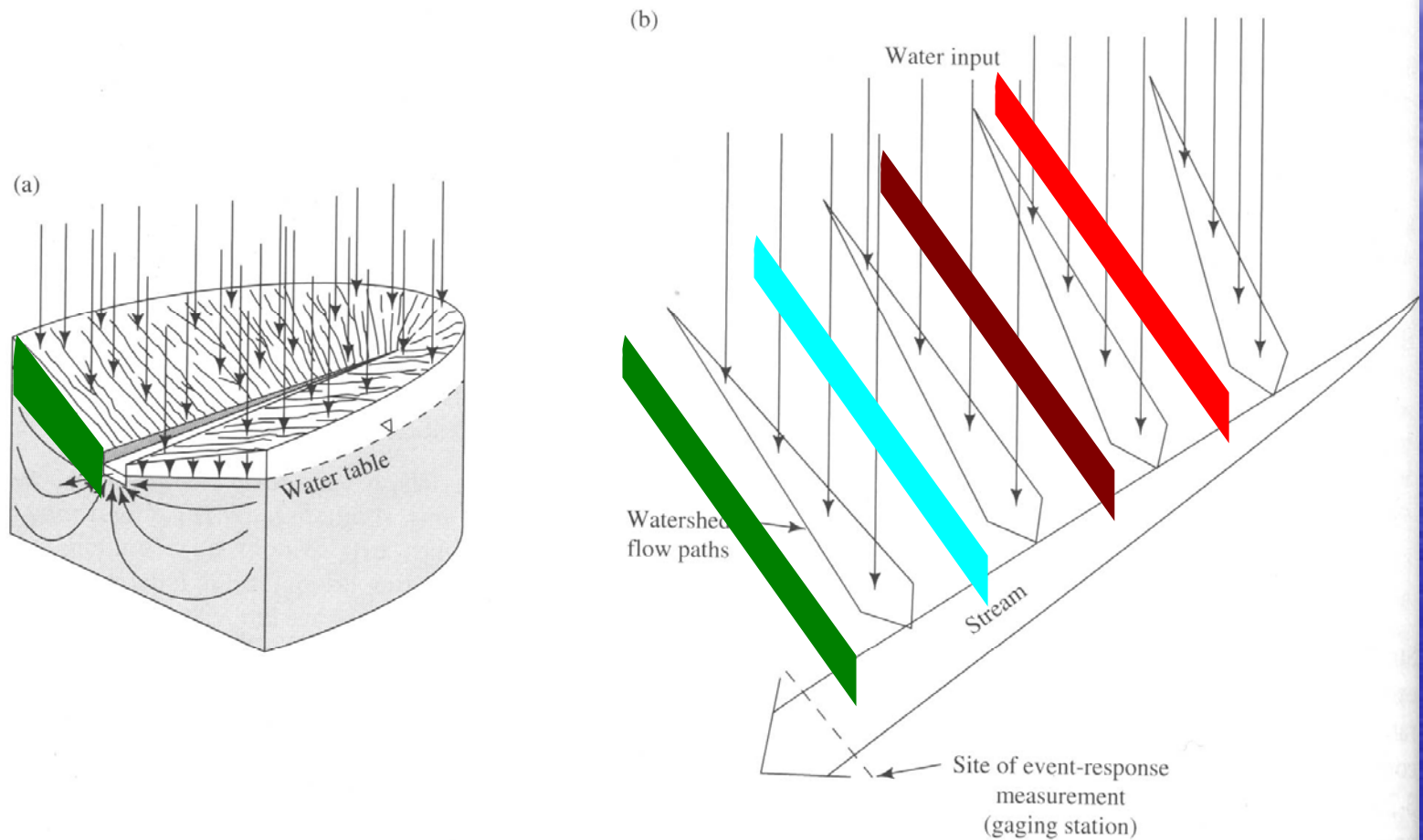
