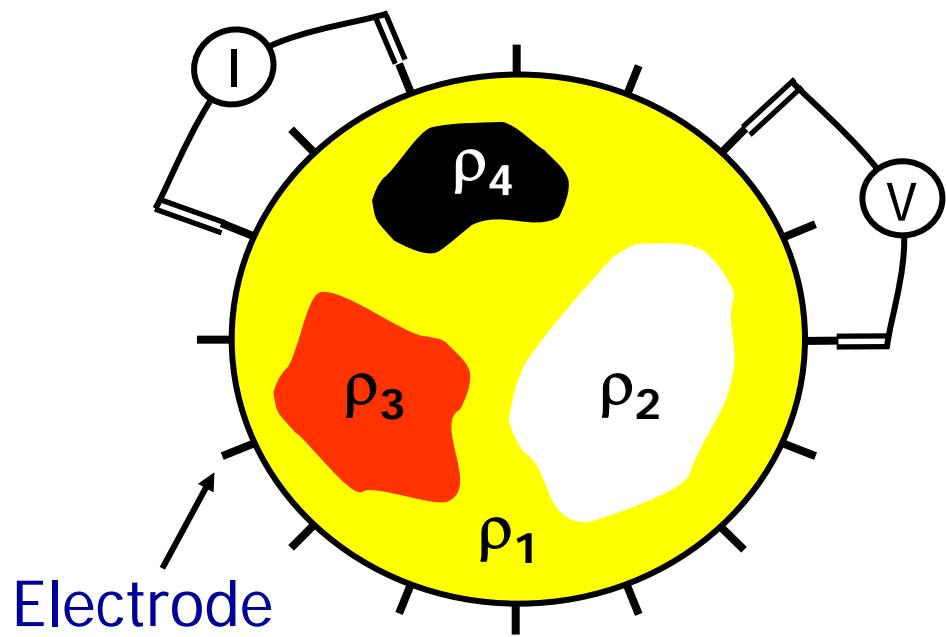


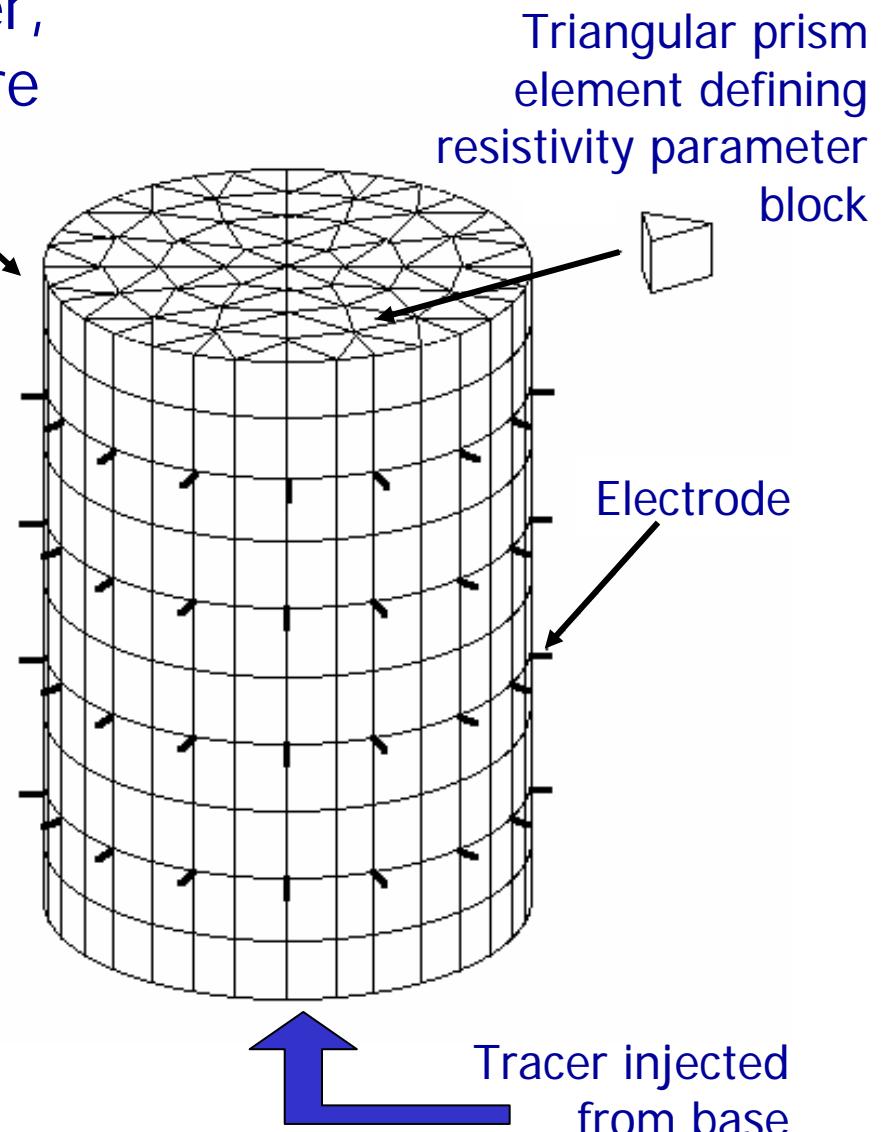
Case 1: Preferential flow in soil cores

30 cm diameter,
50 cm long core

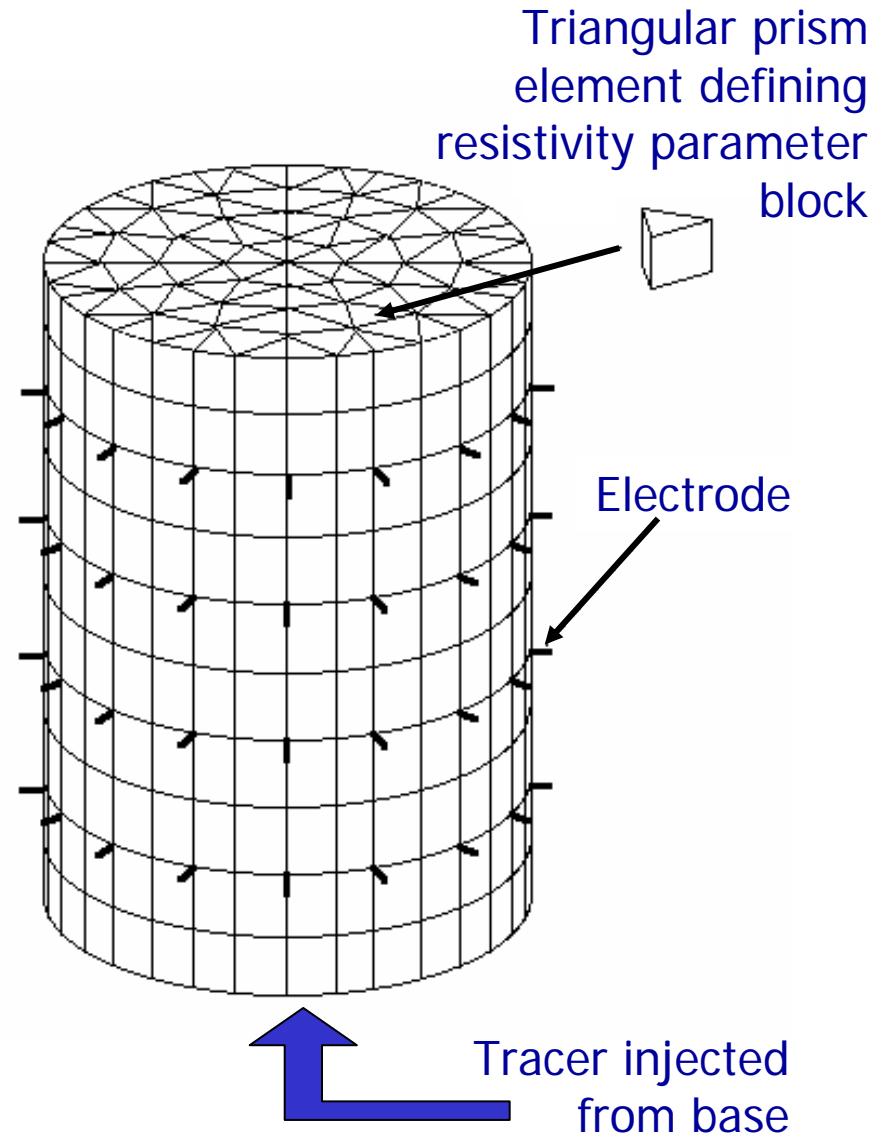


Electrode

400 ERT measurements per plane
(2 minutes data collection time)
300 frames for each plane

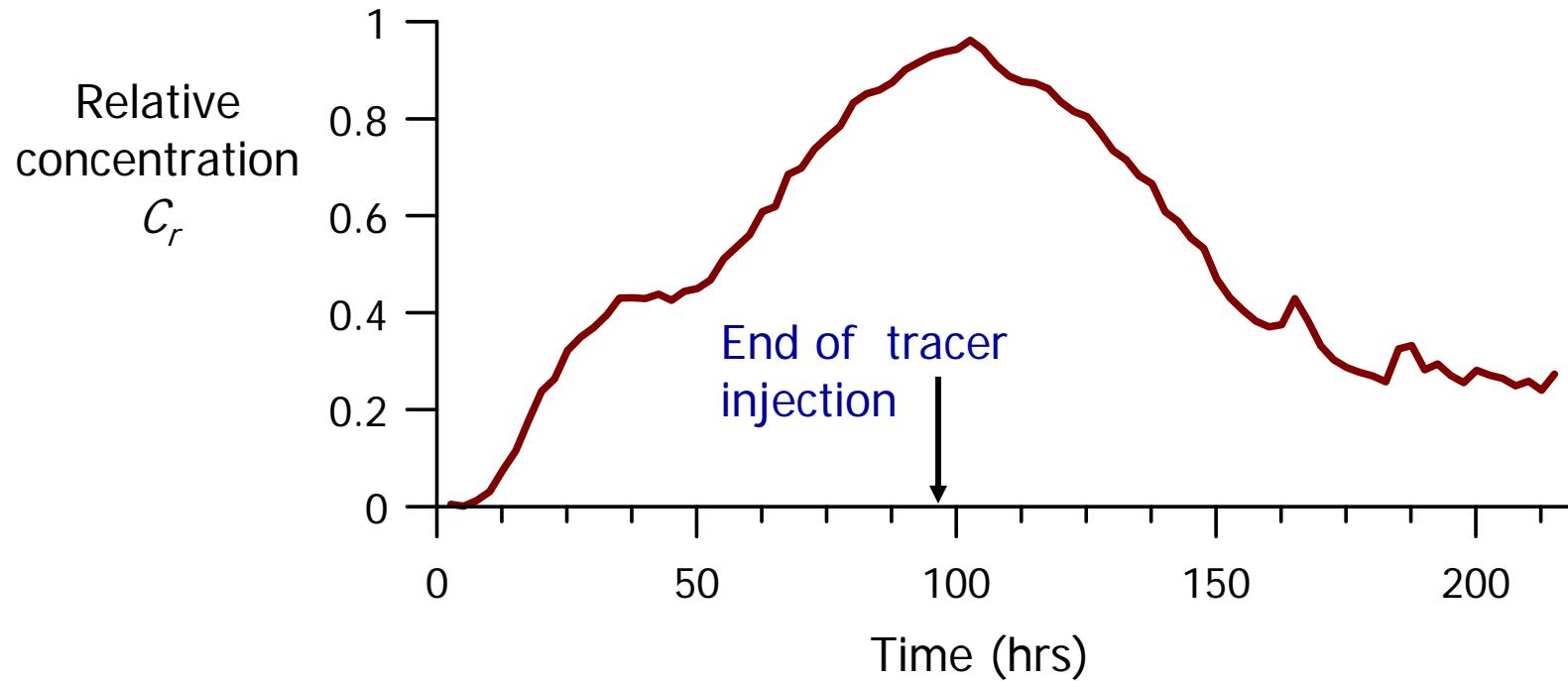


Case 1: Preferential flow in soil cores

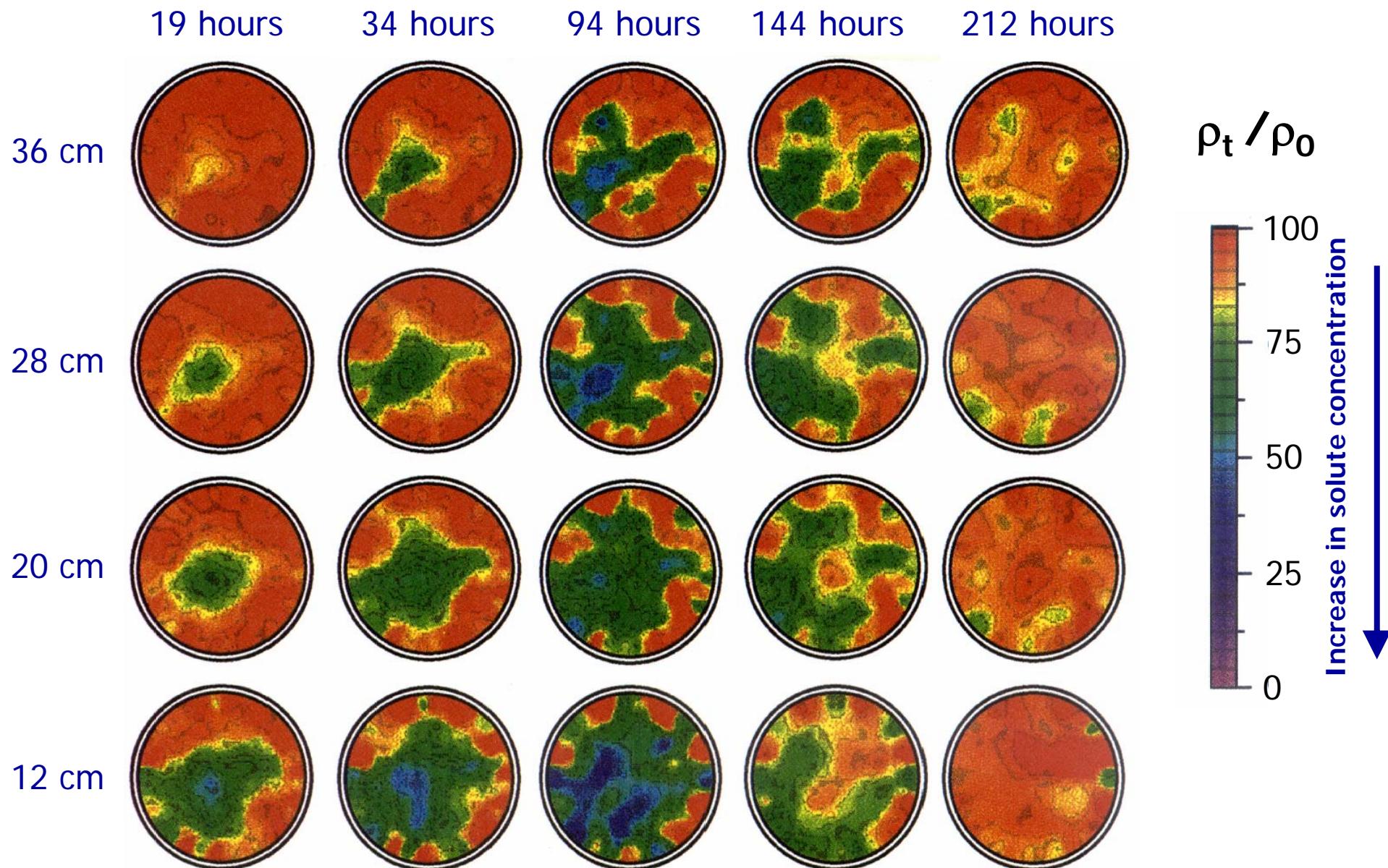


Case 1: Preferential flow in soil cores

Breakthrough curve (effluent concentration)

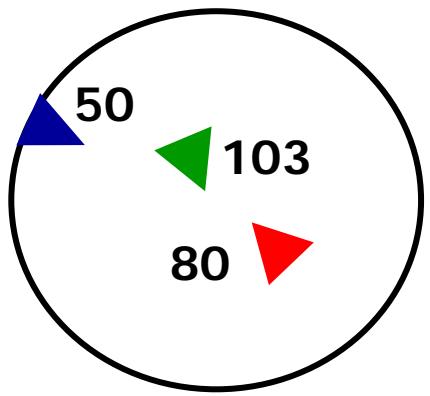


Case 1: Preferential flow in soil cores

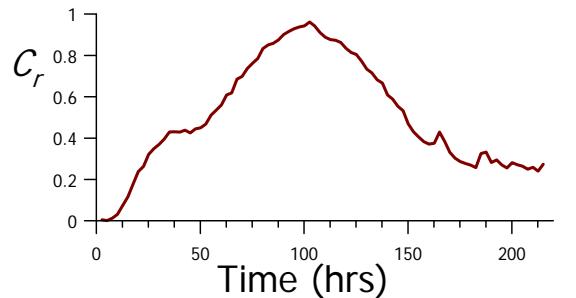


Case 1: Preferential flow in soil cores

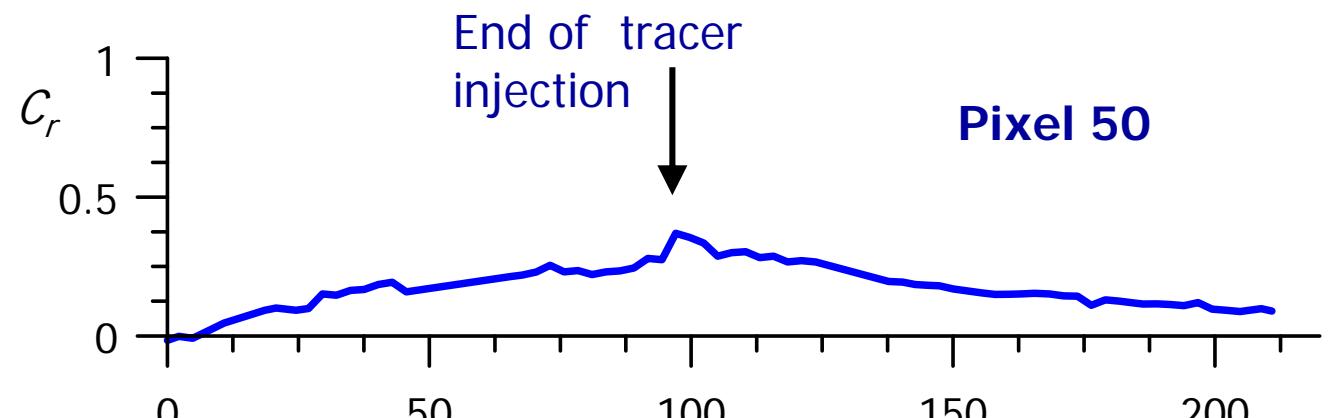
Pixel breakthrough
curves in plane
12 cm from
injection



