SNO KARST : a network of observatories on karst catchments – (France) Added value and perspectives

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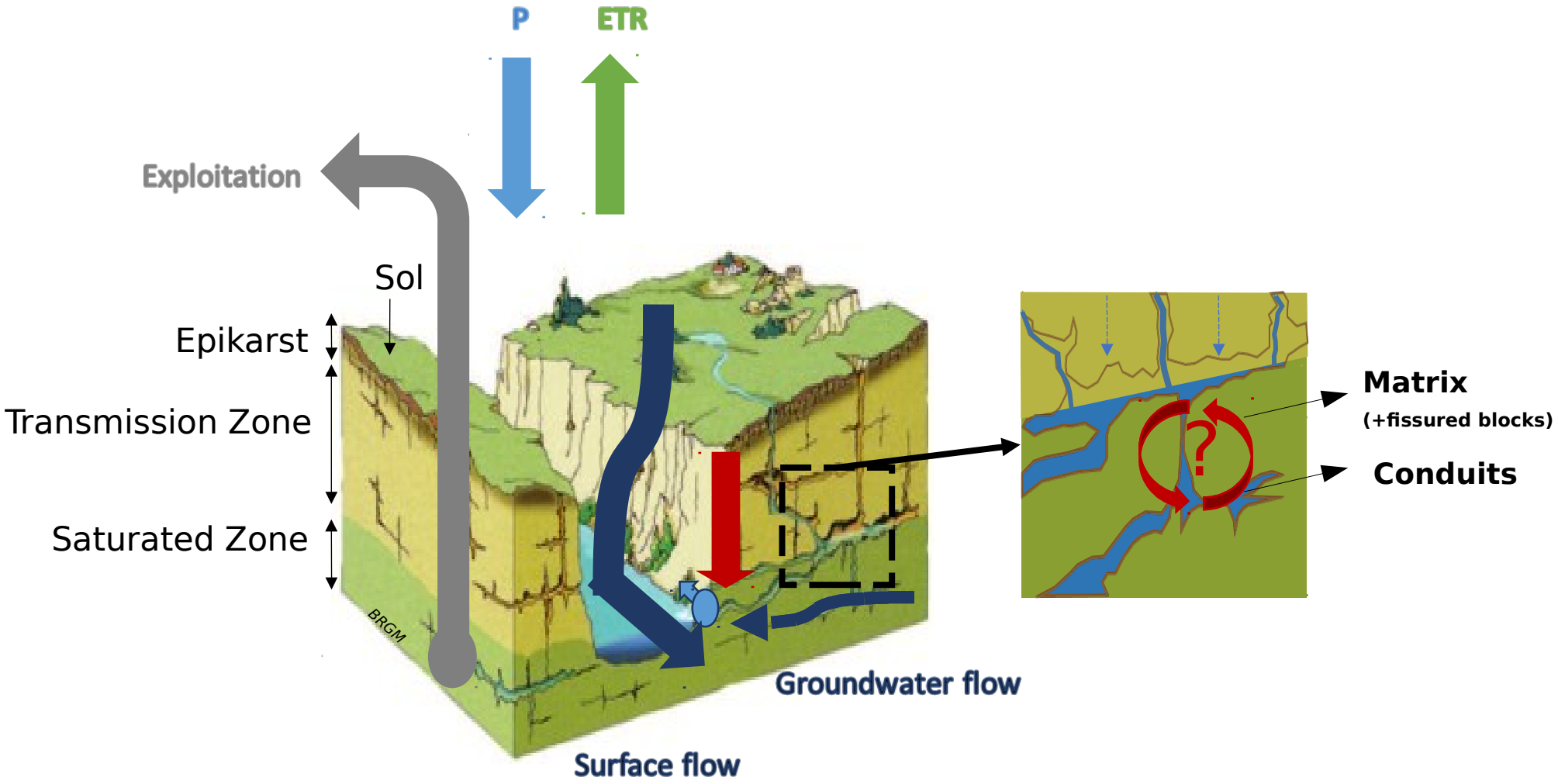
Karst is a complex medium