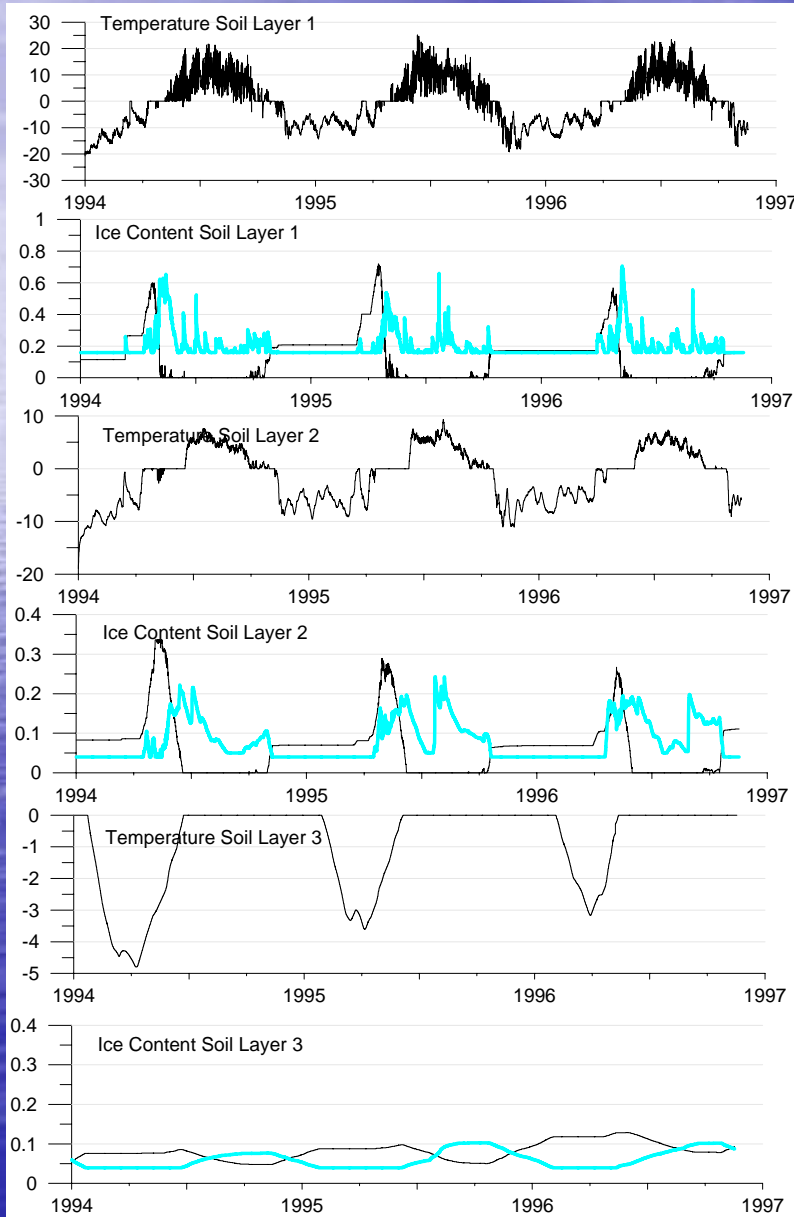