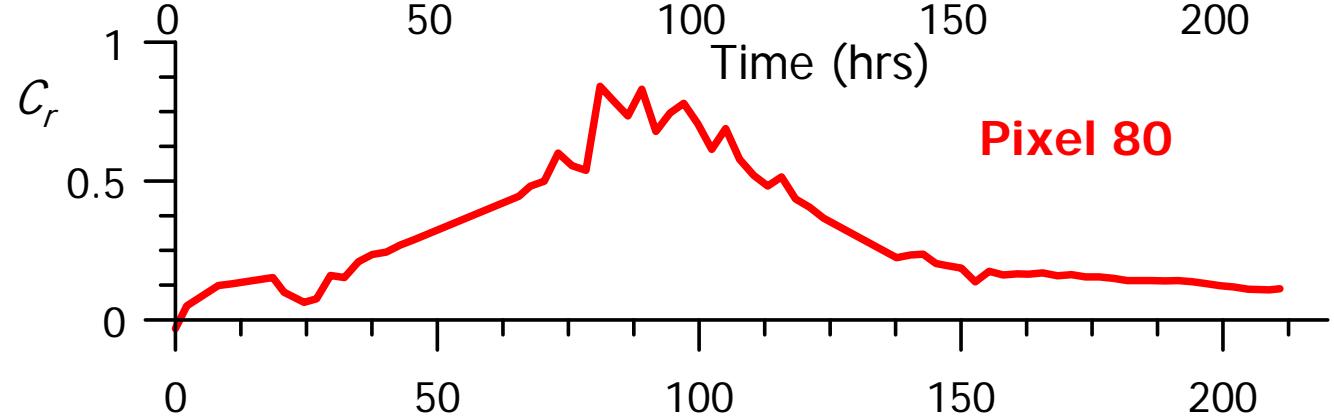
Pixel location



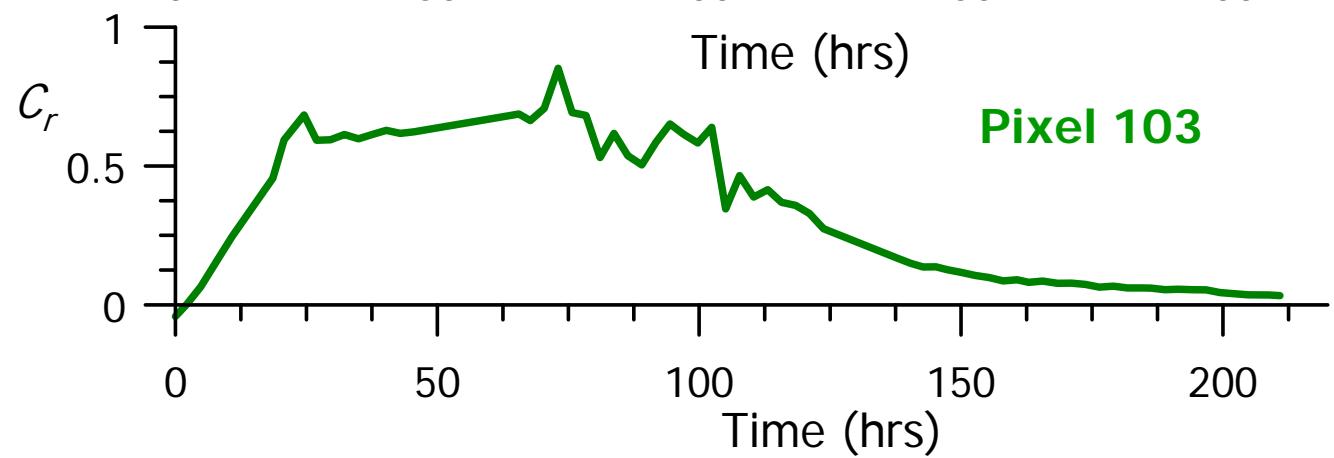
Effluent breakthrough



Pixel 50



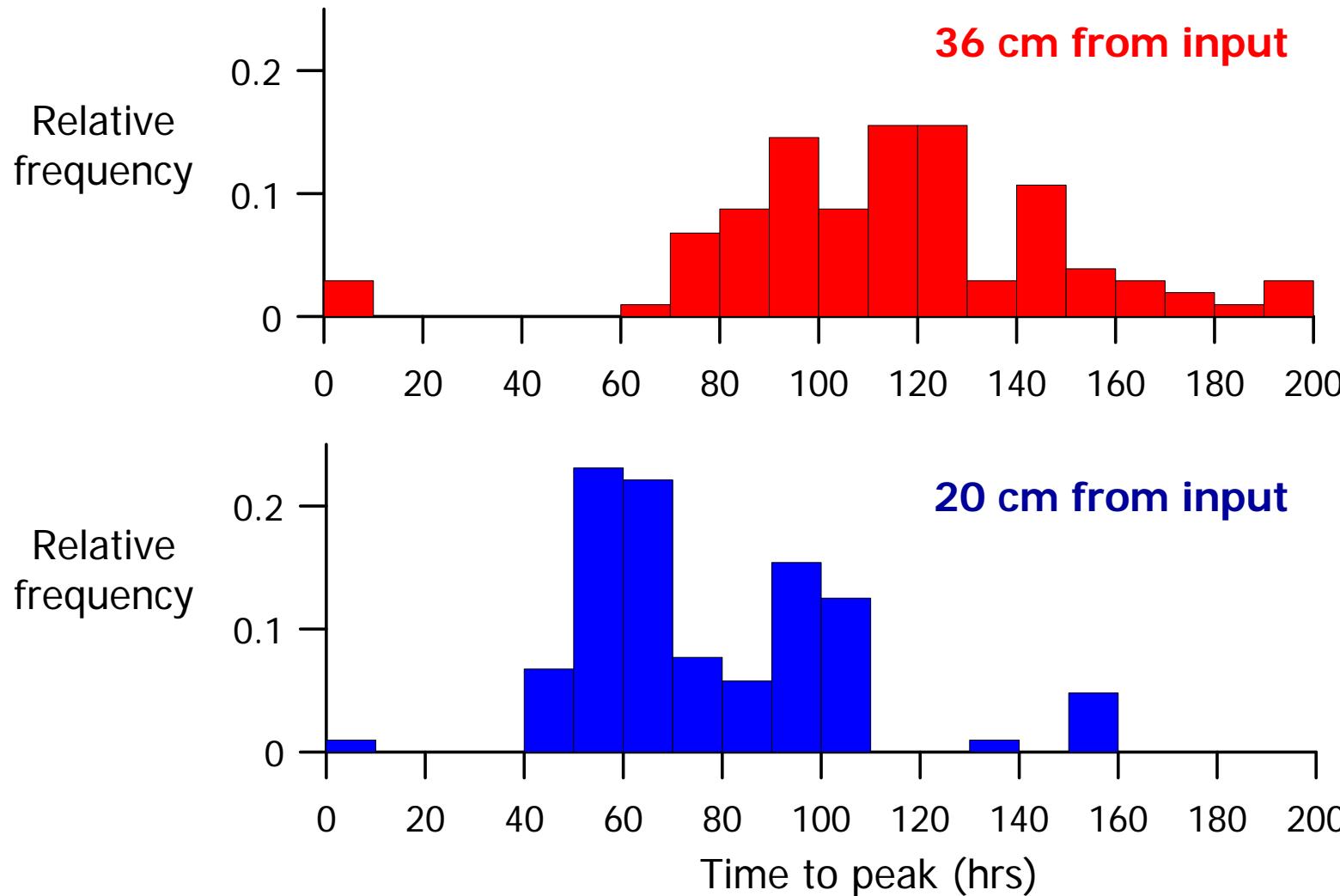
Pixel 80



Pixel 103

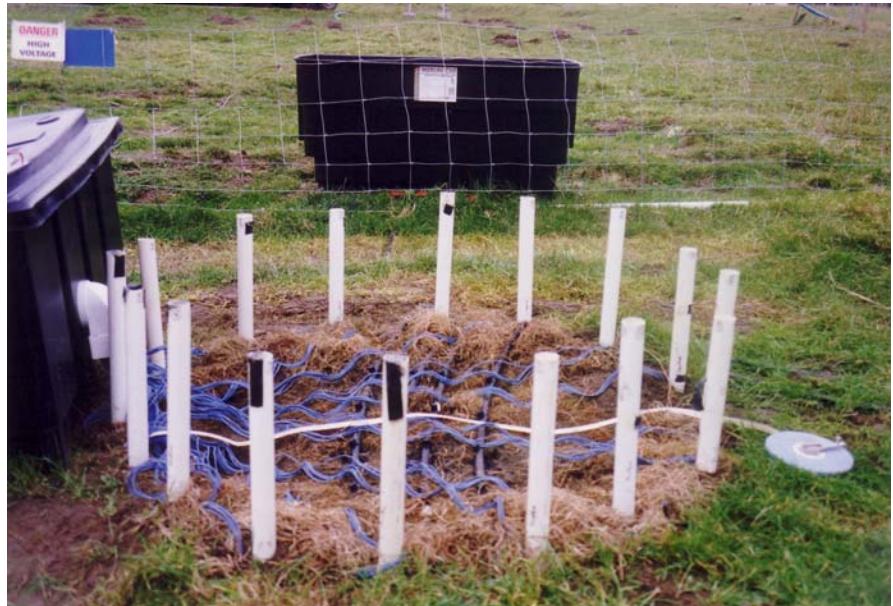
Case 1: Preferential flow in soil cores

Histogram of time to peak for pixel locations in an ERT plane 20 cm and 36 cm from tracer injection.



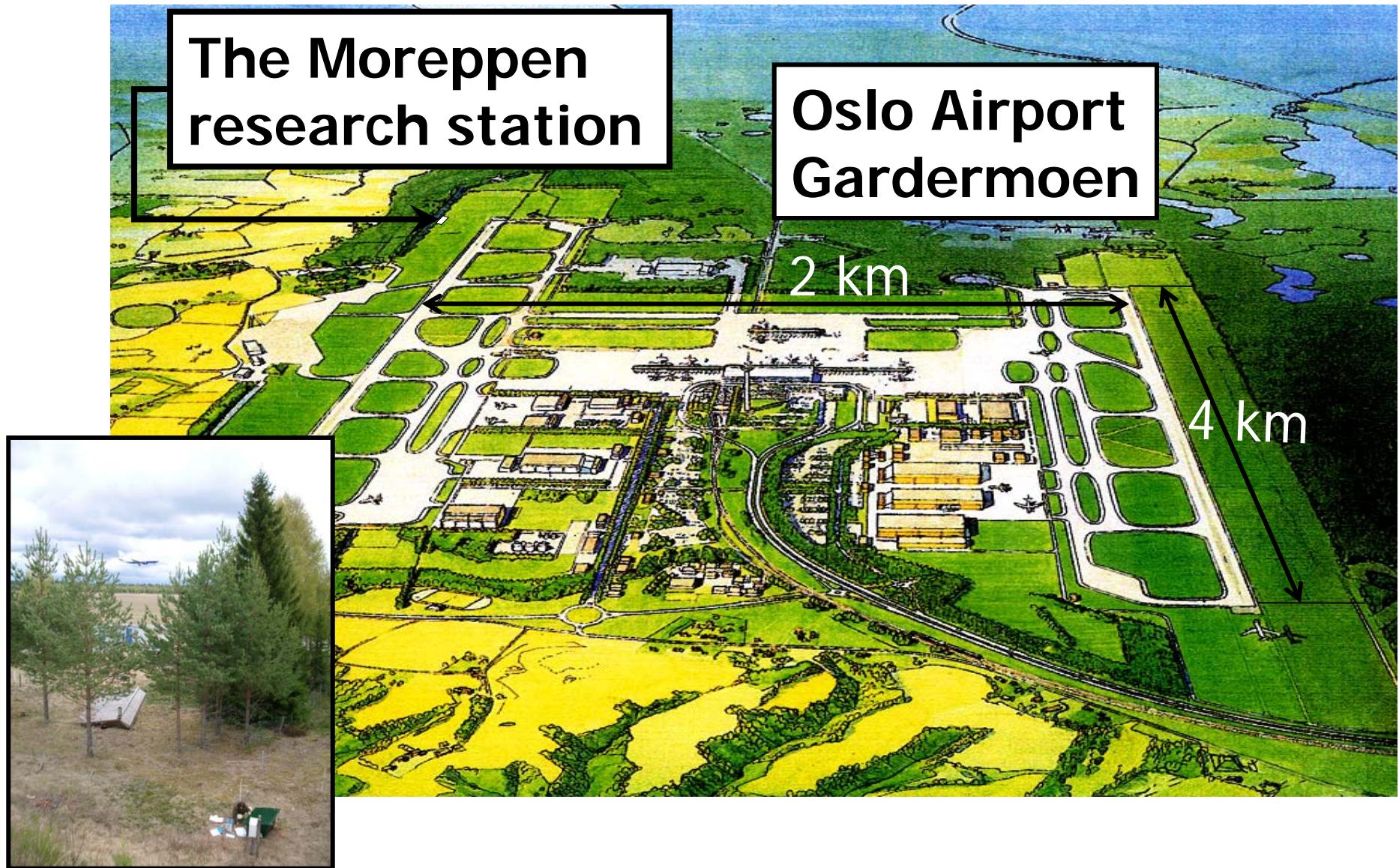
Case 1: Preferential flow in soil cores

Similar experiments can be run at the plot scale in the field



Case 2: – Preferential infiltration during snowmelt

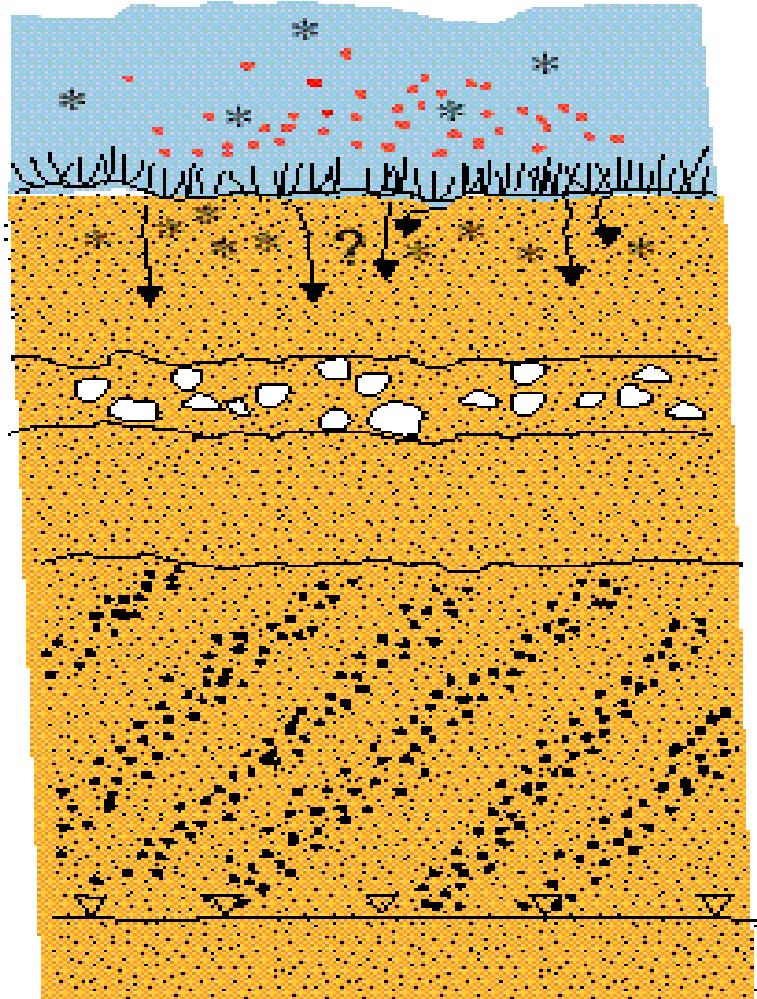
Joint with Helen French, Jordforsk (Norway)