Water goes through compartments that have specific flow-related properties



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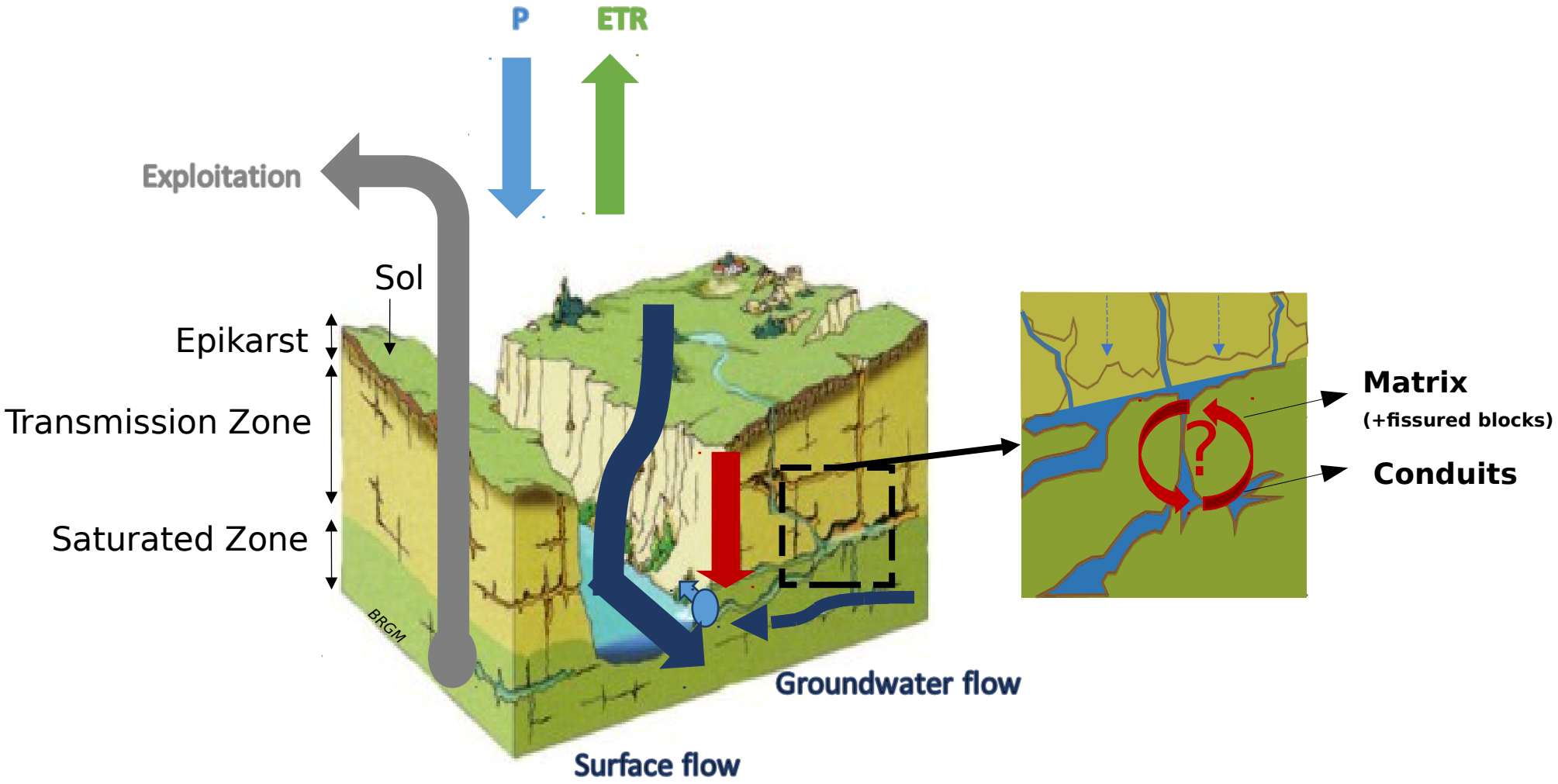
Impact on flow dynamics
Impact on water quality