FIGURE 9-1

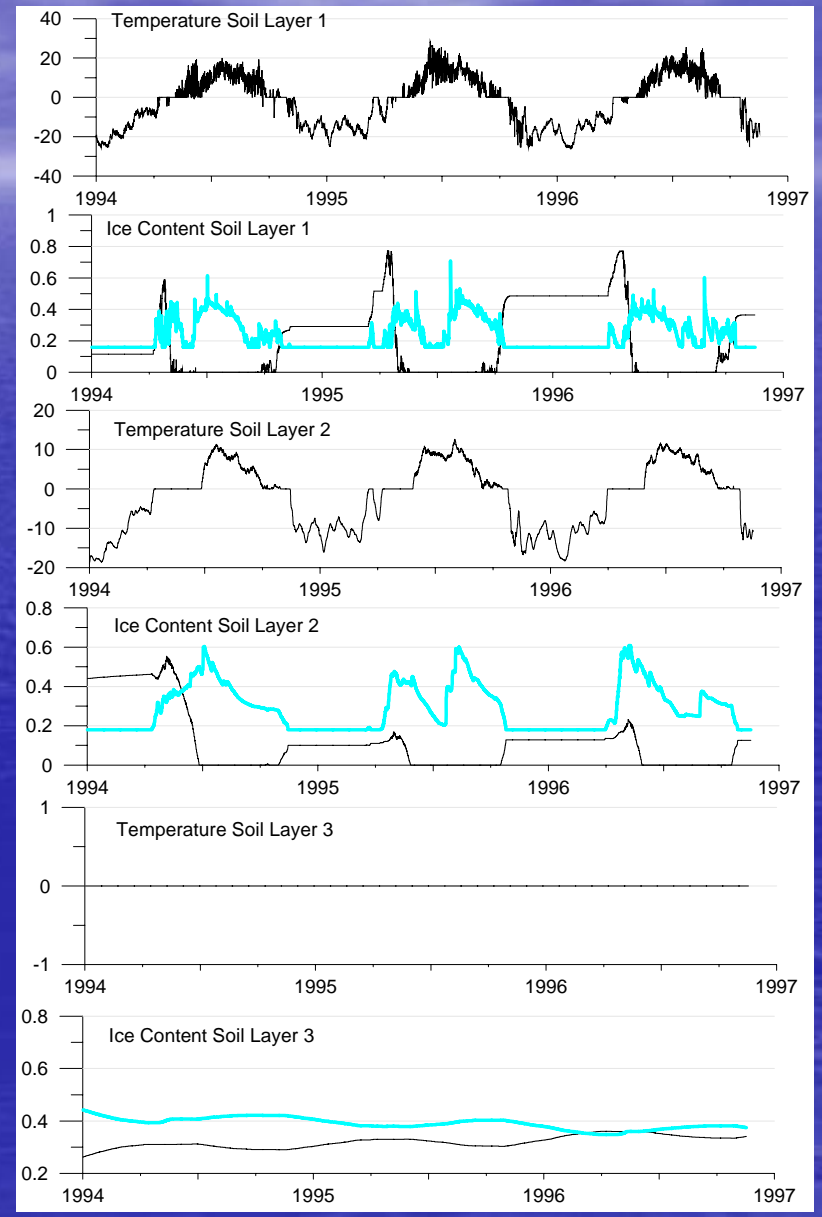
(a) Schematic flow paths in a small upland watershed receiving water input. (b) The essence of watershed response as the integrated result of flow with lateral inflows.