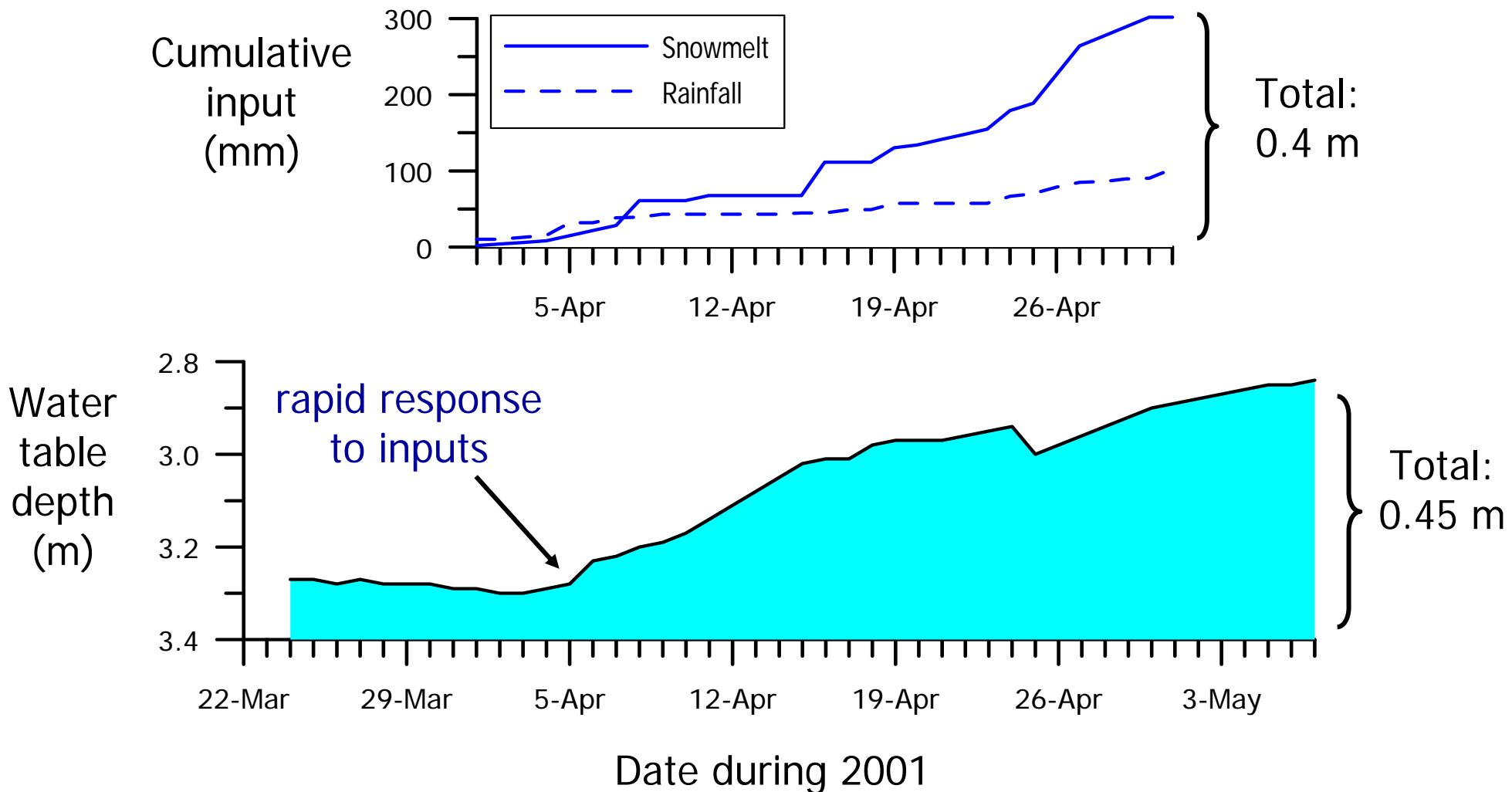
Case 2: Mapping snowmelt infiltration

Aim: to characterise the spatial distribution of infiltration and solute transport during snowmelt

Hypothesis: the spatial distribution of snowmelt infiltration is not uniform



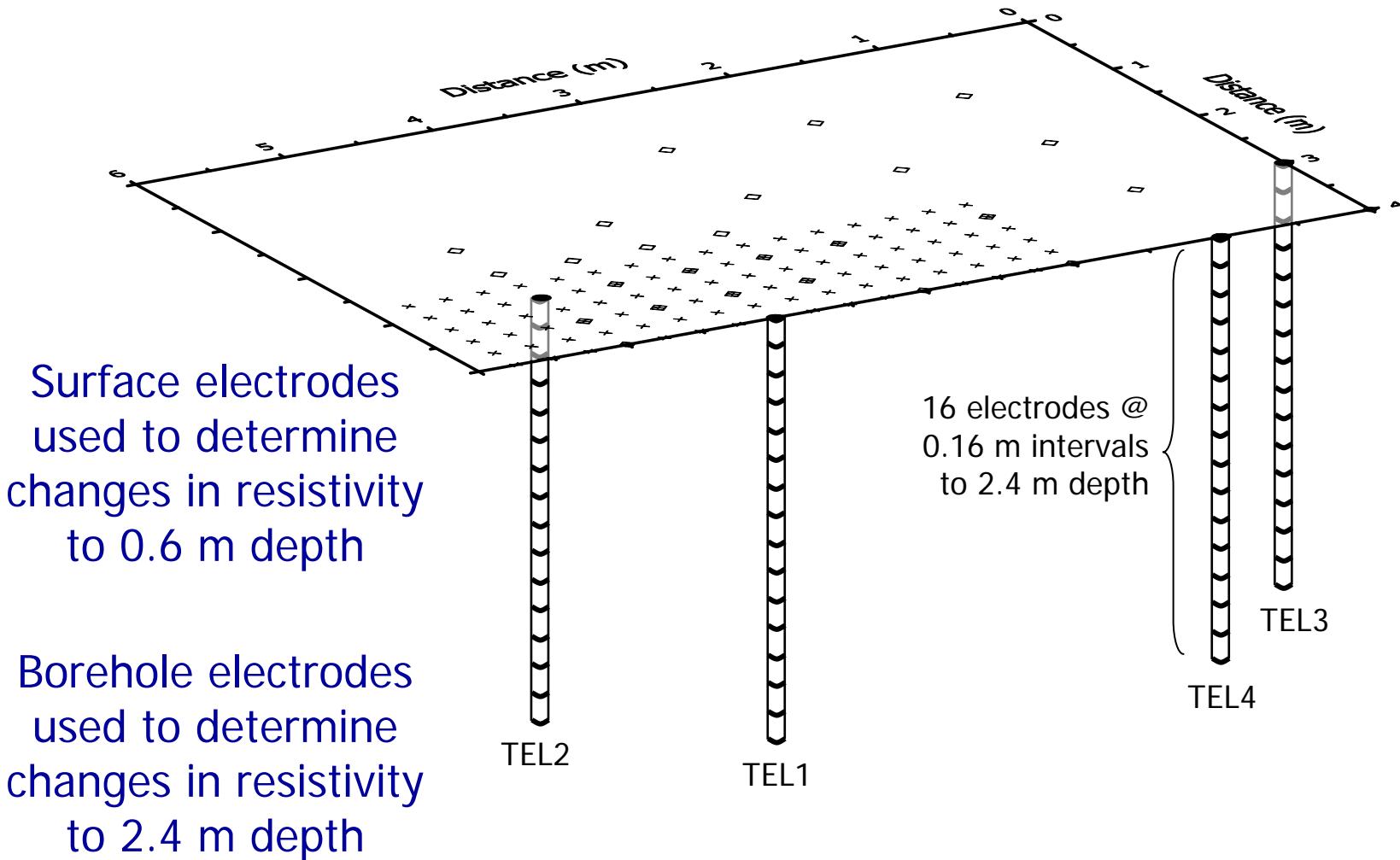
Case 2: Mapping snowmelt infiltration – water table response



For a porosity of 40% a 0.45 m rise in water table is equivalent to 0.2 m input

Case 2: Mapping snowmelt infiltration – site layout

Surface and borehole electrode arrays used:



Case 2: Mapping snowmelt infiltration – site layout

Photo: 27-April-2001

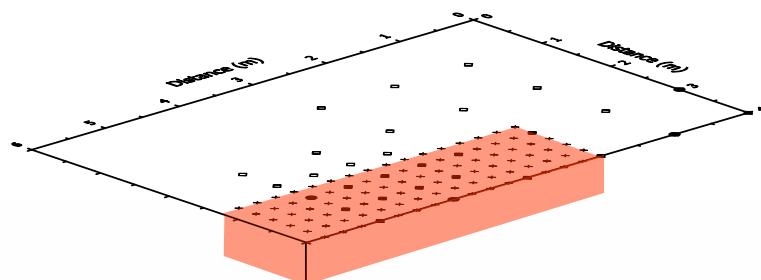


Case 2: Mapping snowmelt infiltration – site layout

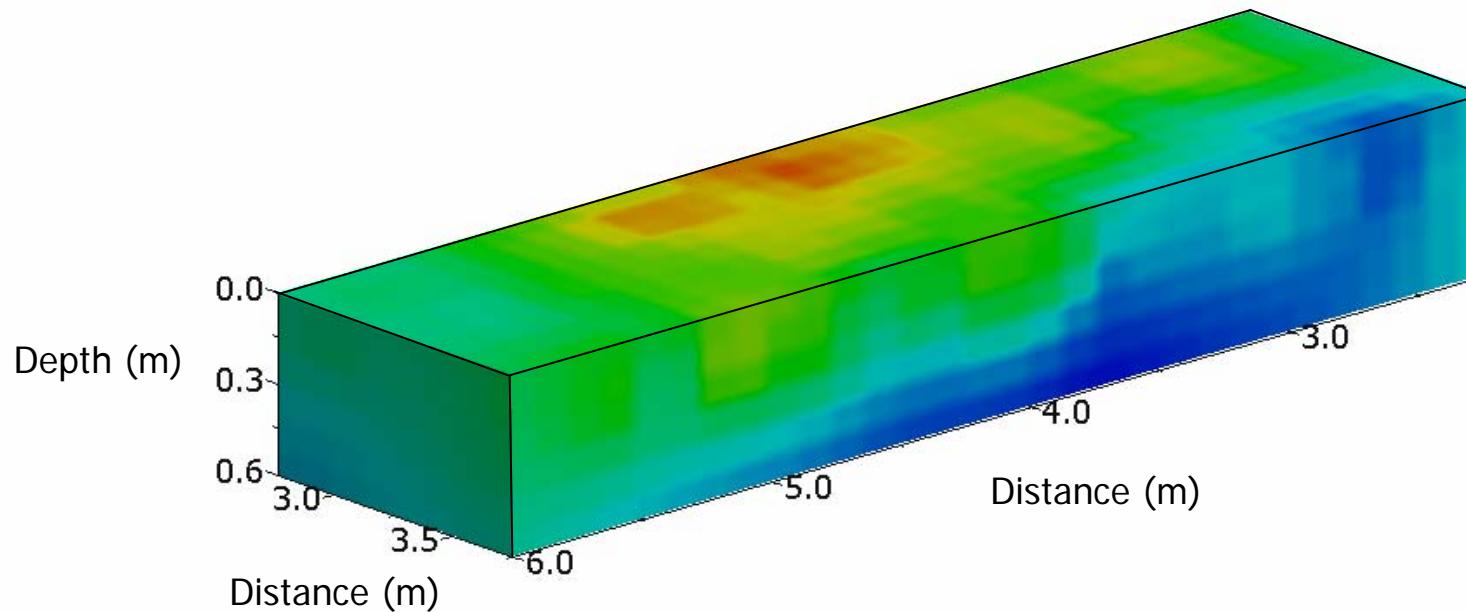
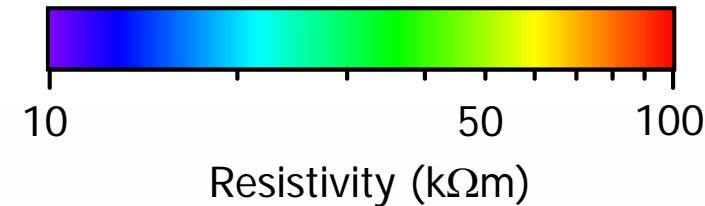
Photo: 13-March-2001



Case 2: Mapping snowmelt infiltration – 3D resistivity

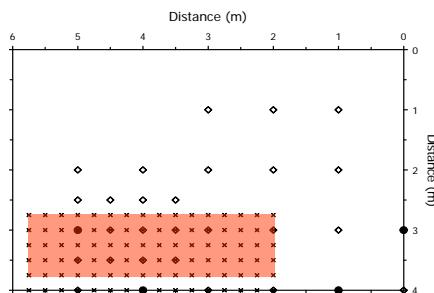


3D resistivity on 01-April-01



Full 3D inversion of
multiple surface lines

Case 2: Mapping snowmelt infiltration – surface resistivity



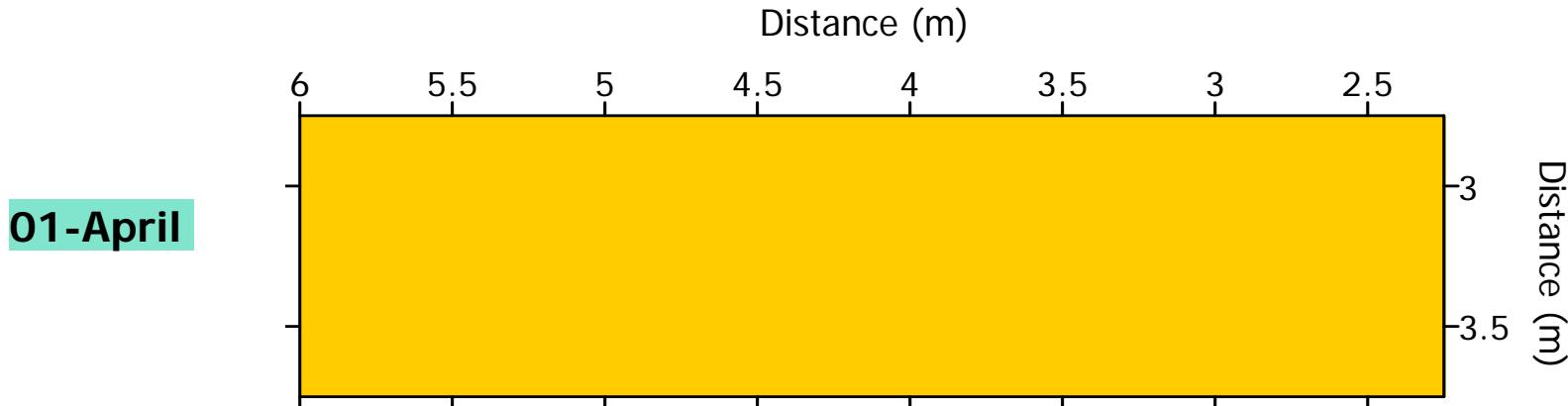
01-April

Cumulative
input (mm)

5-Apr 10-Apr 15-Apr 20-Apr 25-Apr 30-Apr

Snowmelt

Rainfall



01-April

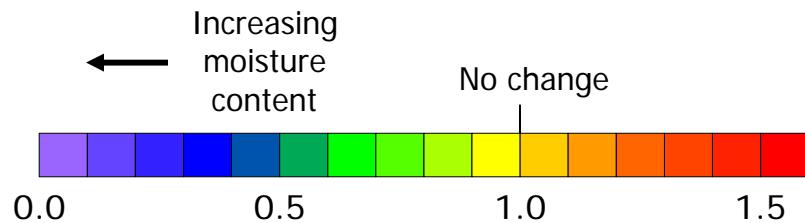
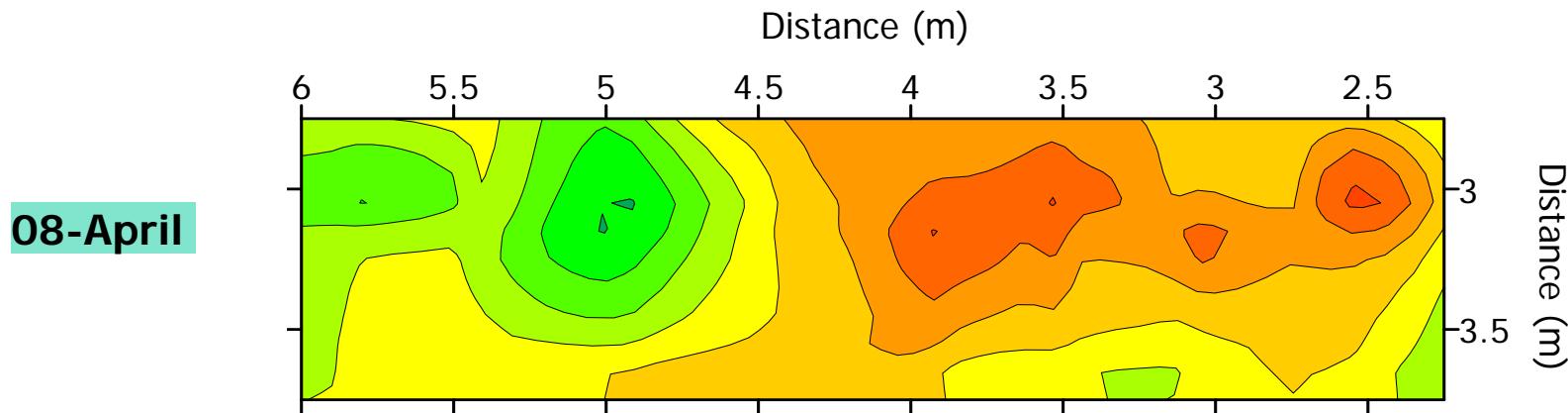
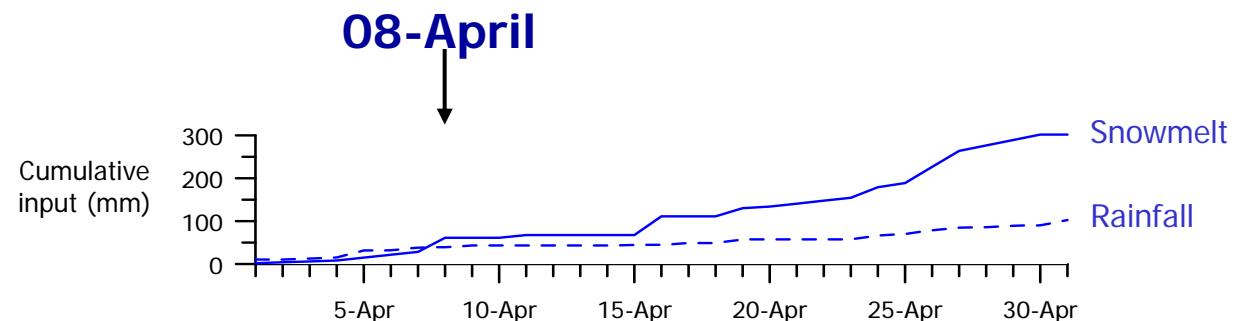
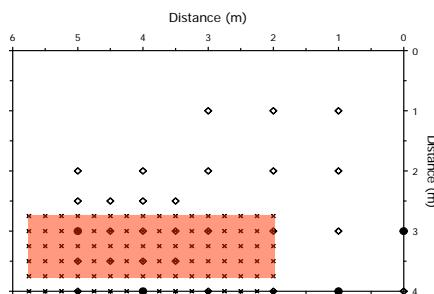
Increasing
moisture
content

