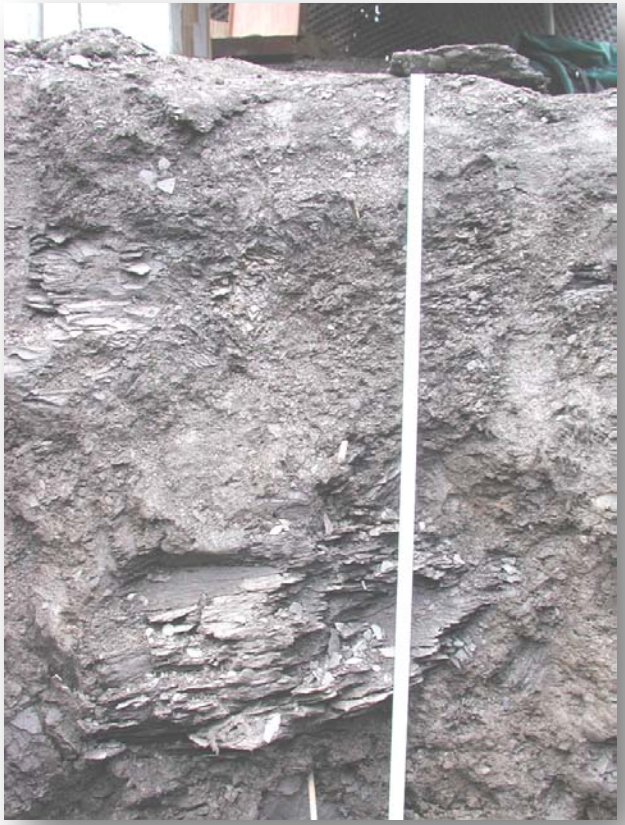
General Assembly 2011
Vienna, Austria, 03 – 08 April 2011

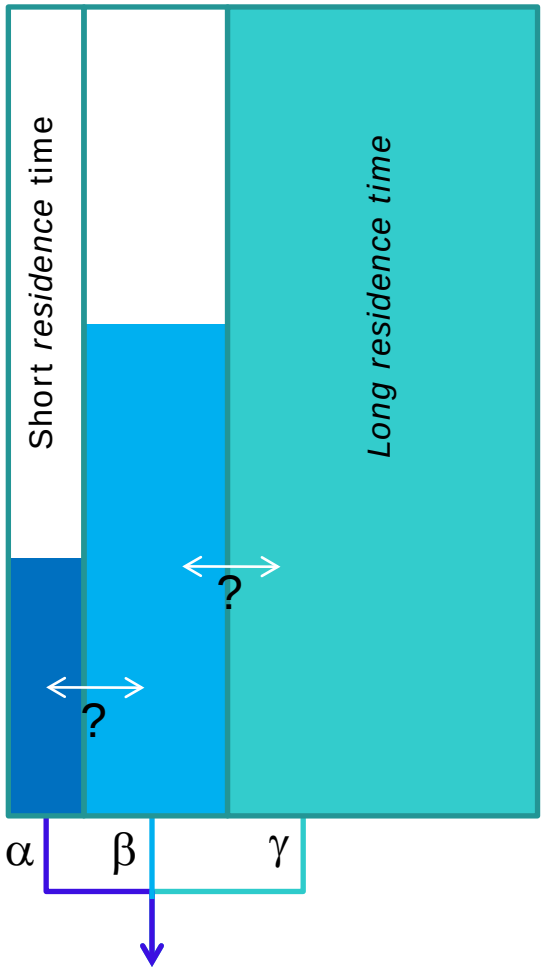
Project SISCA

Flow processes investigation in soft clay shales from tracing experiments at the laboratory scale

Vincent Marc, Stéphane Ruy, Olivier Poilleux, Thomas Madre, Michel Daniel, Bruno Jouaud and Roland Simler