Soil moisture & temperature: wetland

Pine Forest



Wetland

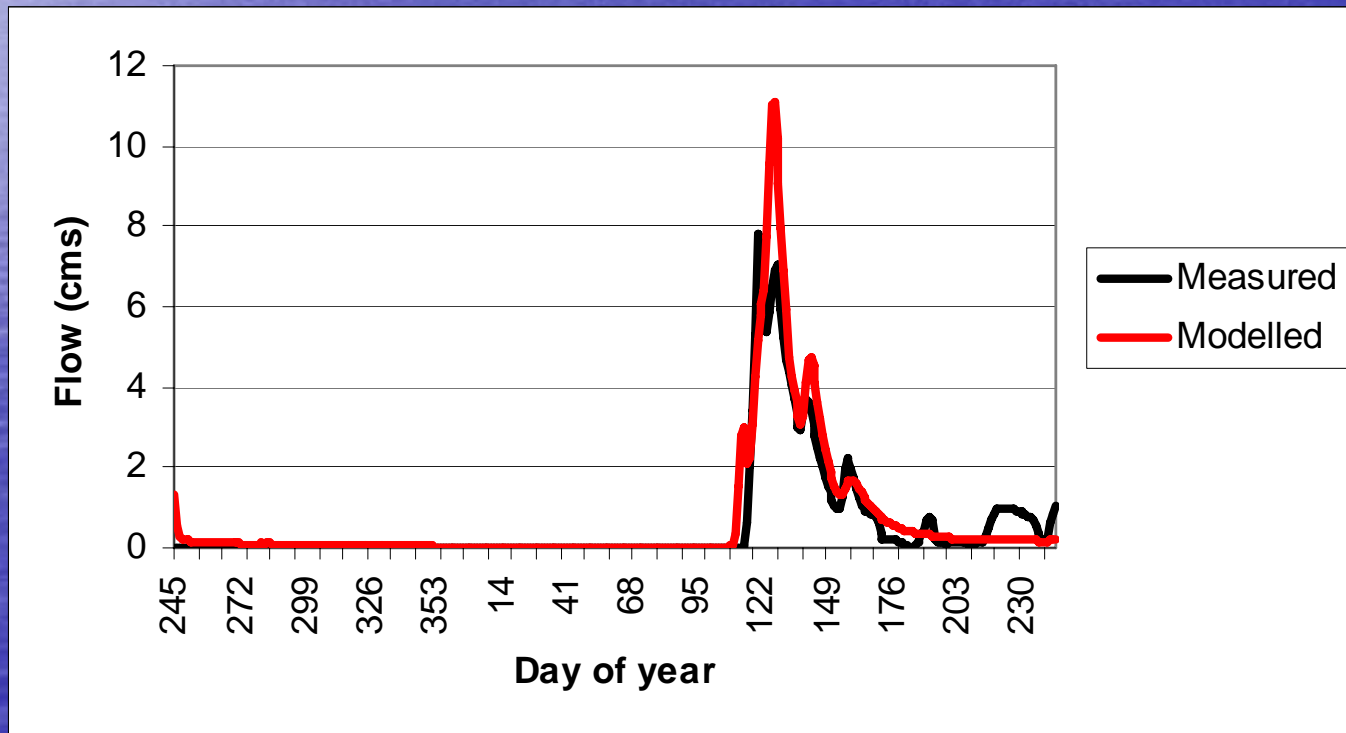


What we need from other IP3 researchers

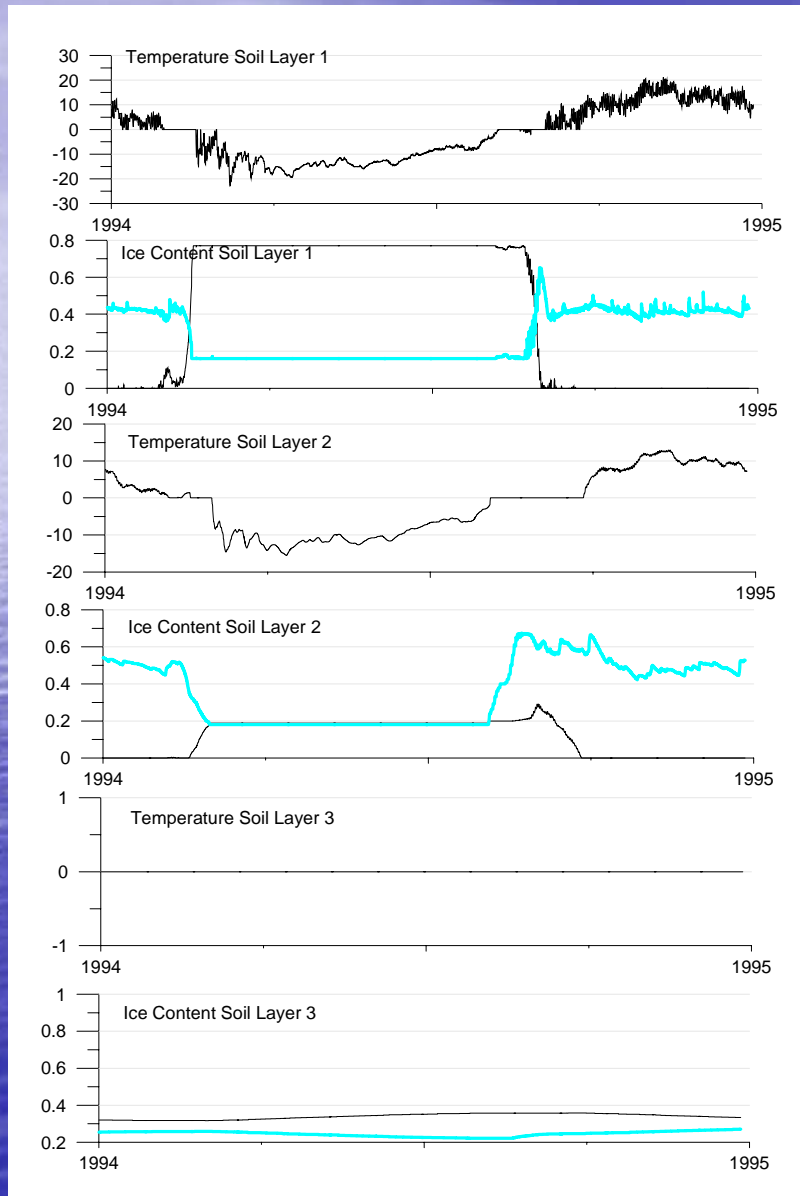
- Validation of internal variables
- Ideas for new processes to model
- Parameterizations
- Ability to use calibration of other objective functions in addition to streamflow