No change

0.0 0.5 1.0 1.5

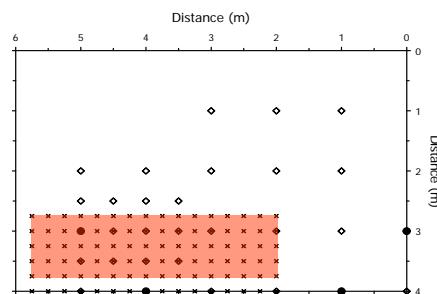
Ratio of resistivity at ground surface
relative to 01-April-01

Case 2: Mapping snowmelt infiltration – surface resistivity

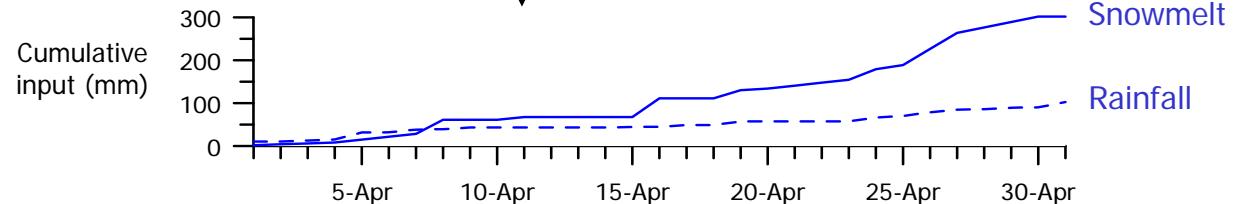


Ratio of resistivity at ground surface
relative to 01-April-01

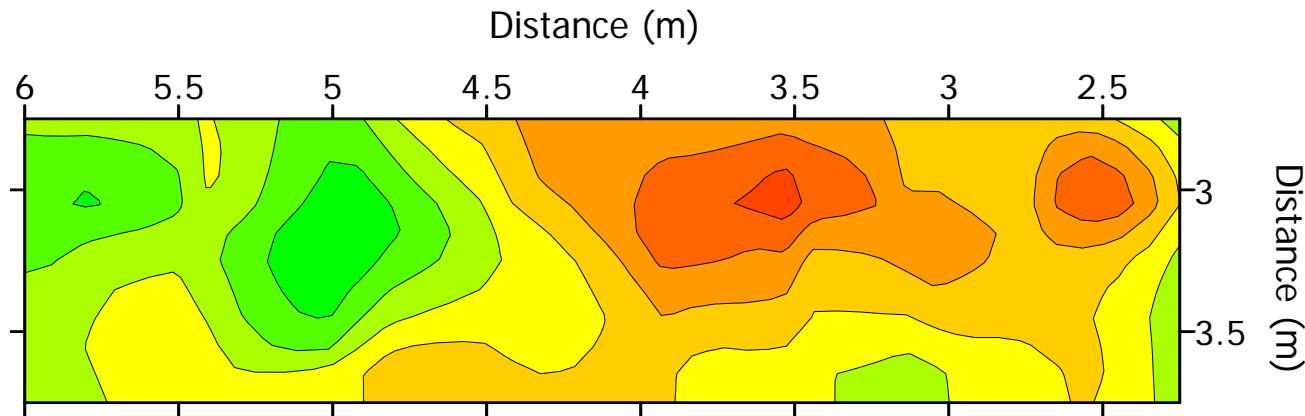
Case 2: Mapping snowmelt infiltration – surface resistivity



11-April

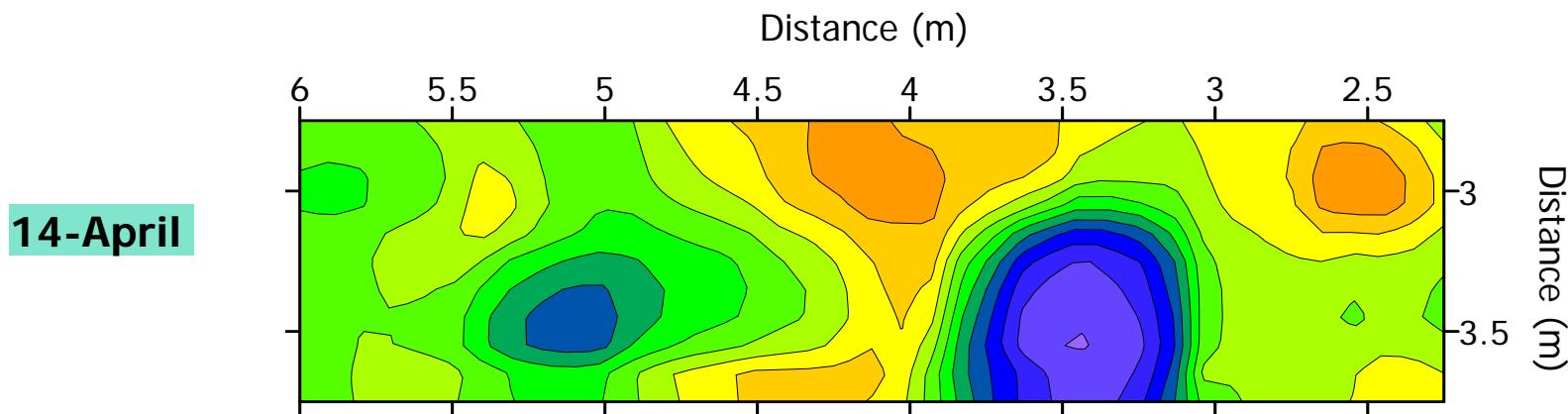
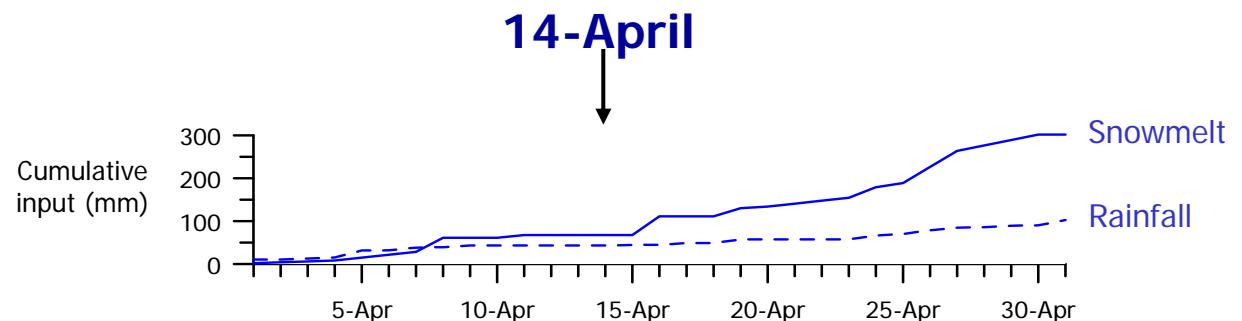
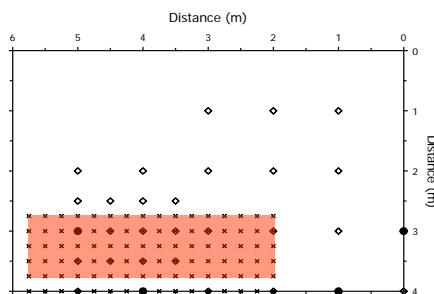


11-April



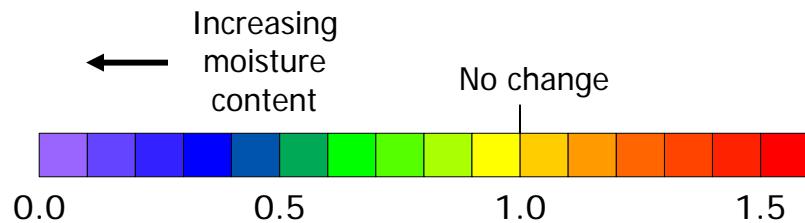
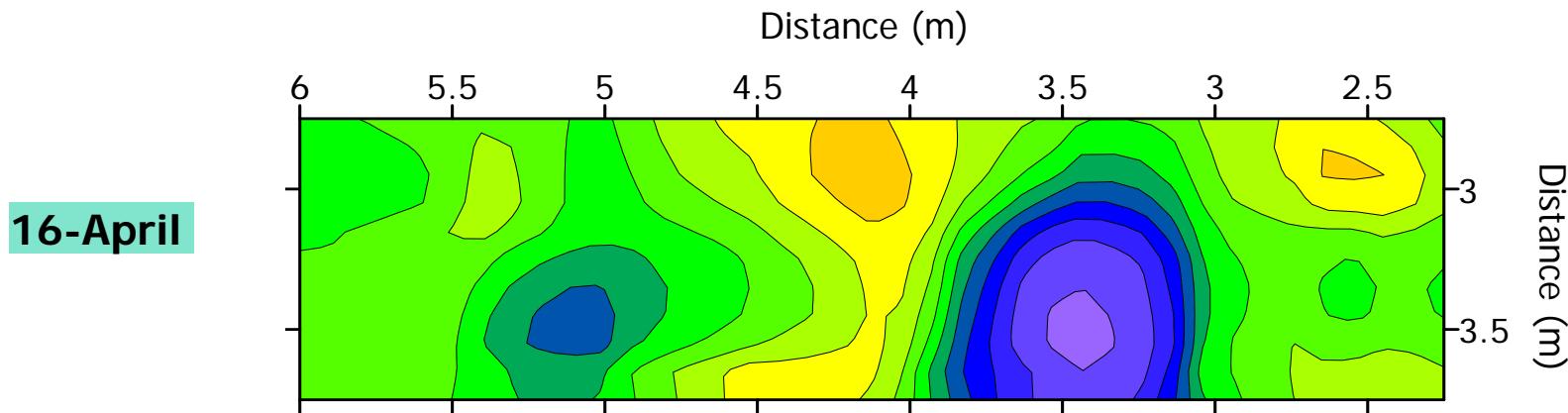
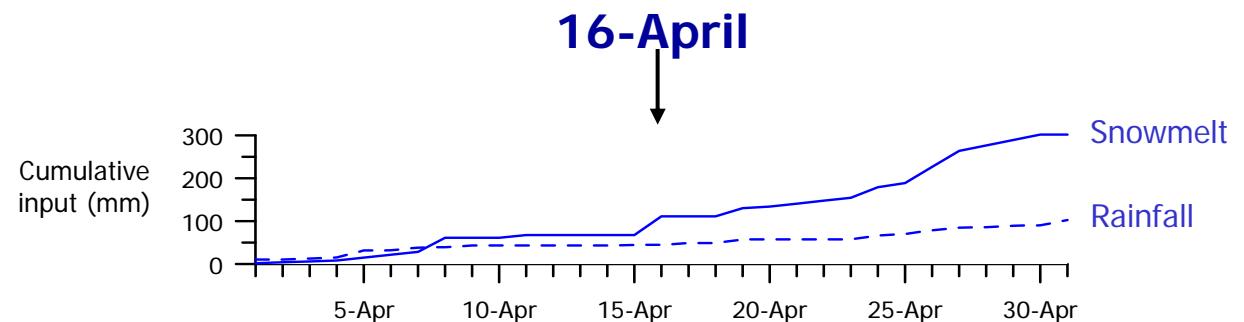
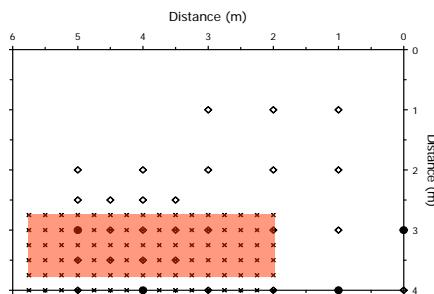
Ratio of resistivity at ground surface
relative to 01-April-01

Case 2: Mapping snowmelt infiltration – surface resistivity



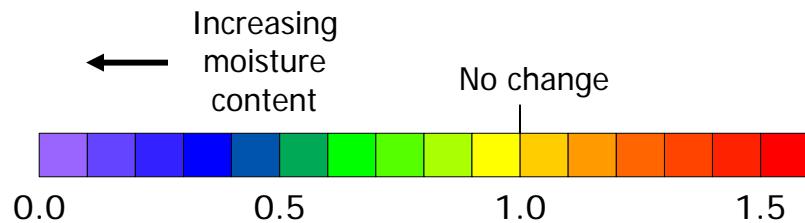
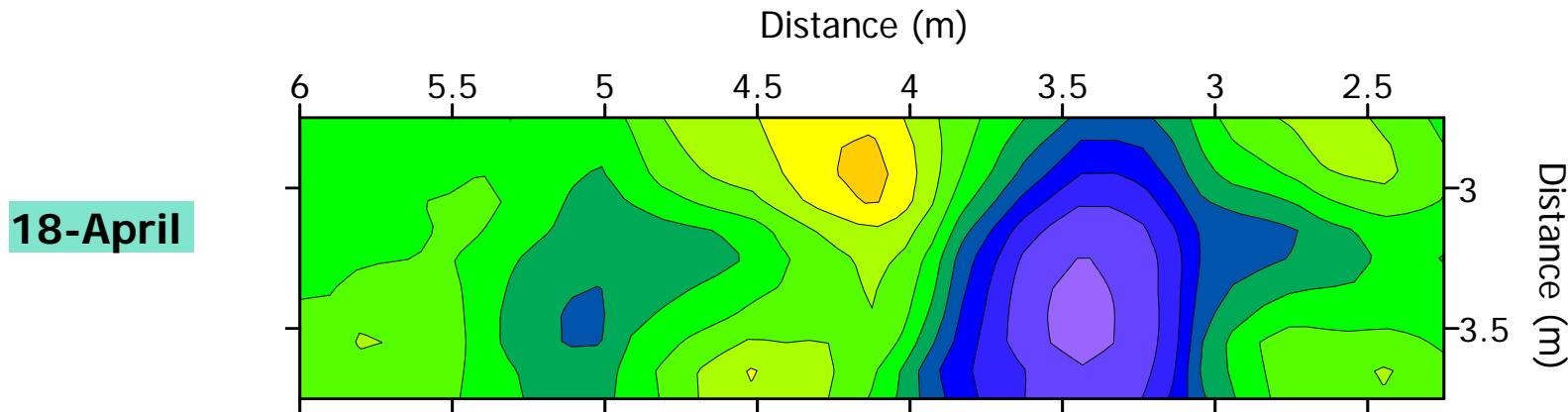
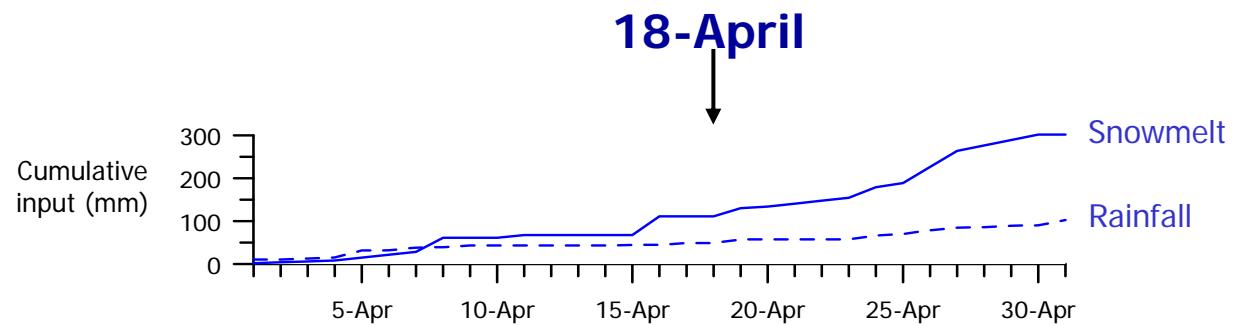
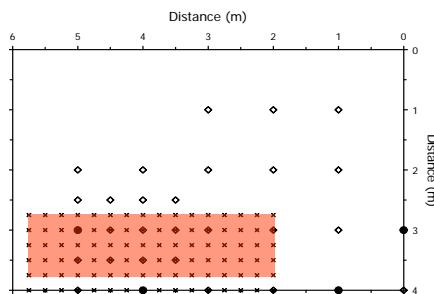
Ratio of resistivity at ground surface
relative to 01-April-01