Recharge processes in soft clay shales





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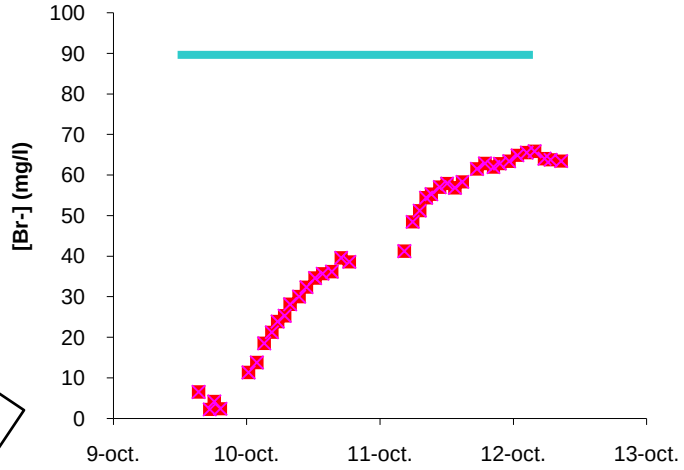
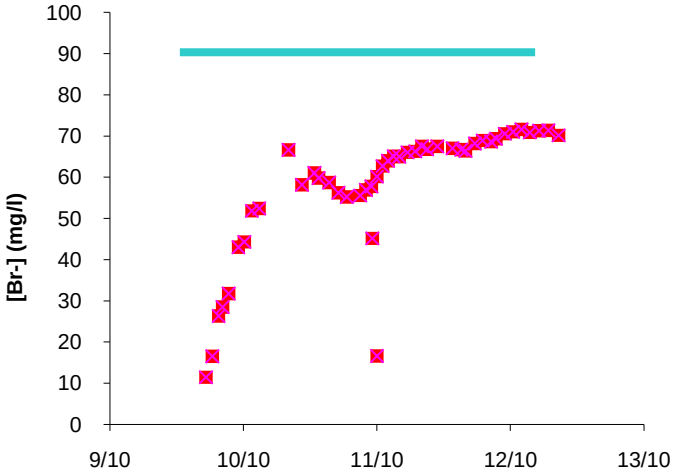
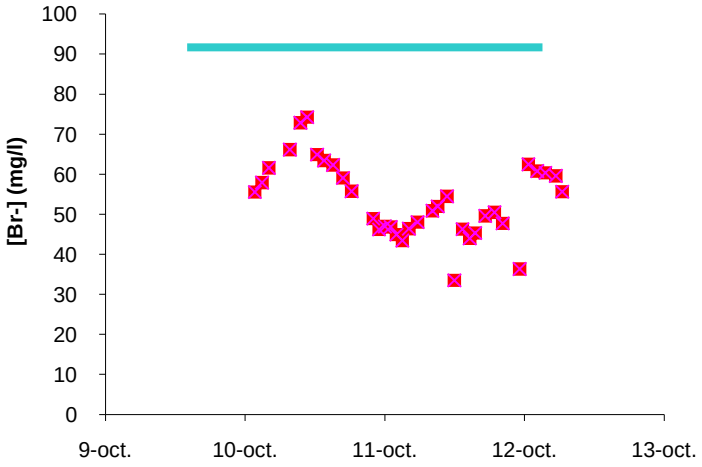
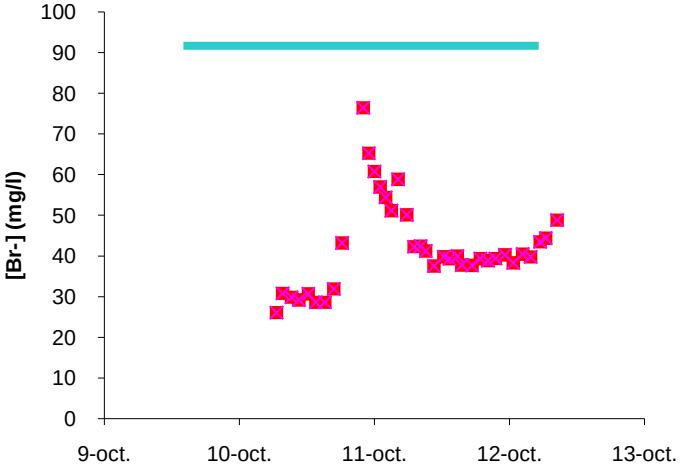
FIELD