Scotty Creek Preliminary Results

- Scotty Creek hydrograph



Scotty Creek Preliminary Results



Soil Temperature Layer 1

Soil Moisture (liquid – Blue, solid – Black) Layer 1

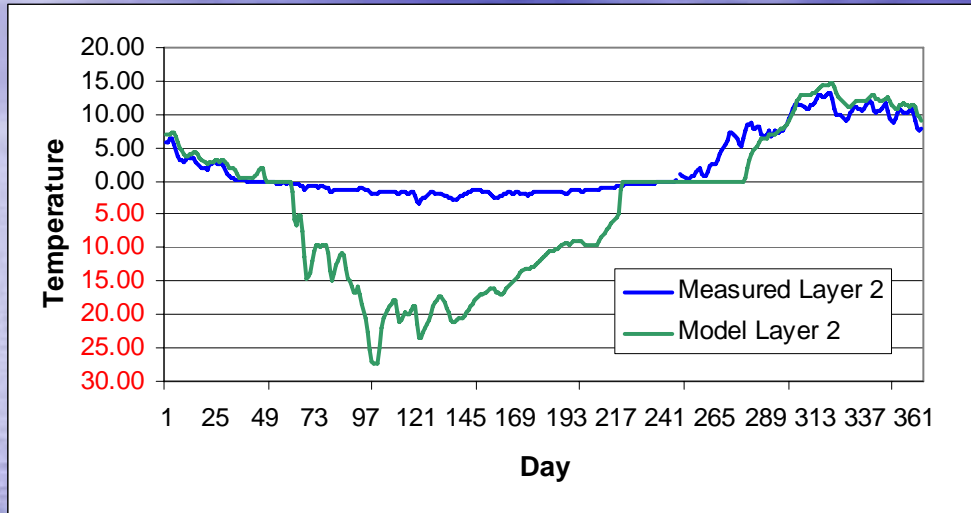
Soil Temperature Layer 2

Soil Moisture (liquid – Blue, solid – Black) Layer 1

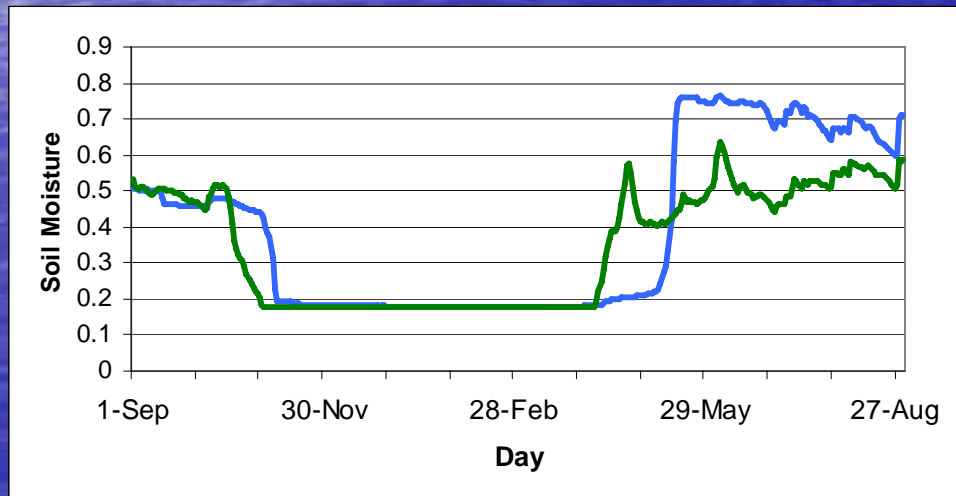