Case 2: Mapping snowmelt infiltration – surface resistivity



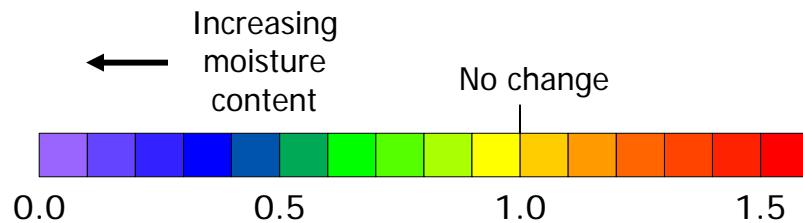
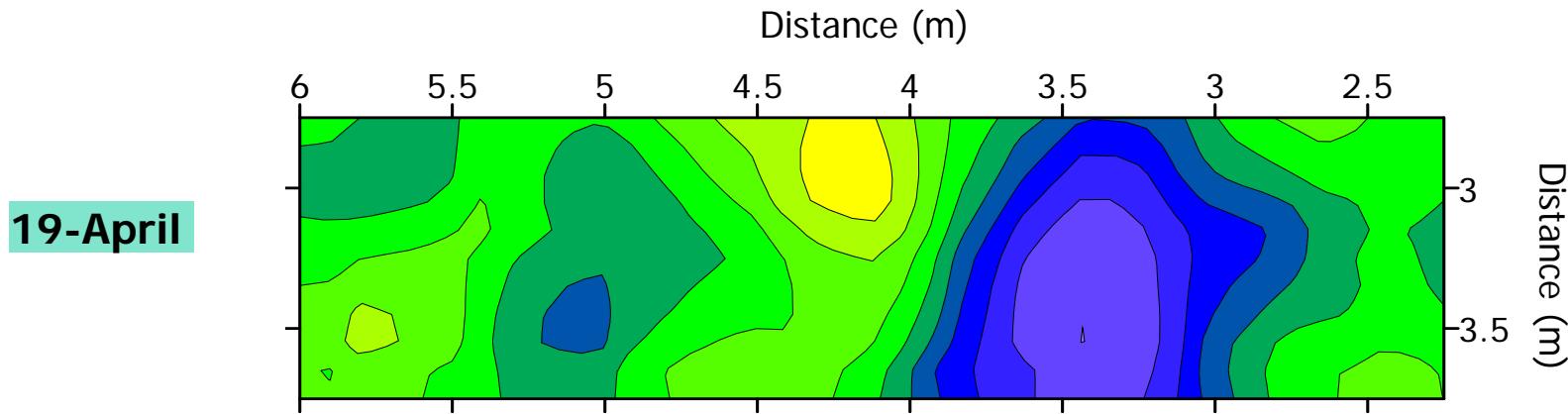
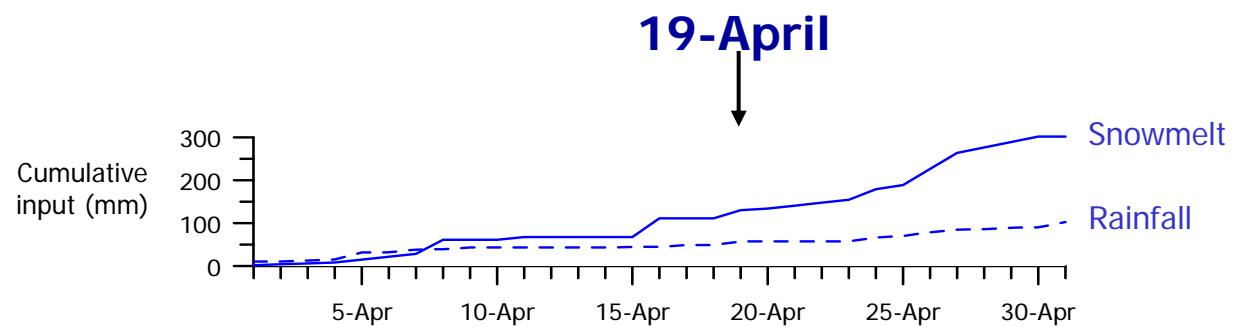
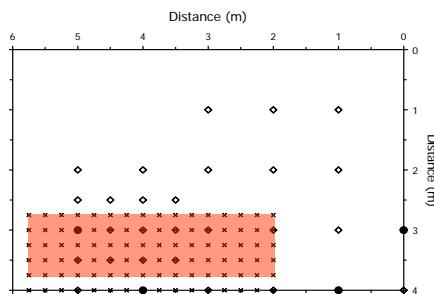
Ratio of resistivity at ground surface
relative to 01-April-01

Case 2: Mapping snowmelt infiltration – surface resistivity

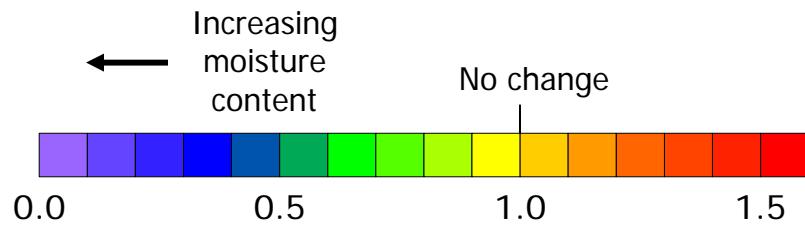
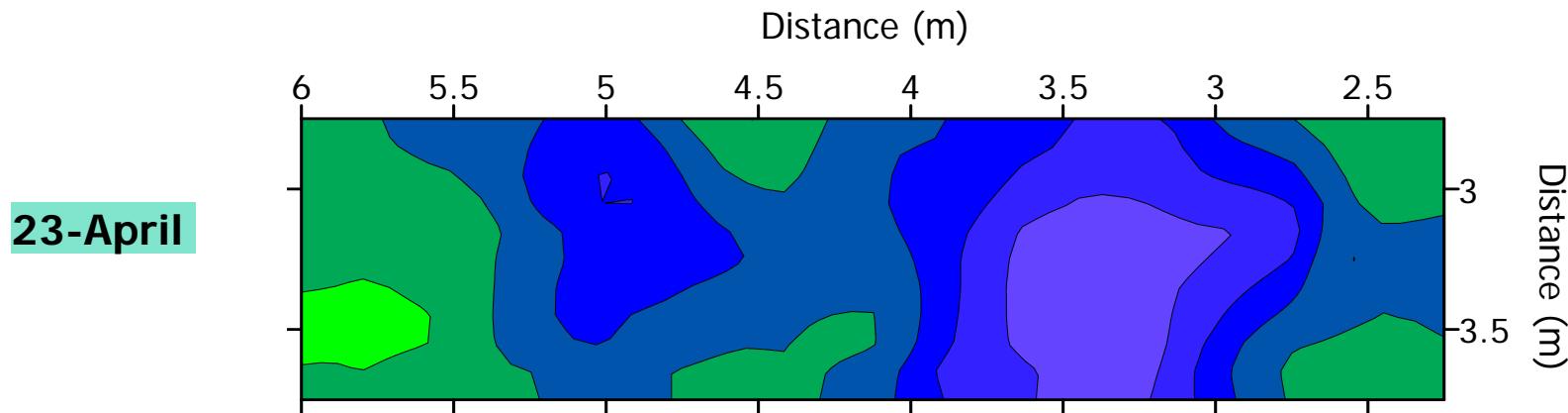
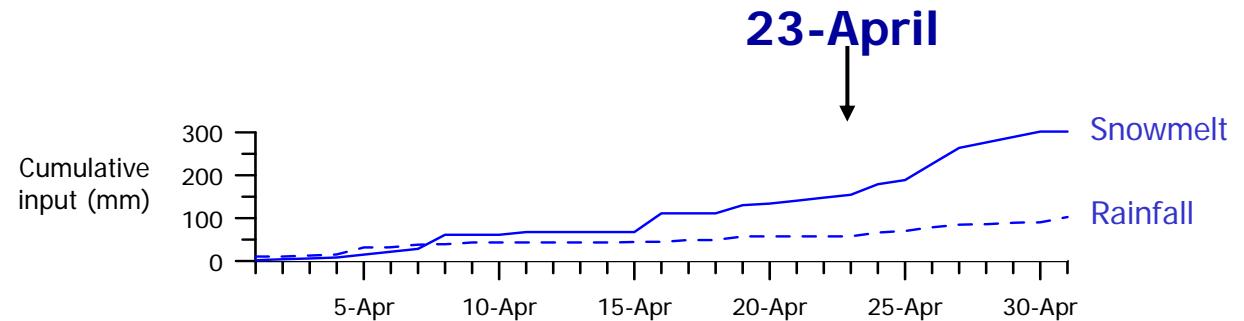
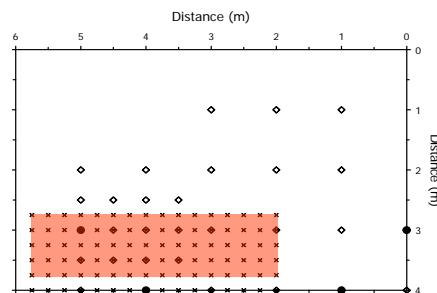


Ratio of resistivity at ground surface
relative to 01-April-01

Case 2: Mapping snowmelt infiltration – surface resistivity

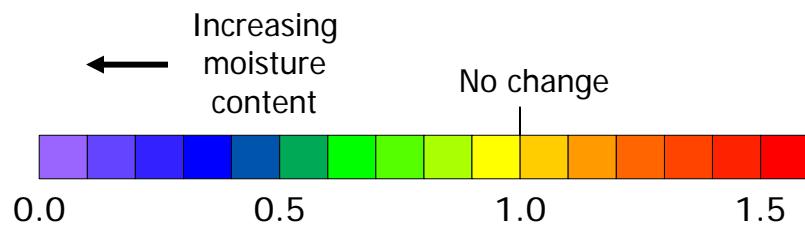
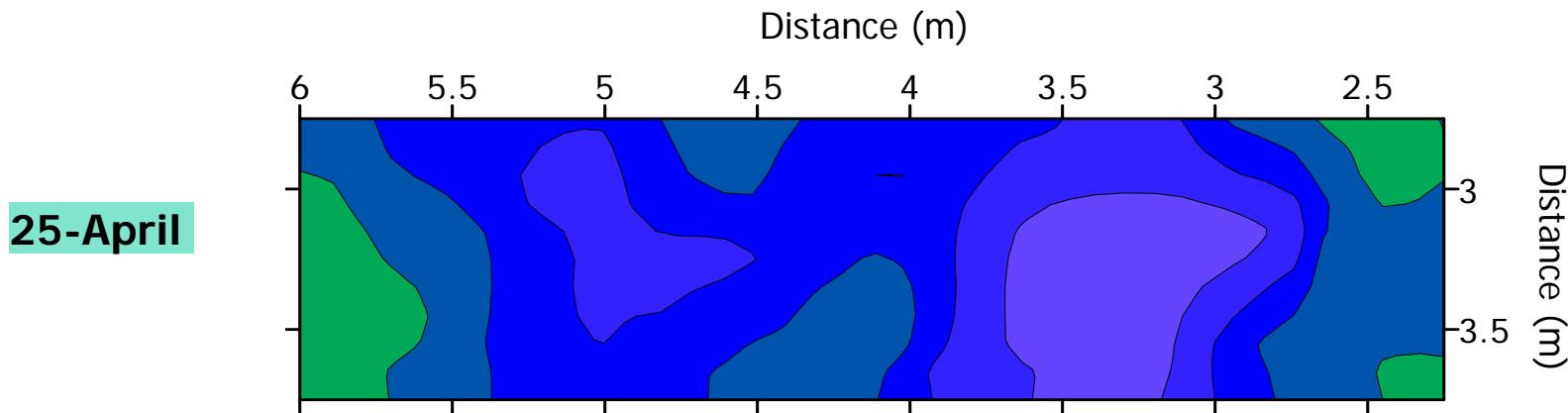
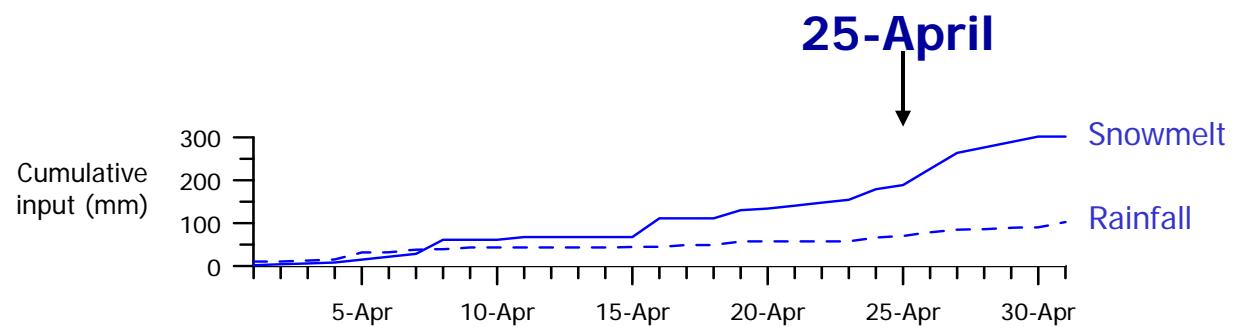
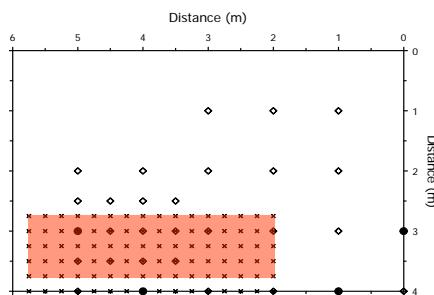


Case 2: Mapping snowmelt infiltration – surface resistivity

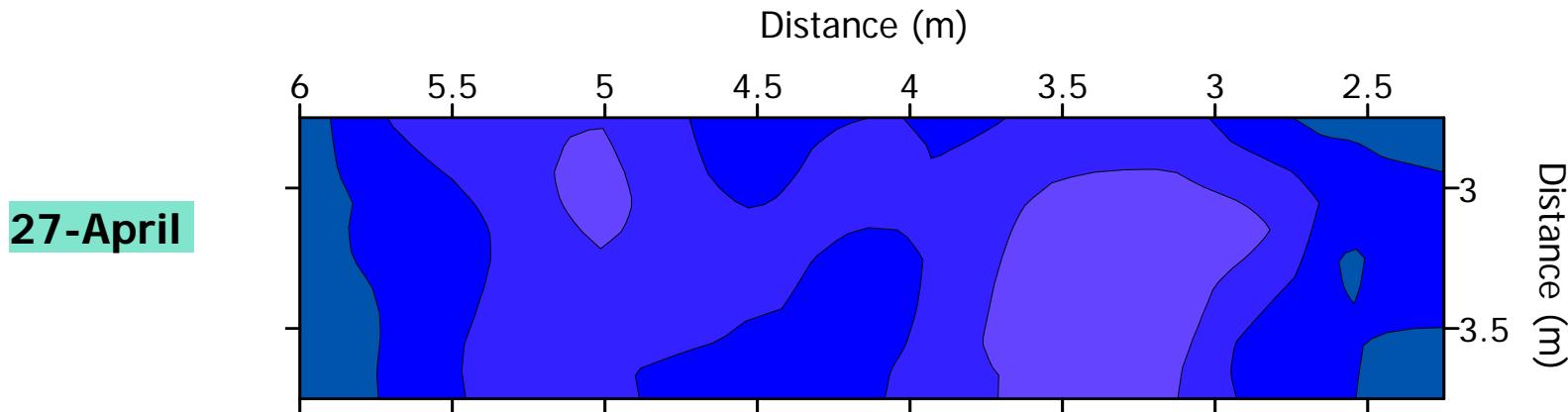
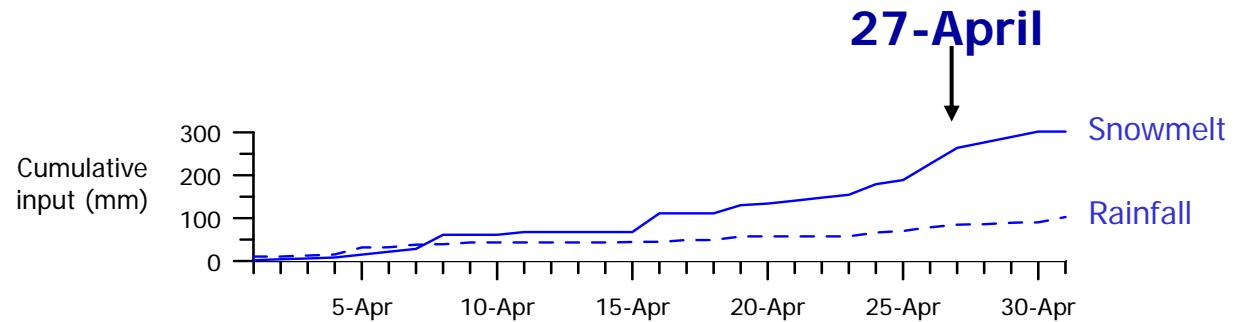
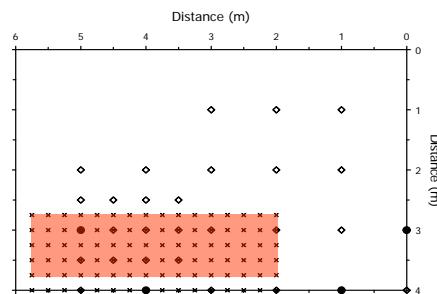