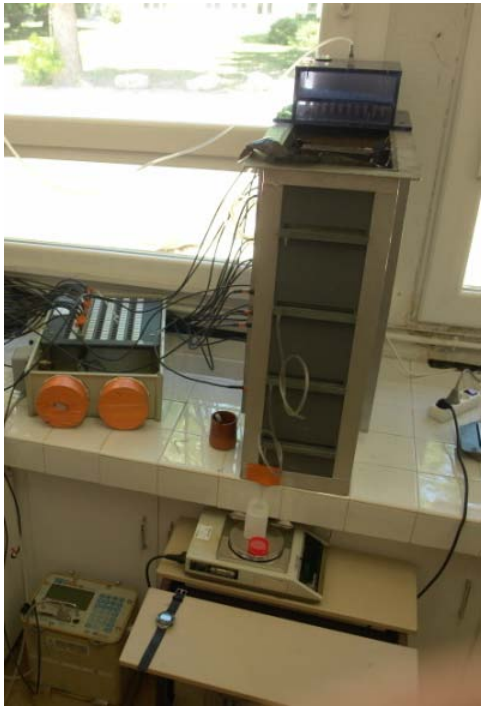








Rainfall simulations in the lab



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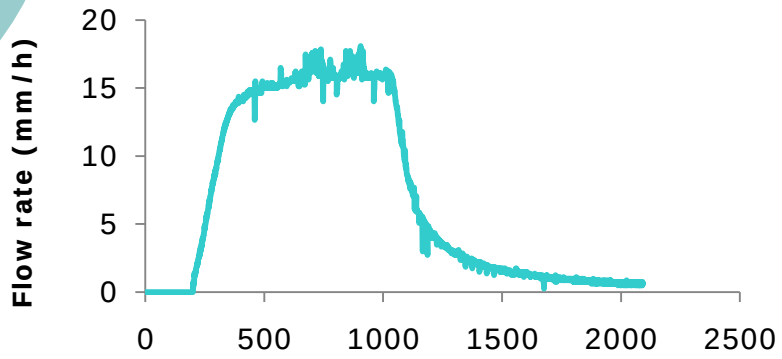
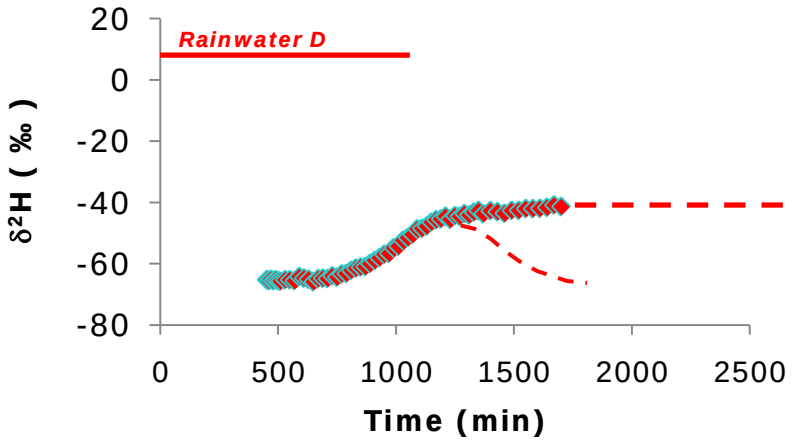
2-3 juin 2010