Soil Temperature Layer 3

Soil Moisture (liquid – Blue, solid – Black) Layer 1

Scotty Creek Preliminary Results



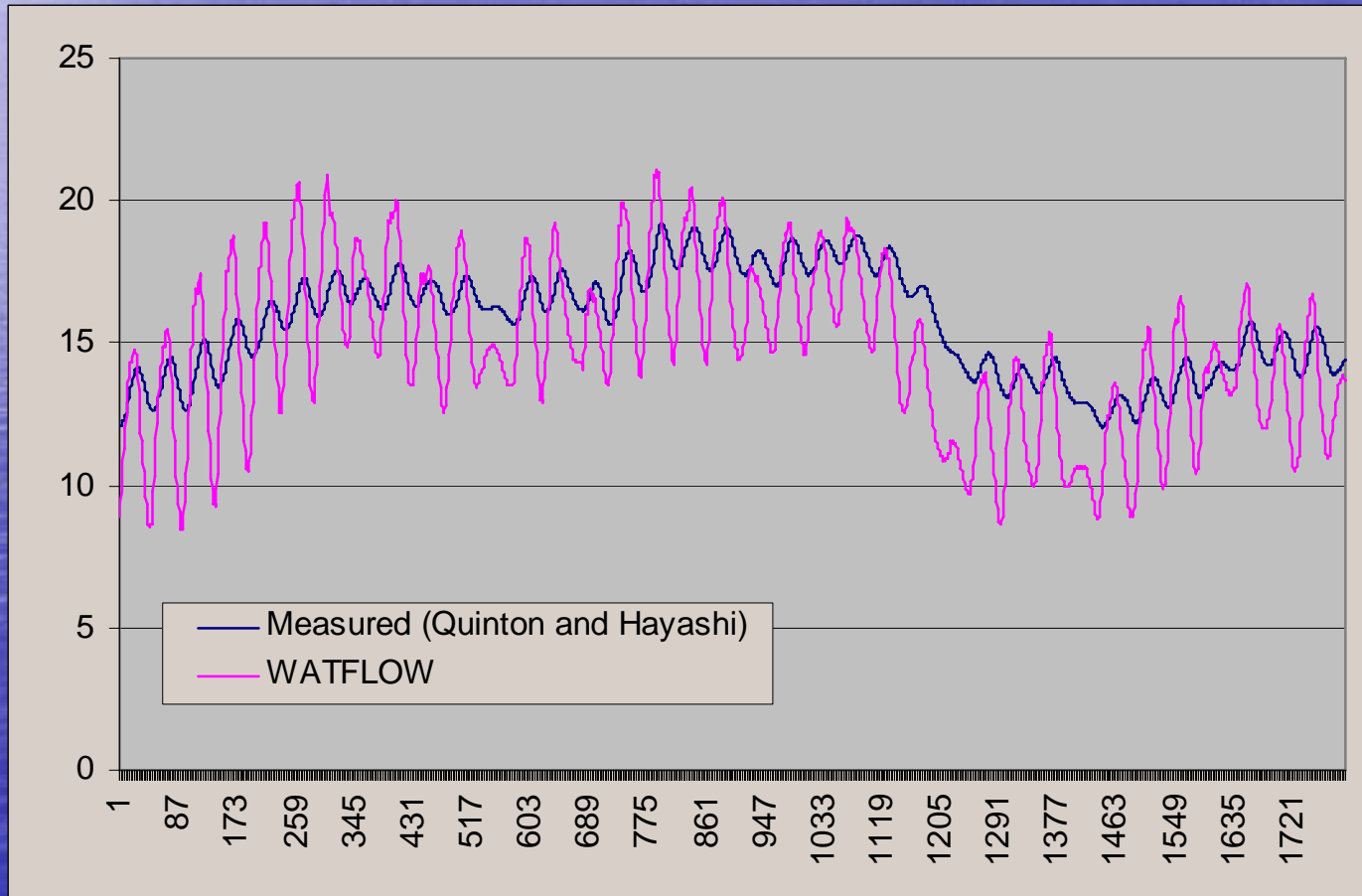
Soil Temperature



Soil Moisture

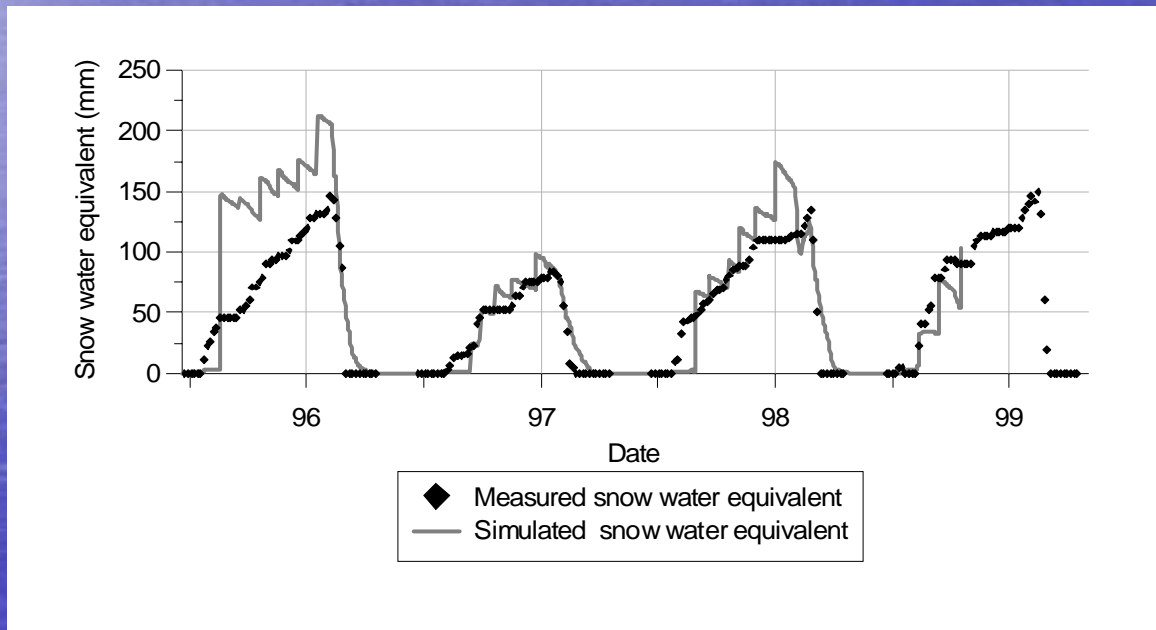
Scotty Creek Preliminary Results

Surface water temperature – Scotty Creek
June 25, 2005 – August 1, 2005