Ratio of resistivity at ground surface
relative to 01-April-01

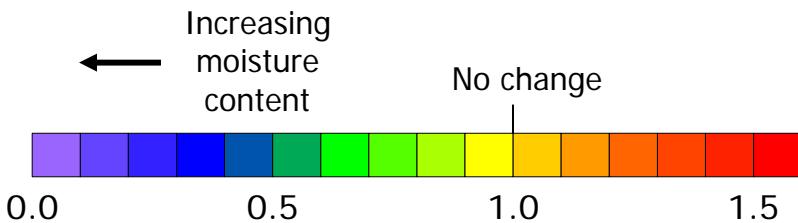
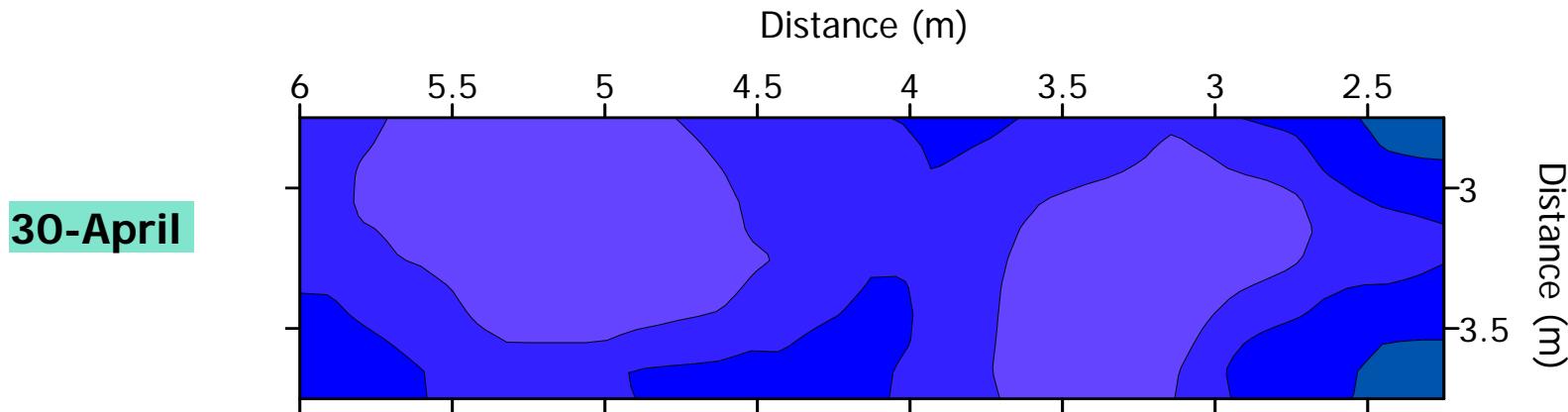
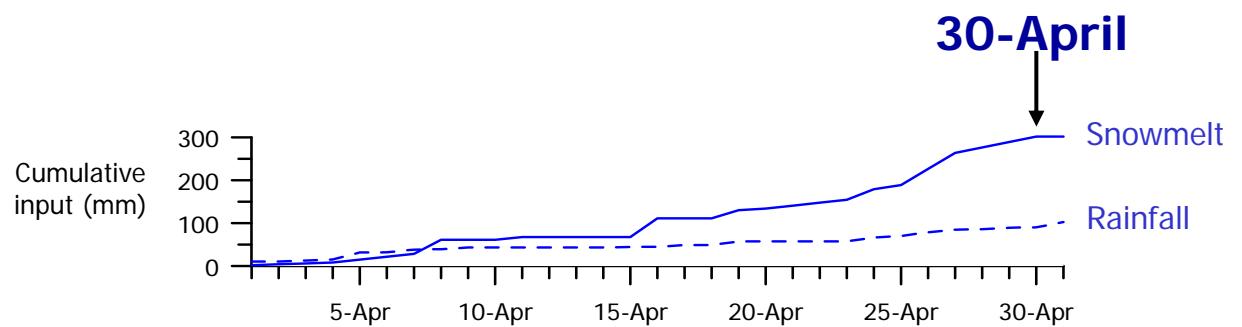
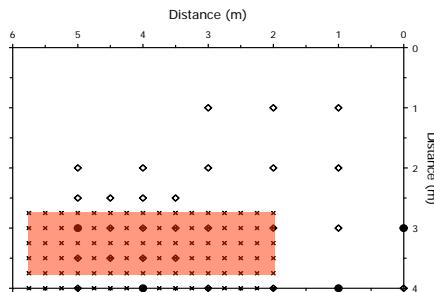
Case 2: Mapping snowmelt infiltration – surface resistivity



Case 2: Mapping snowmelt infiltration – surface resistivity

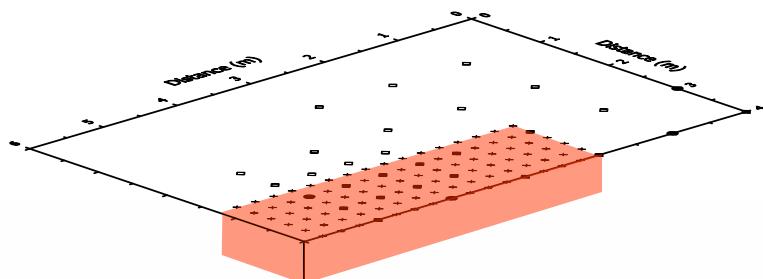


Case 2: Mapping snowmelt infiltration – surface resistivity



Ratio of resistivity at ground surface
relative to 01-April-01

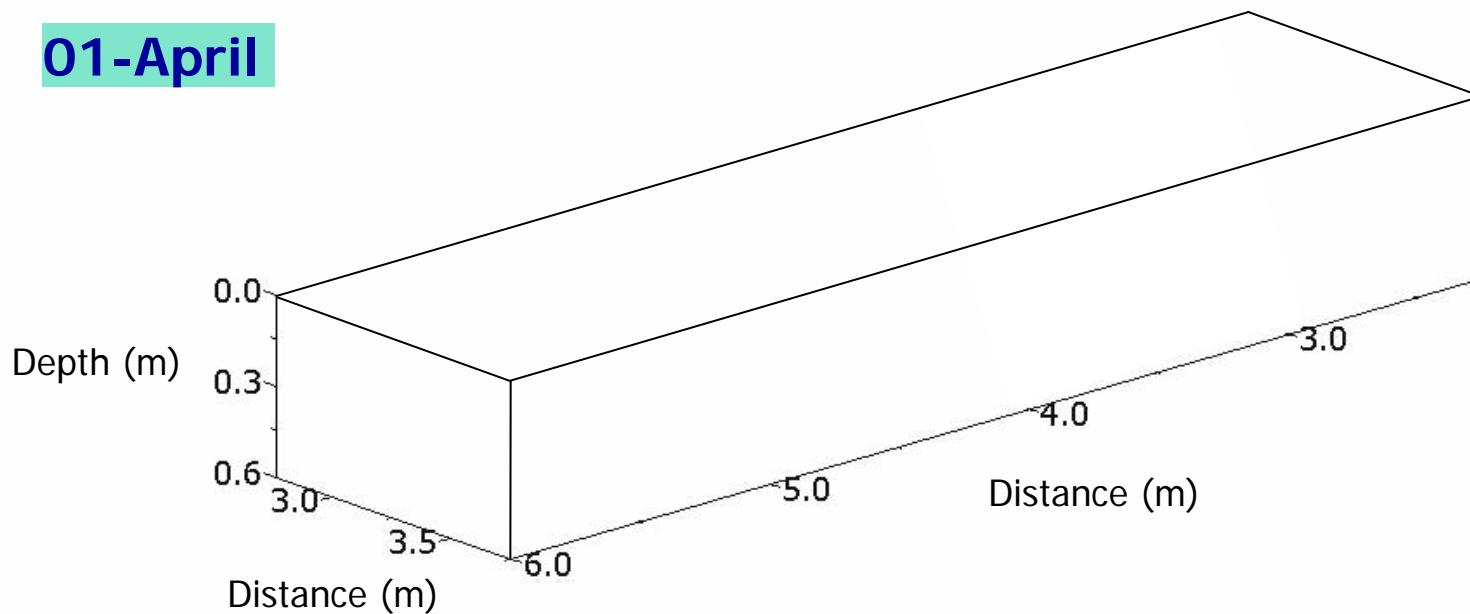
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



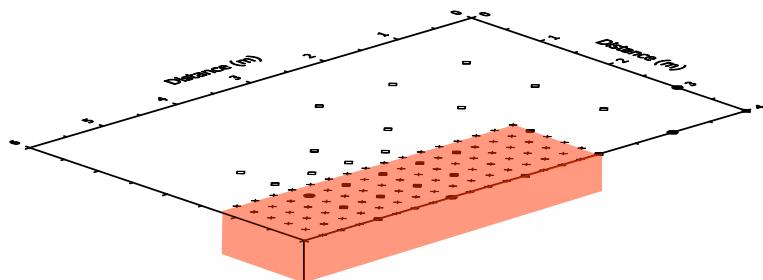
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

01-April



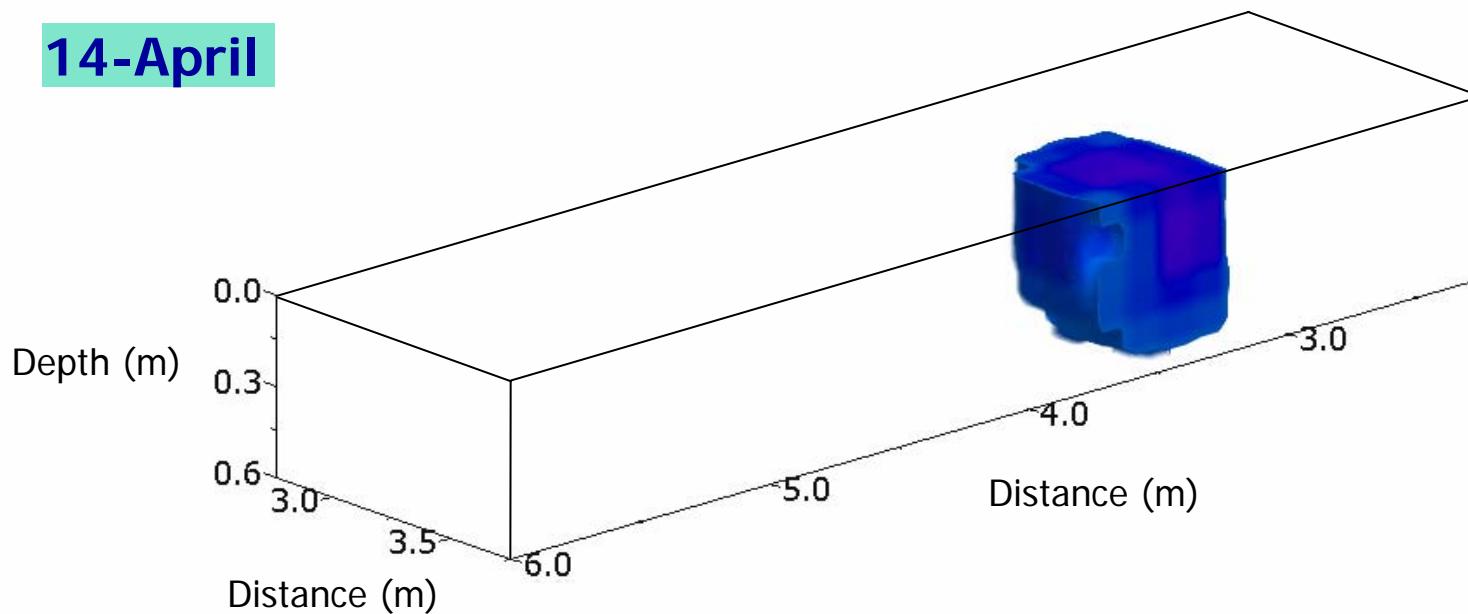
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



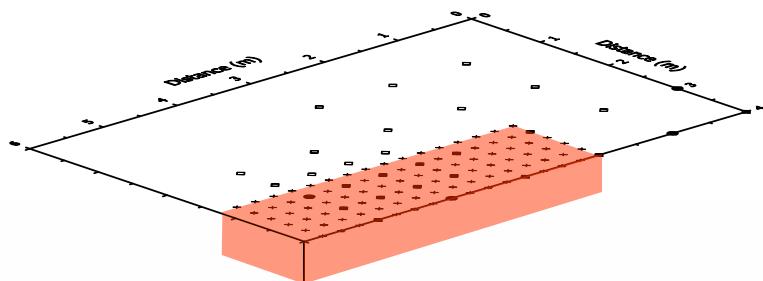
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

14-April



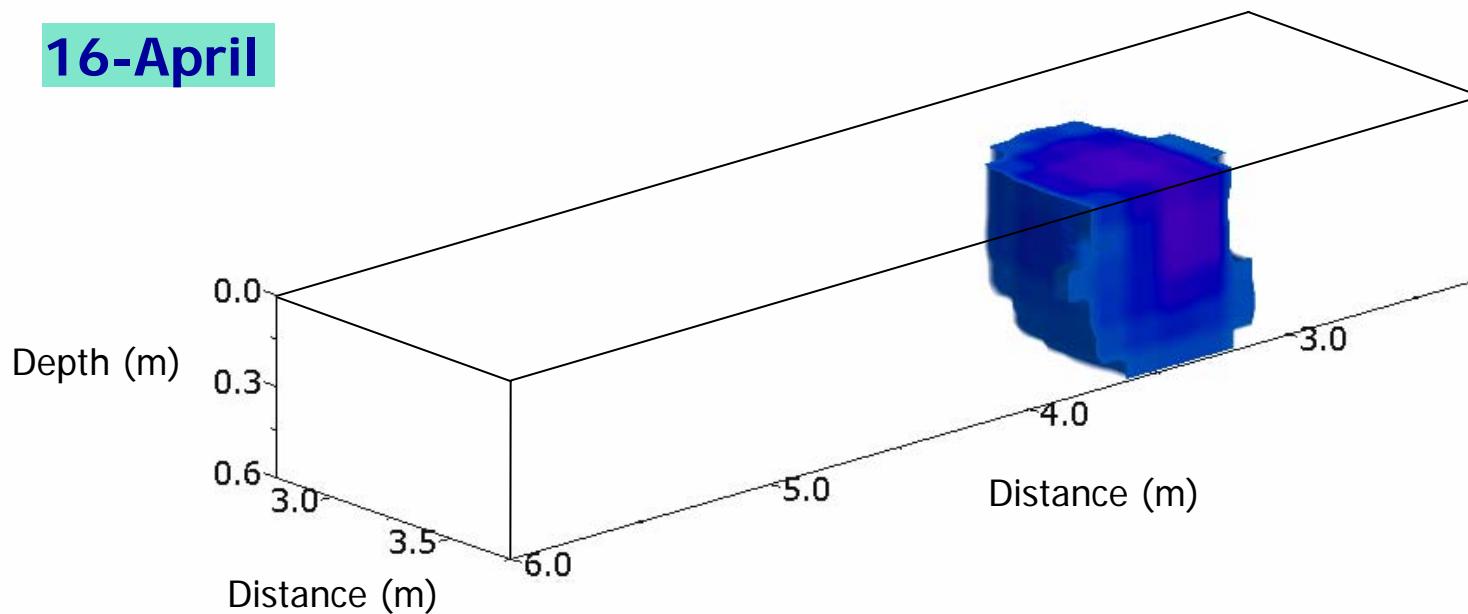
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



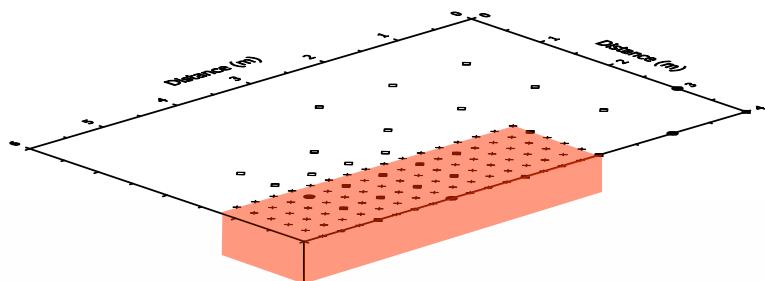
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