I=15,6 mm/h

17,2 h

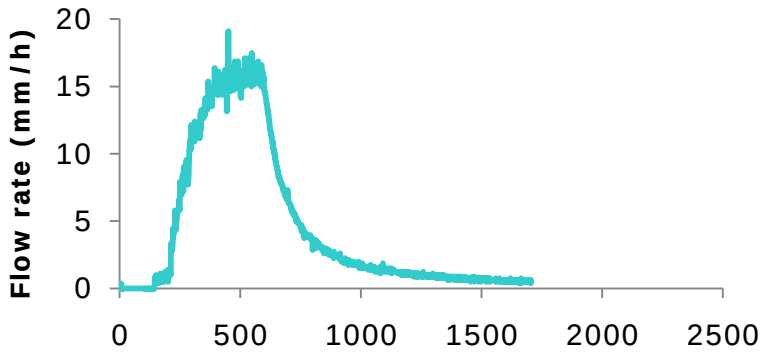


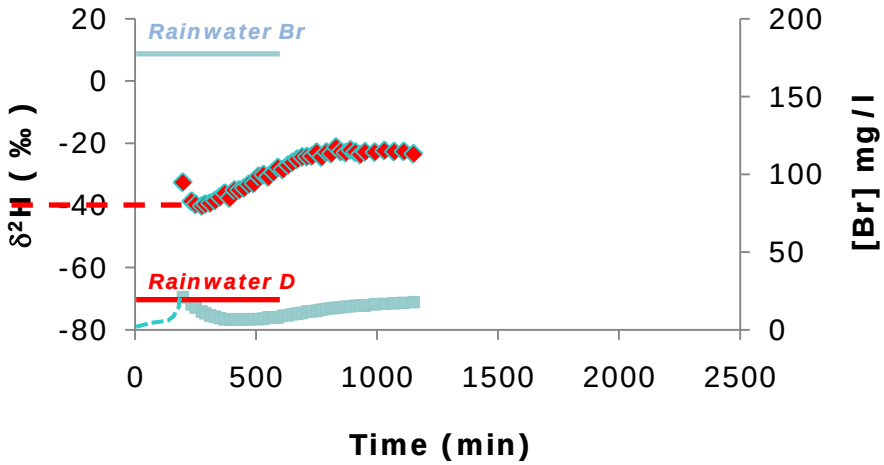


29-30 juin 2010