Wolf Creek Preliminary Results

Snow water equivalent in the Wolf
Creek Basin

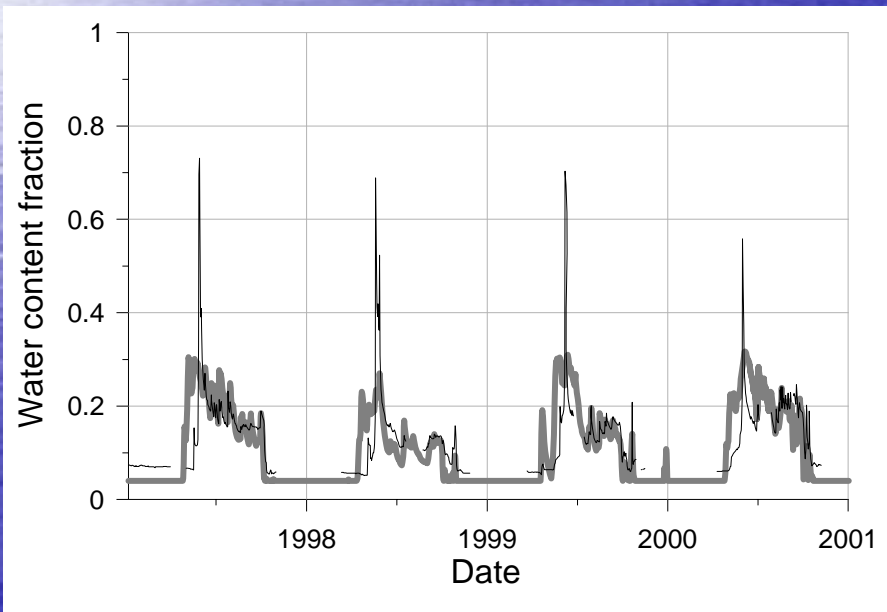


Next Steps

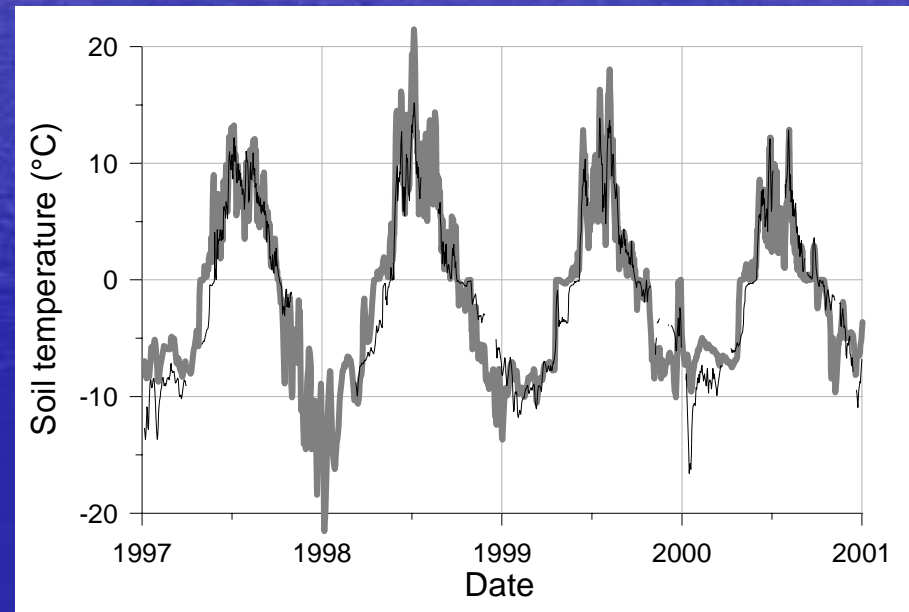
- Move down the slope from meso scale to process scale
- Set up MESH in research basins
- Reduce set of optimization parameters using remote sensing