16-April



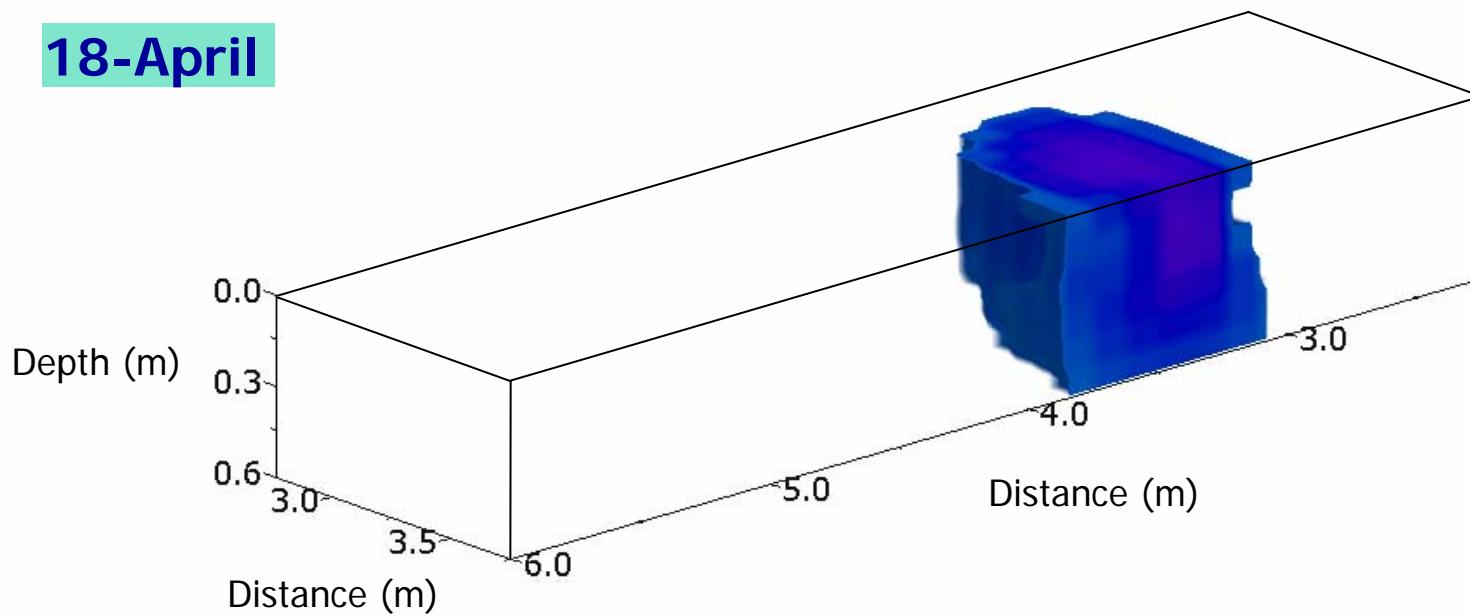
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



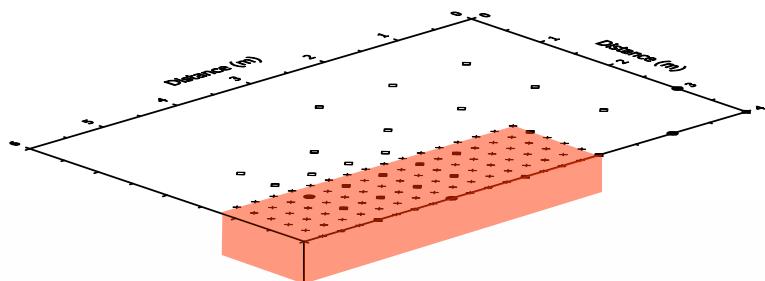
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

18-April



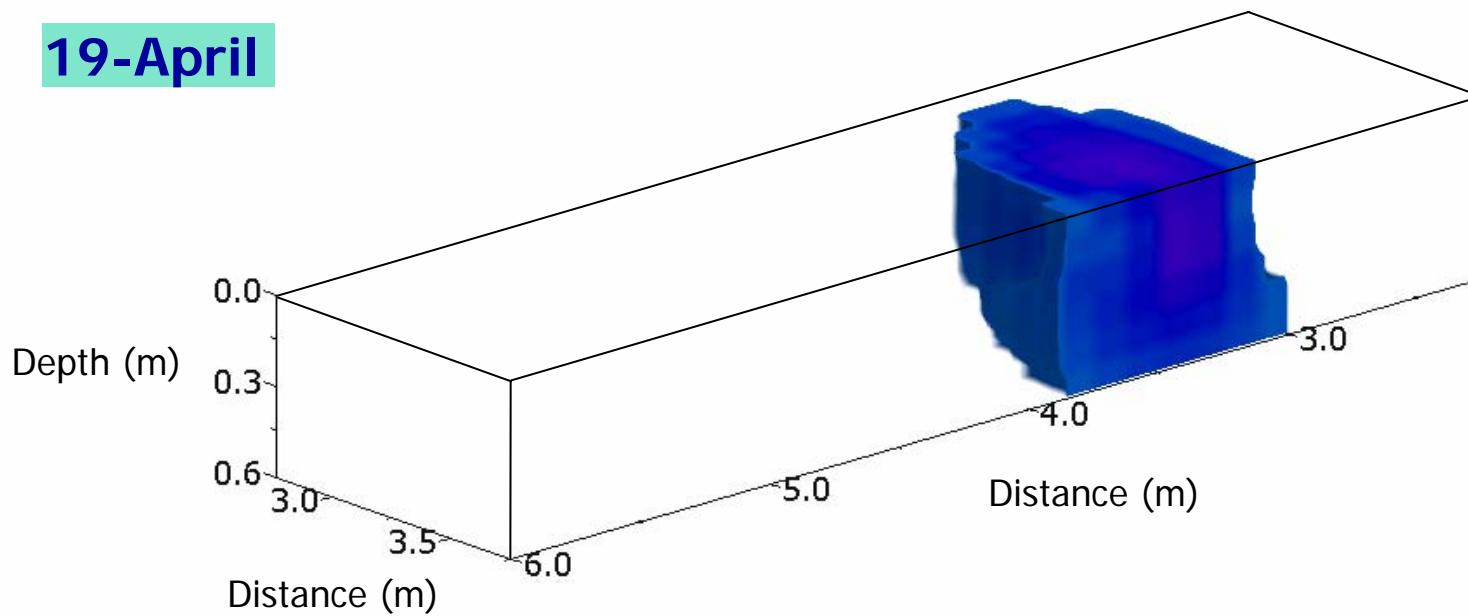
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



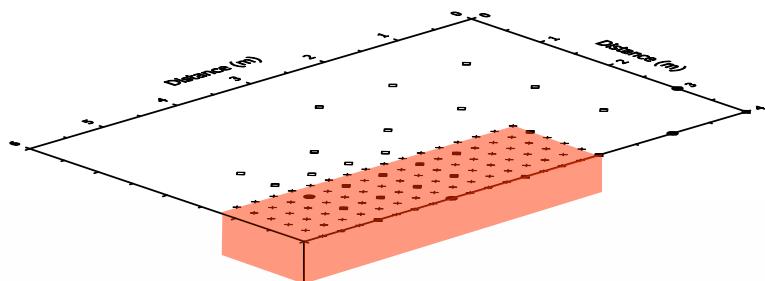
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

19-April



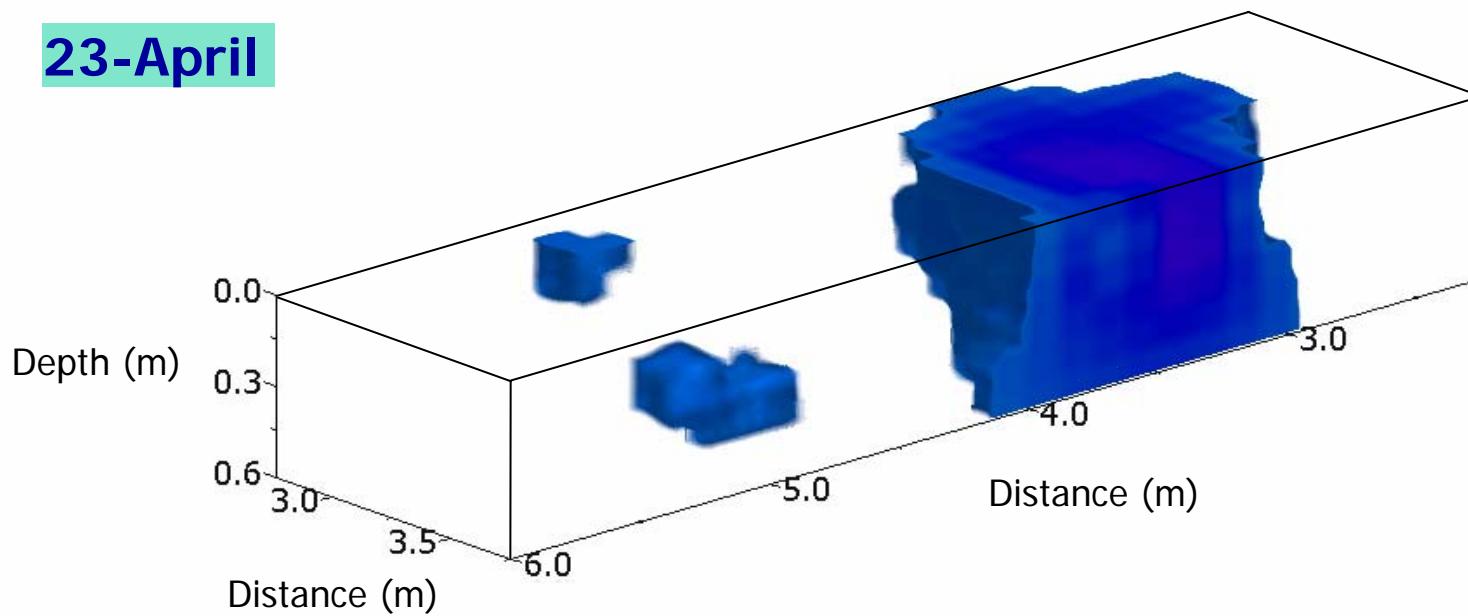
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



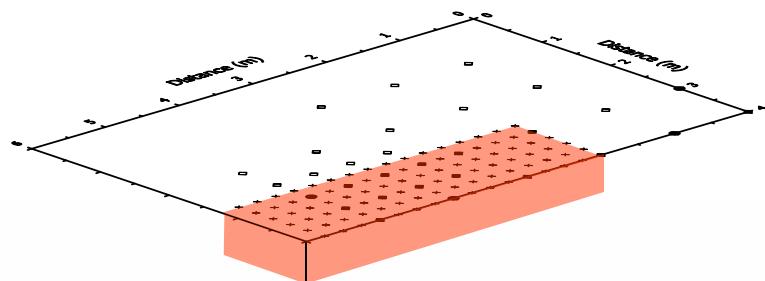
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

23-April



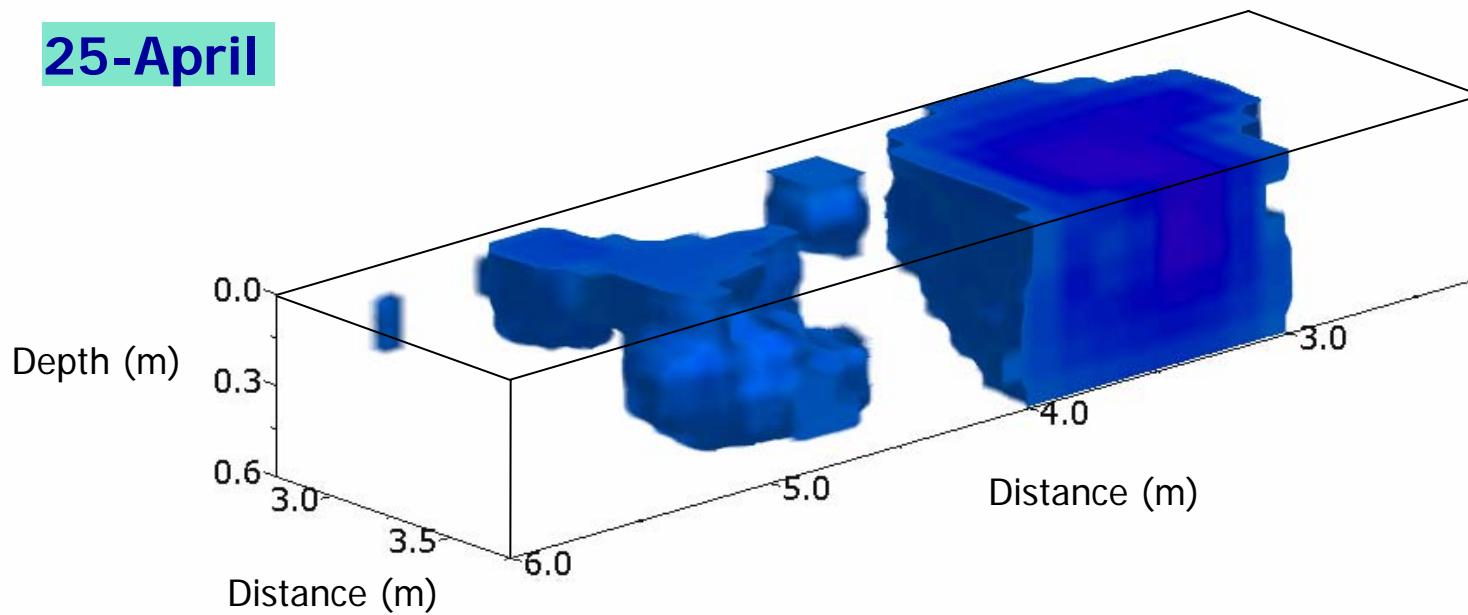
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



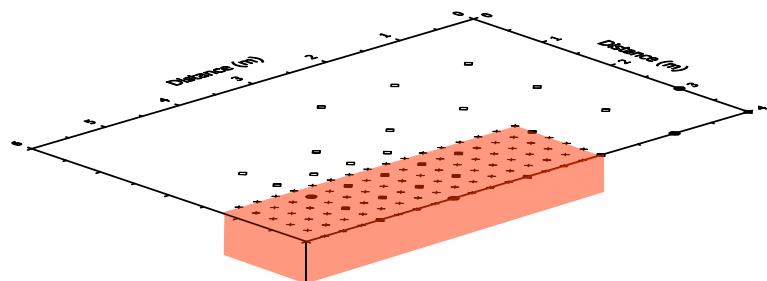
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

25-April



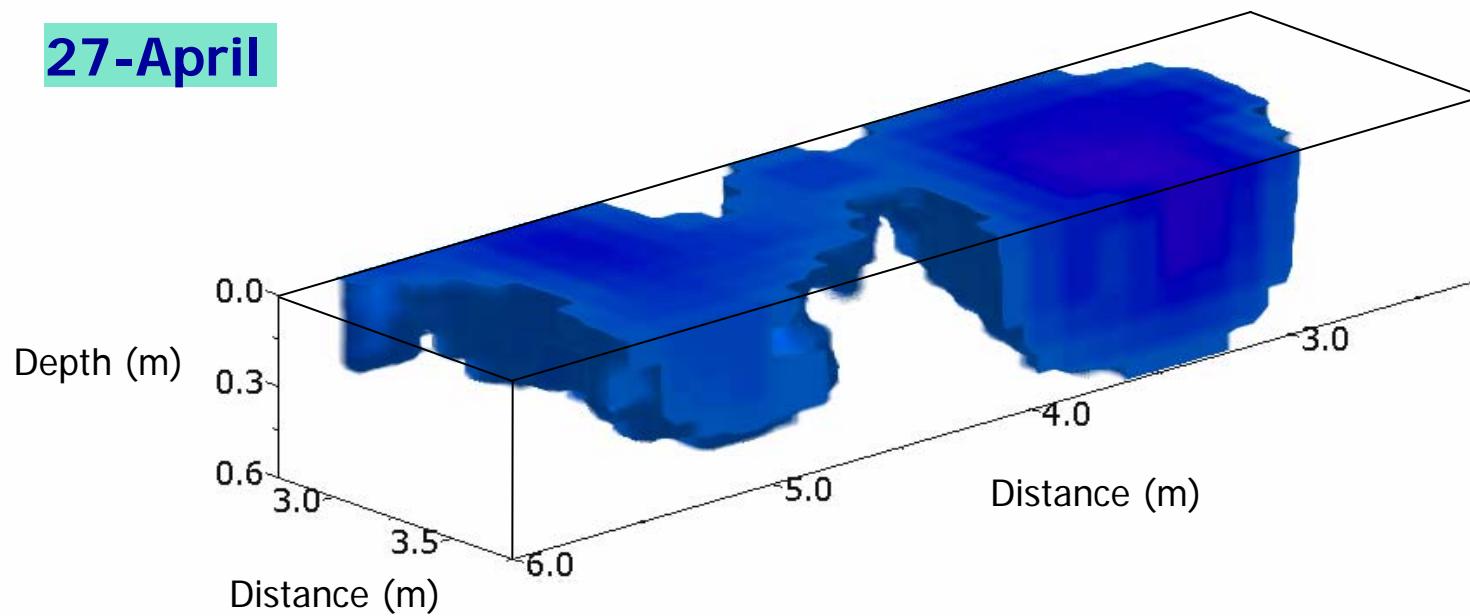
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



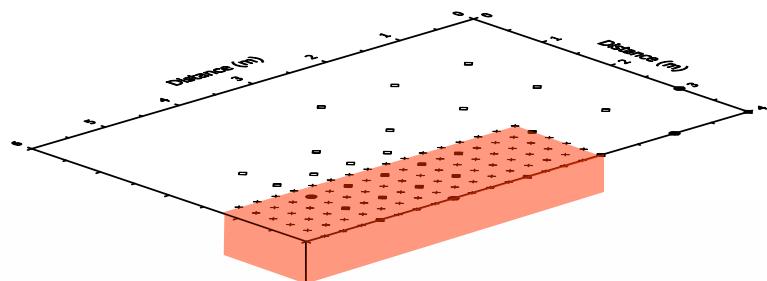
Change in 3D
resistivity relative to
01-April-01