I=16,7 mm/h

10,2 h





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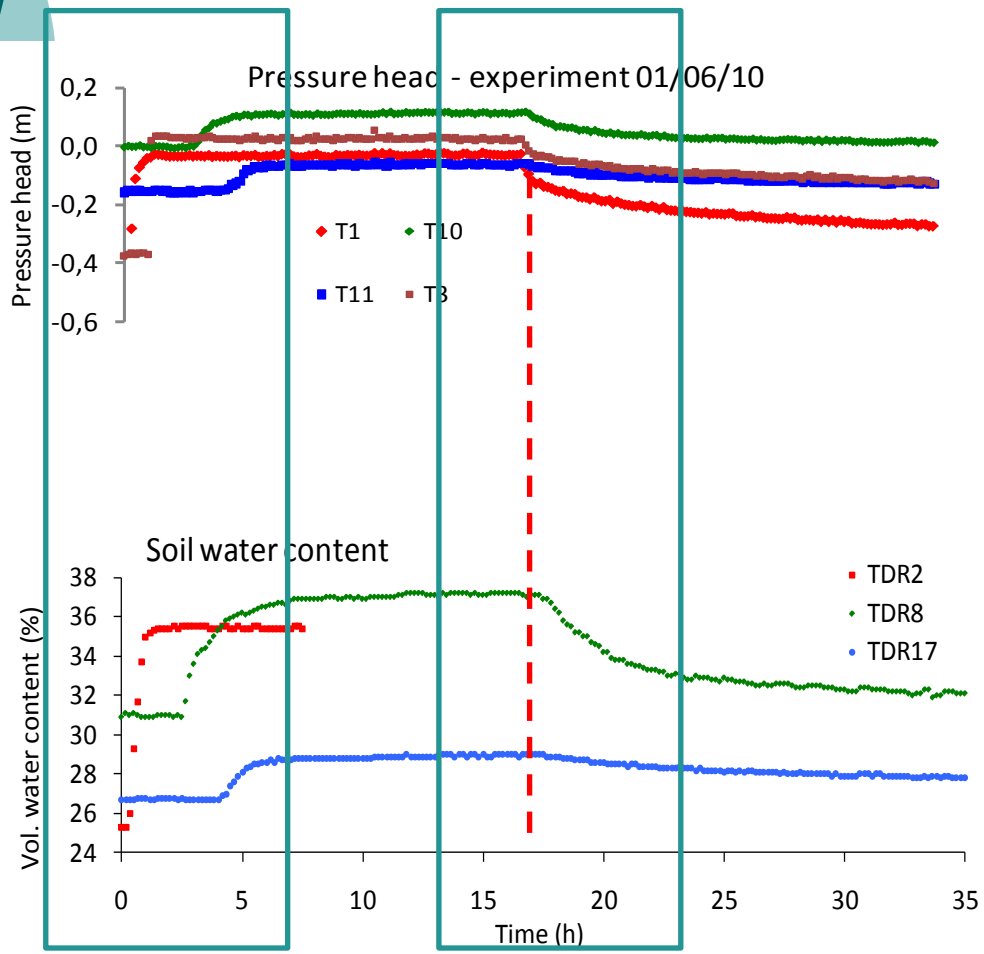