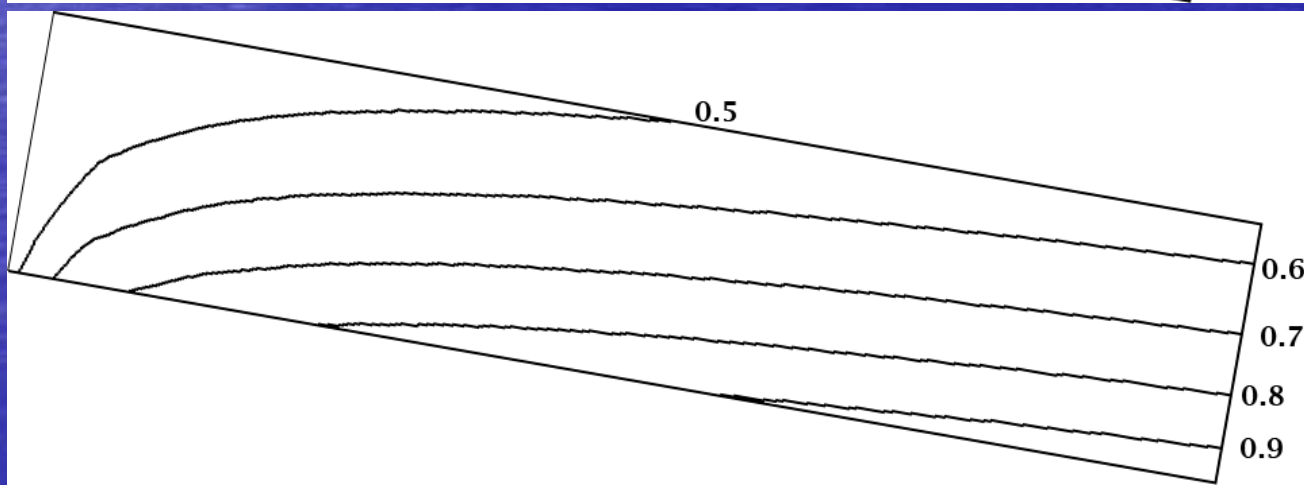
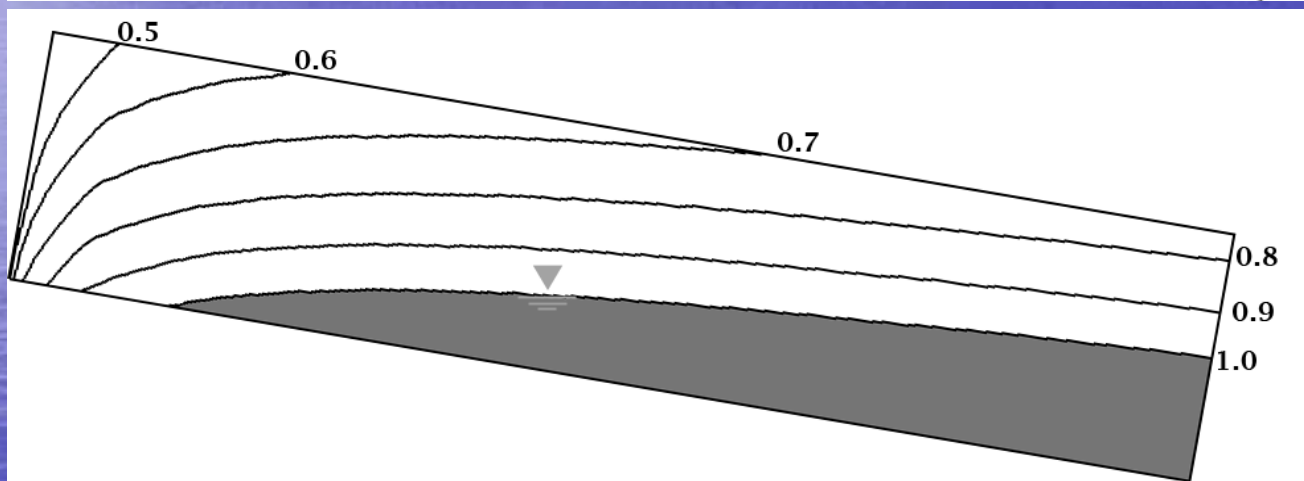
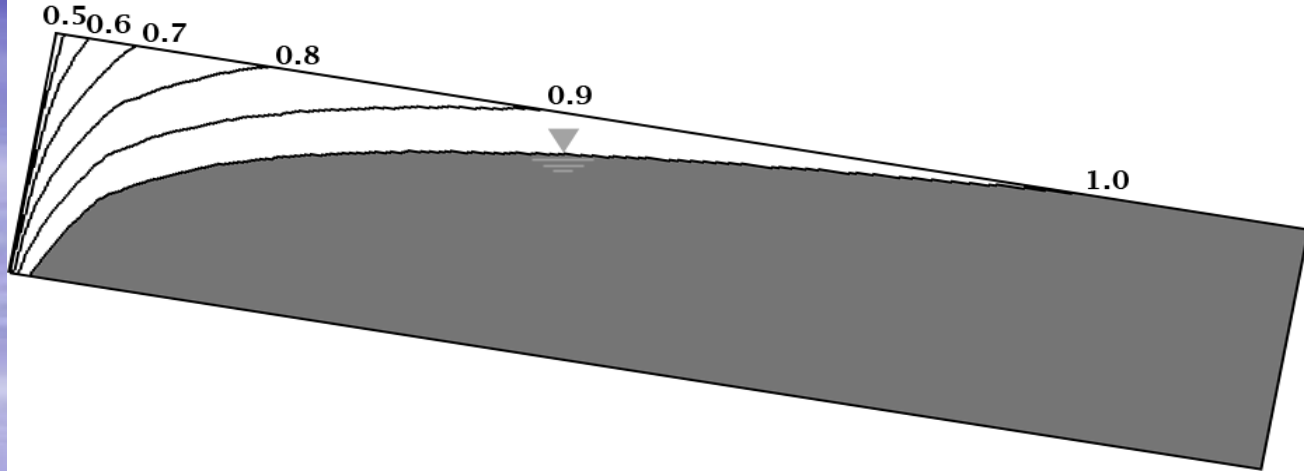
Wolf Creek Preliminary Results

Water content fraction in the upper soil layer in the Wolf Creek research basin



Soil temperature in the upper soil layer in the Wolf Creek research basin





What we can provide to other IP3 researchers

- Consistency checks of data sets
- CHRM evaluation