All changes above 0.3
are transparent

27-April



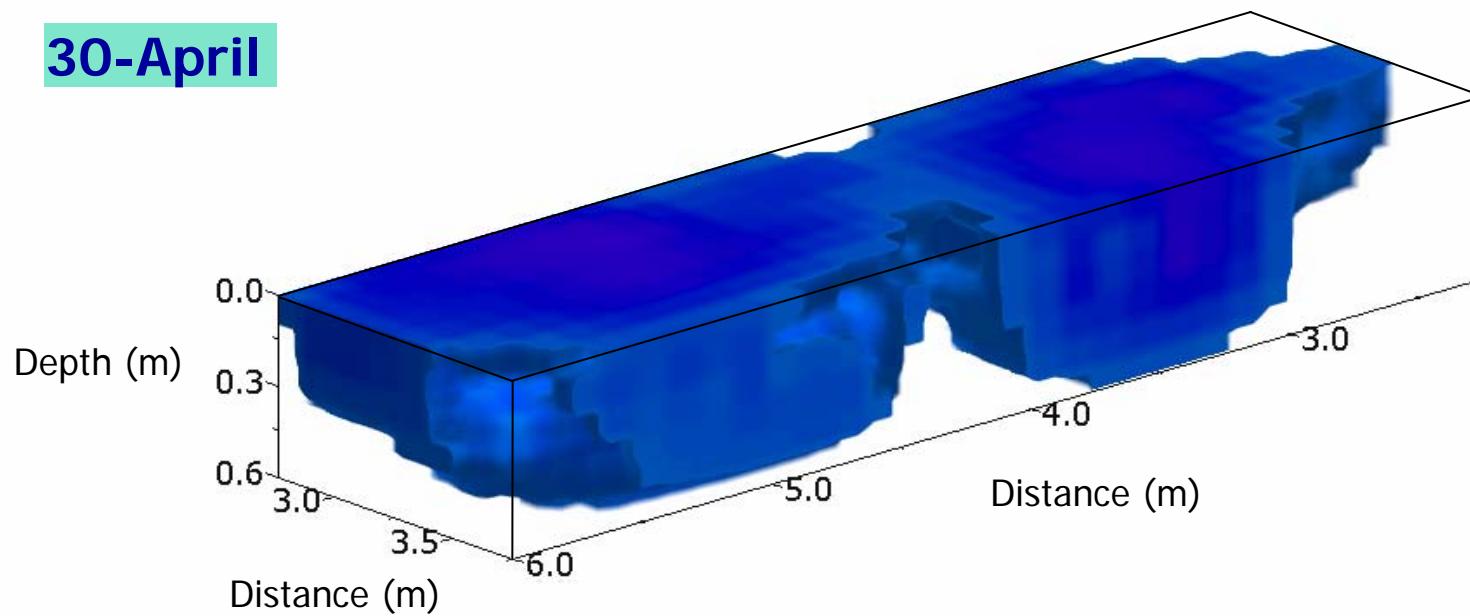
Case 2: Mapping snowmelt infiltration – 3D resistivity changes



Change in 3D
resistivity relative to
01-April-01

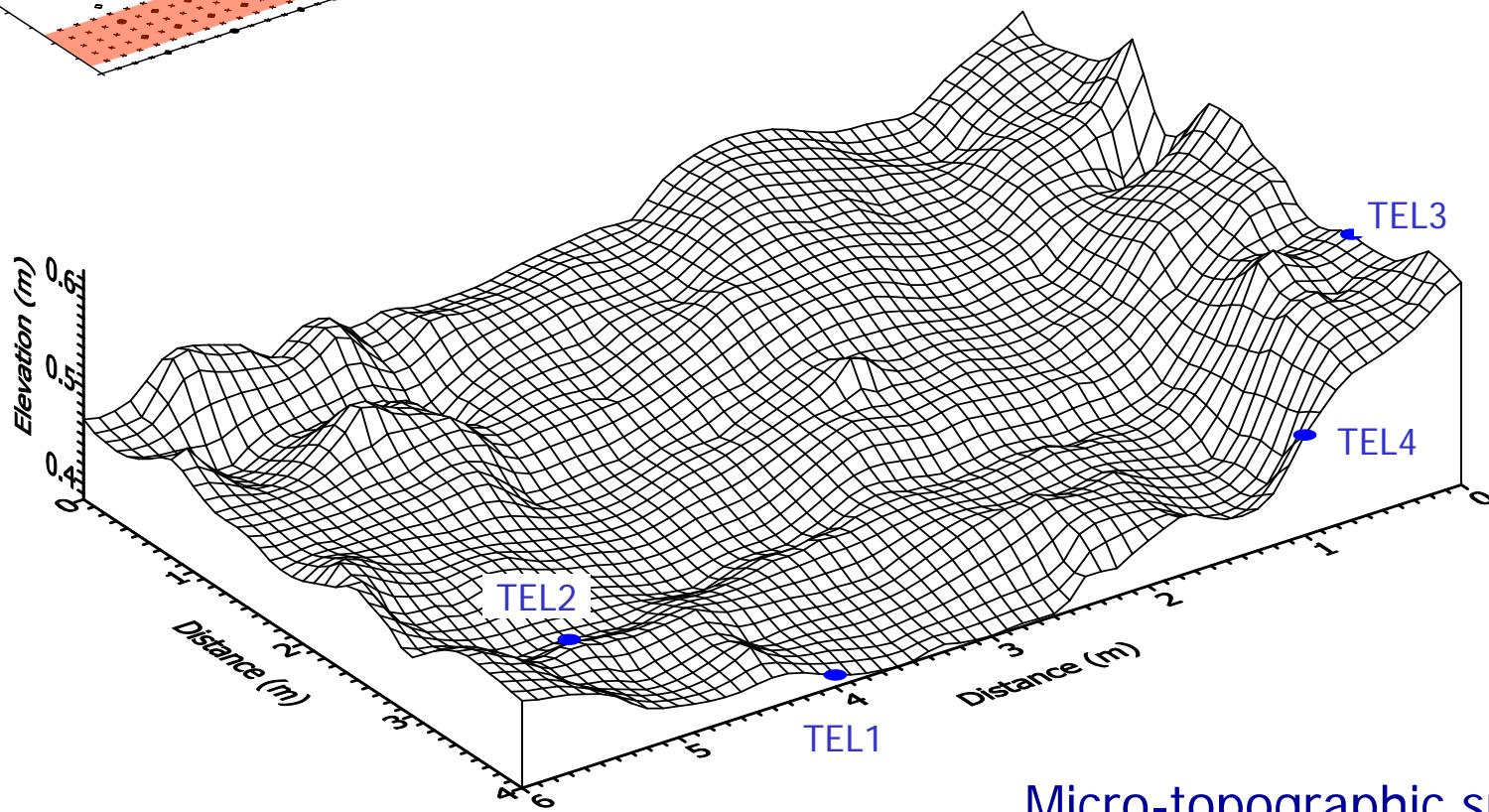
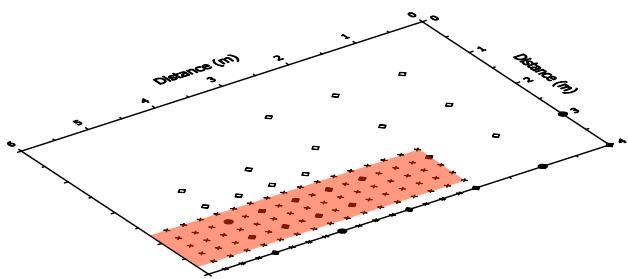
All changes above 0.3
are transparent

30-April



Case 2: Mapping snowmelt infiltration – topography influence

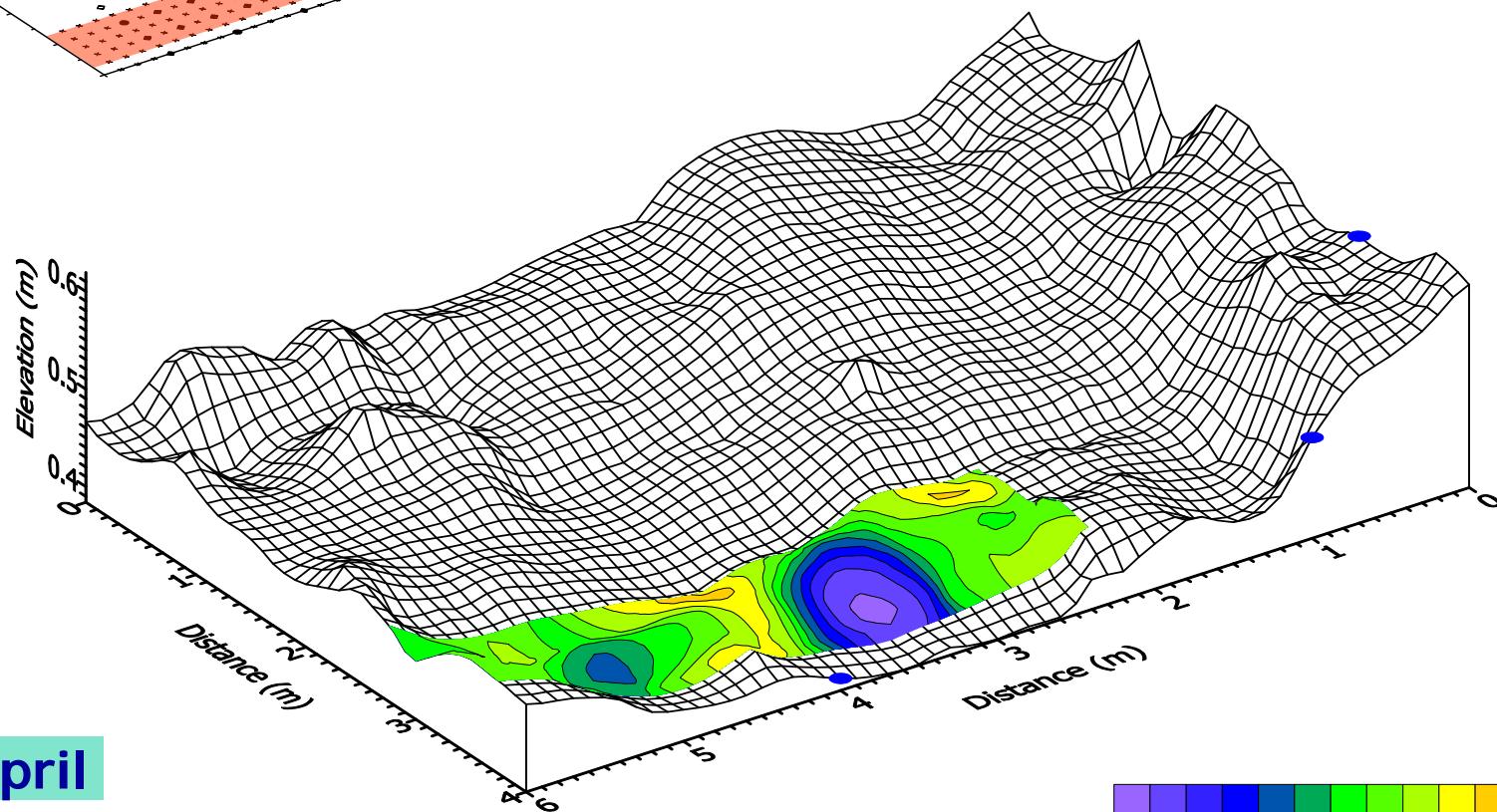
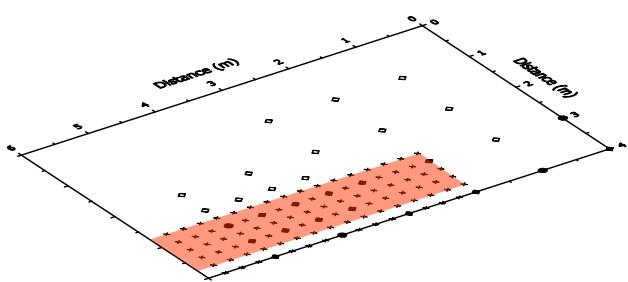
Does topography influence
snowmelt infiltration distribution ?



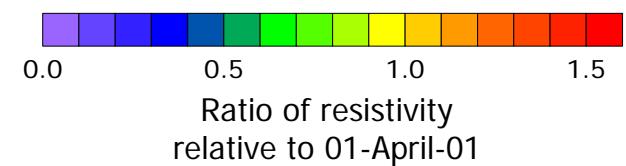
Micro-topographic survey

Case 2: Mapping snowmelt infiltration – topography influence

Change in 3D resistivity
relative to 01-April-01

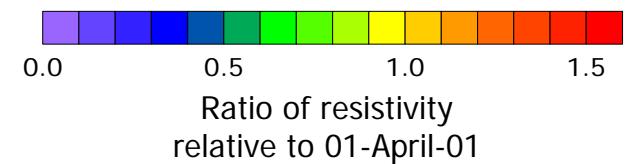
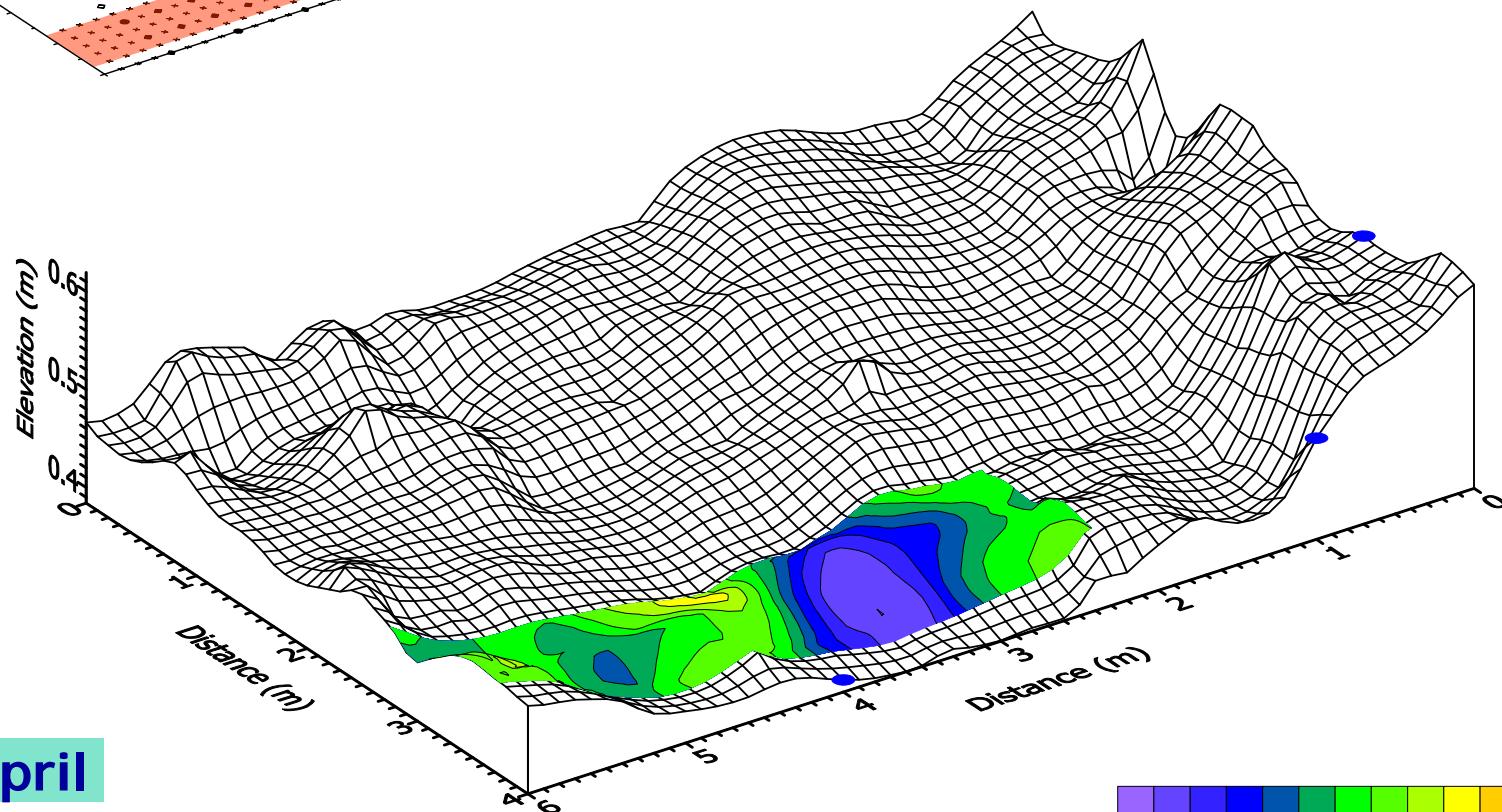
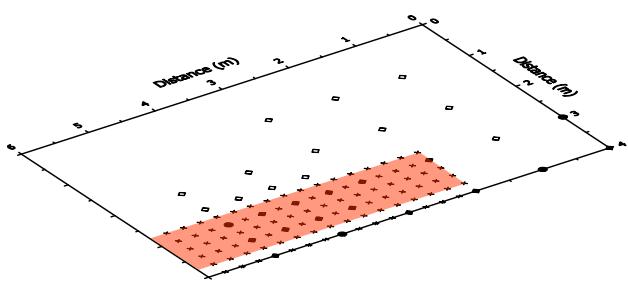


16-April

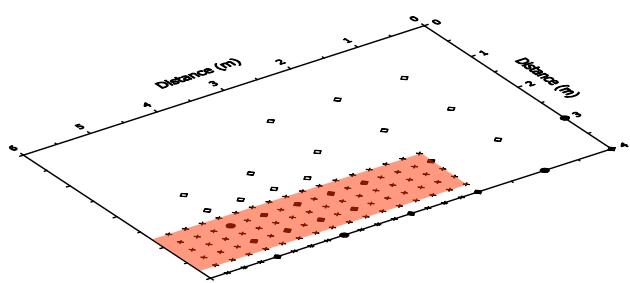


Case 2: Mapping snowmelt infiltration – topography influence

Change in 3D resistivity
relative to 01-April-01



Case 2: Mapping snowmelt infiltration – topography influence



Change in 3D resistivity
relative to 01-April-01