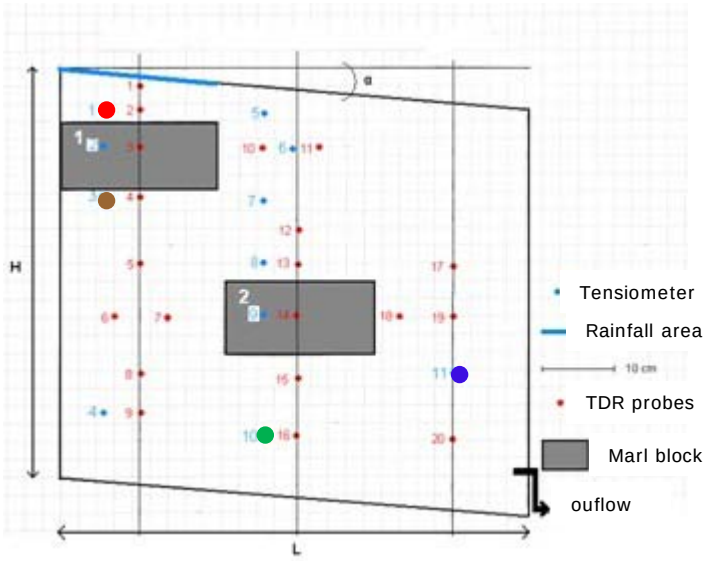
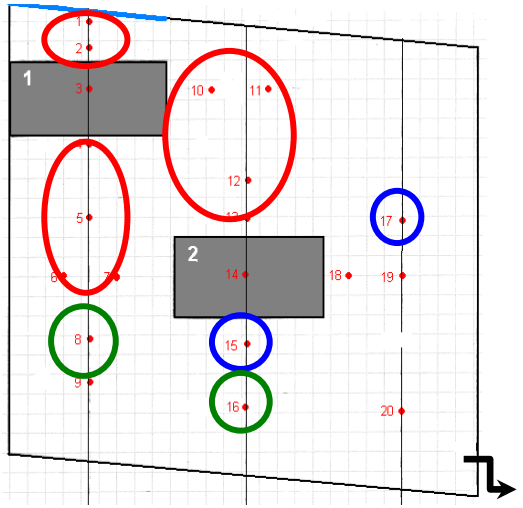
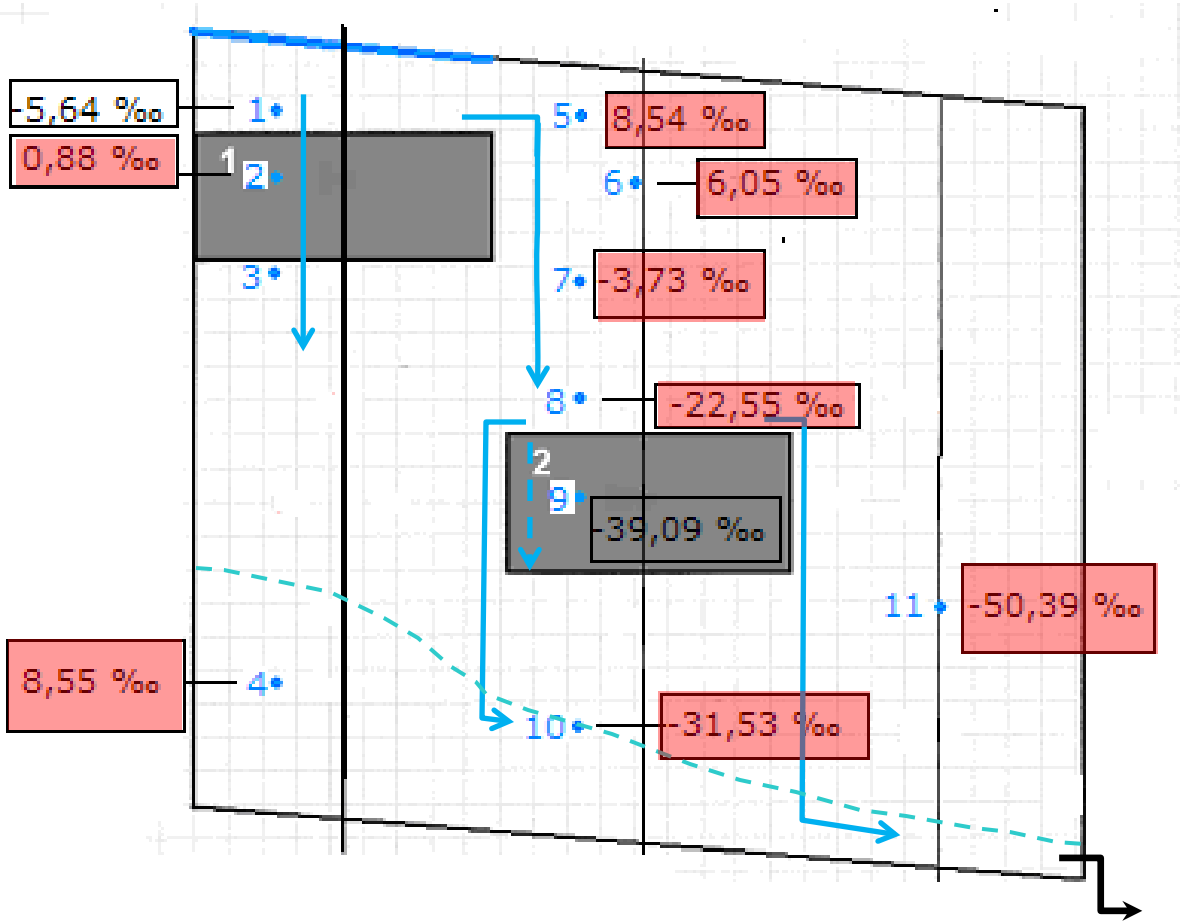


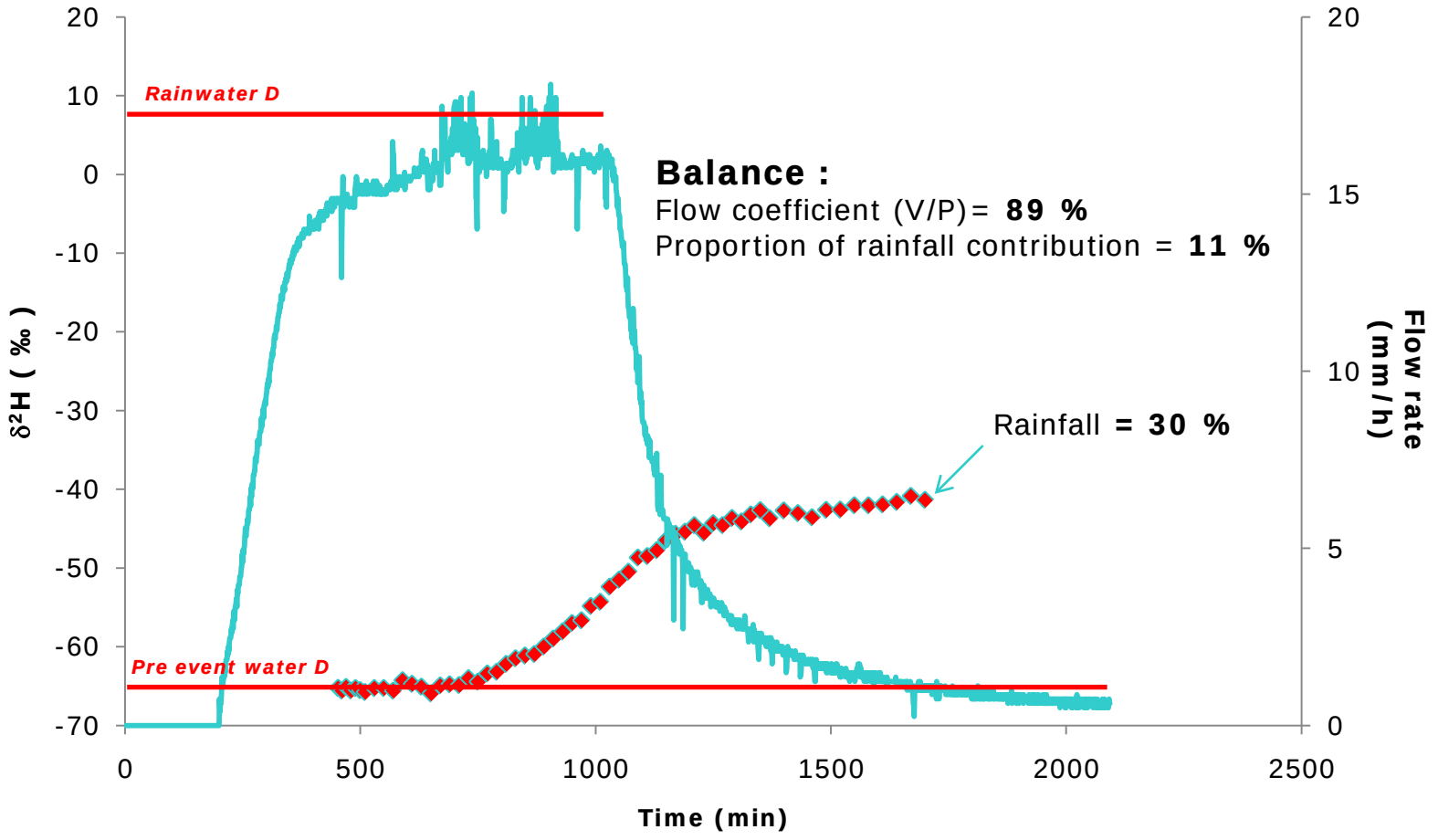




δ^2H rainfall= + 8,50 ‰

δ^2H pre event water = -66 ‰




Rainwater D
Pre event water D
Balance :
Flow coefficient (V/P)= 89 %
Proportion of rainfall contribution = 11 %
Rainfall = 30 %
δ²H (‰)
Flow rate (mm/h)
Time (min)
20
10
0
-10
-20
-30
-40
-50
-60
-70
15
5
500
1000
1500
2000
2500

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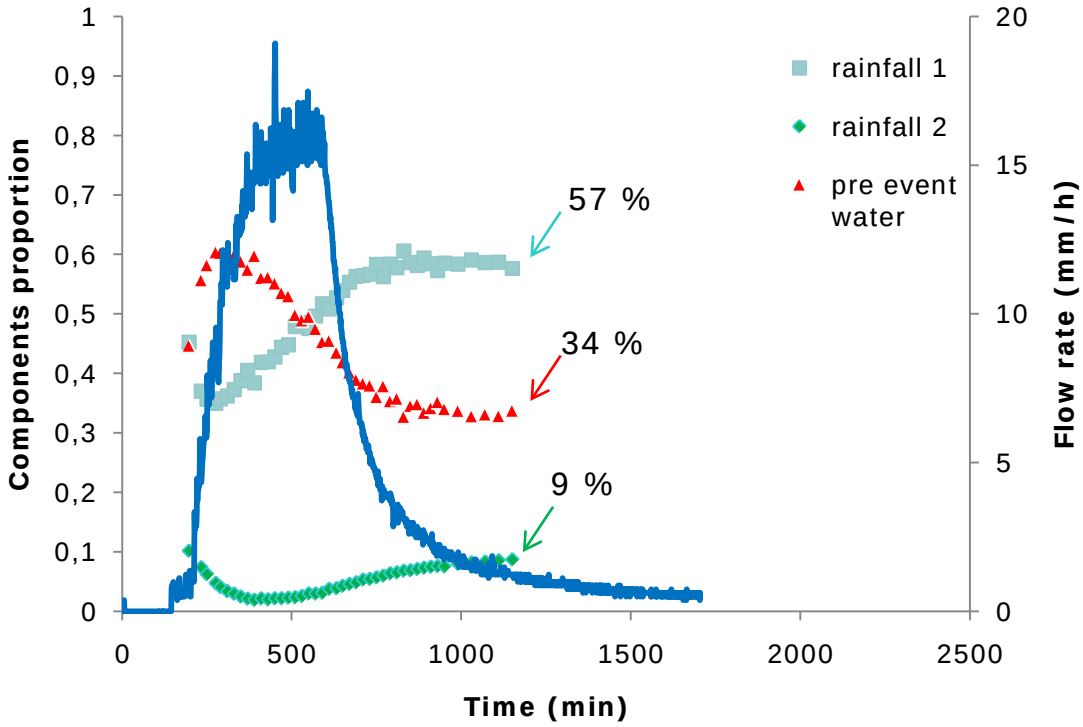
Recharge processes in soft clay shales

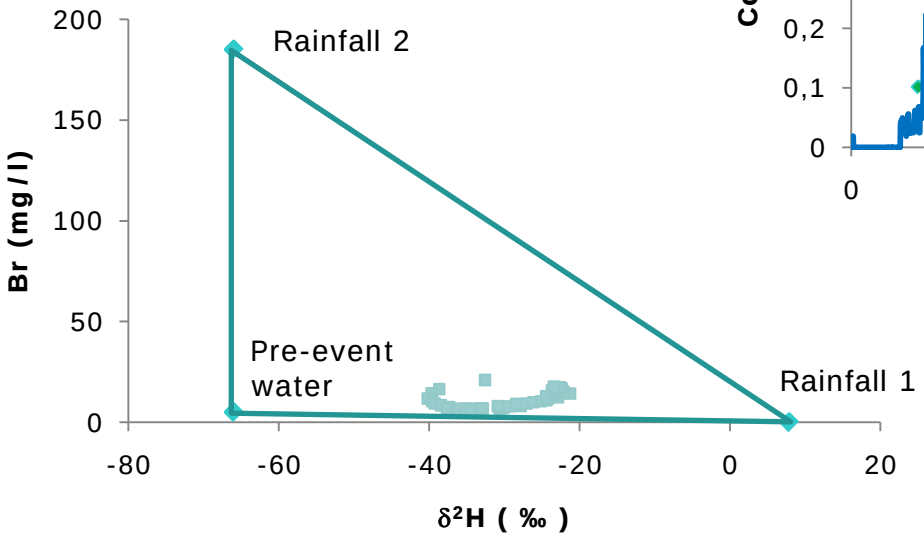
Experiment 29-30 juin 2010

Balance :

Flow coefficient = **75 %**

Proportion of rainfall contribution = **3,6 %**





Conclusions

o Infiltration phase :

→ steady state flow, no surface runoff

→ pre event water dominates outflow

o Recession phase :

→Poor drainage within the matrix

→No increase of pre event water contribution
(poor drainage from microporosity)

o Role of marl blocks :

layering structure and weathering level make it possible water storage in the blocks and preferential flow through them

Poster session : Hydrological processes in soft clay shales

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Emilie Garel, Vincent Marc, Stéphane Ruy, Jean-Philippe Malet, Anne-Laure Cognard-Plancq, Christophe Emblanch, Sébastien Klotz, Roland Simler

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HYDROGEOCHEMICAL MODELLING OF CLAY-RICH LANDSLIDES AND ANOMALIES IN GROUNDWATER COMPOSITIONS: EVIDENCES FROM CASE STUDIES IN THE NORTHERN APENNINES OF ITALY AND SOUTH ALPS OF FRENCH
Federico Cervi , Vincent Marc, Catherine Bertrand, and Jean Philippe Malet

HYDROLOGICAL AND CHEMICAL CHARACTERIZATION OF AN EARTH SLIDE-FLOW
Federico Cervi, Francesco Ronchetti, Alessandro Corsini, Thom Bogaard, and Vincent Marc

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