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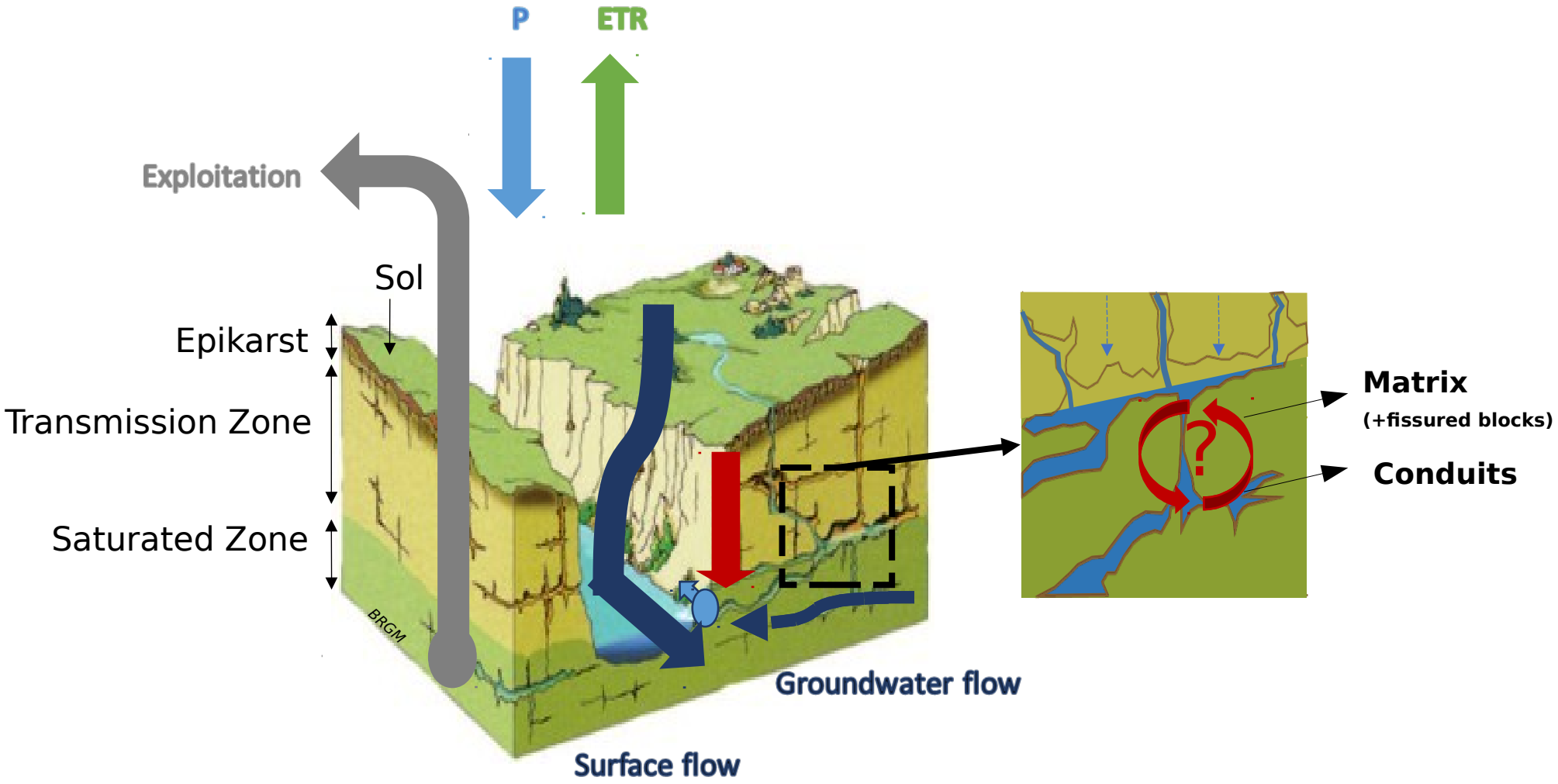
Impact on flow dynamics
Impact on water quality

Impact on water resource quantity
Impact on water resource quantity



Karst is a complex medium

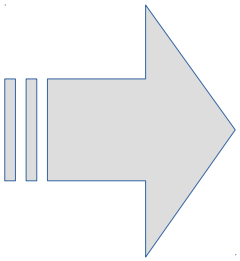
Water goes through compartments that have specific flow-related properties

- **Impact on flow dynamics**
- **Impact on water quality**

- **Impact on water resource quantity**
- **Impact on water resource quantity**

Specific natural and human-induced hazards
Also great opportunities as regards water resource…

Addressing the “karst challenge” requires long-terme and complete datasets
+ expertise in different scientific fields



structuration of the french karst community within the SNO Karst network

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French network of observatories located in a variety of climatic, geologic, geomorphologic and physiographic contexts

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KARST DE LA CRAIE

JURASSIC KARST

VAL D'ORLEANS

FONT. DE VAUCLUSE
LSBB

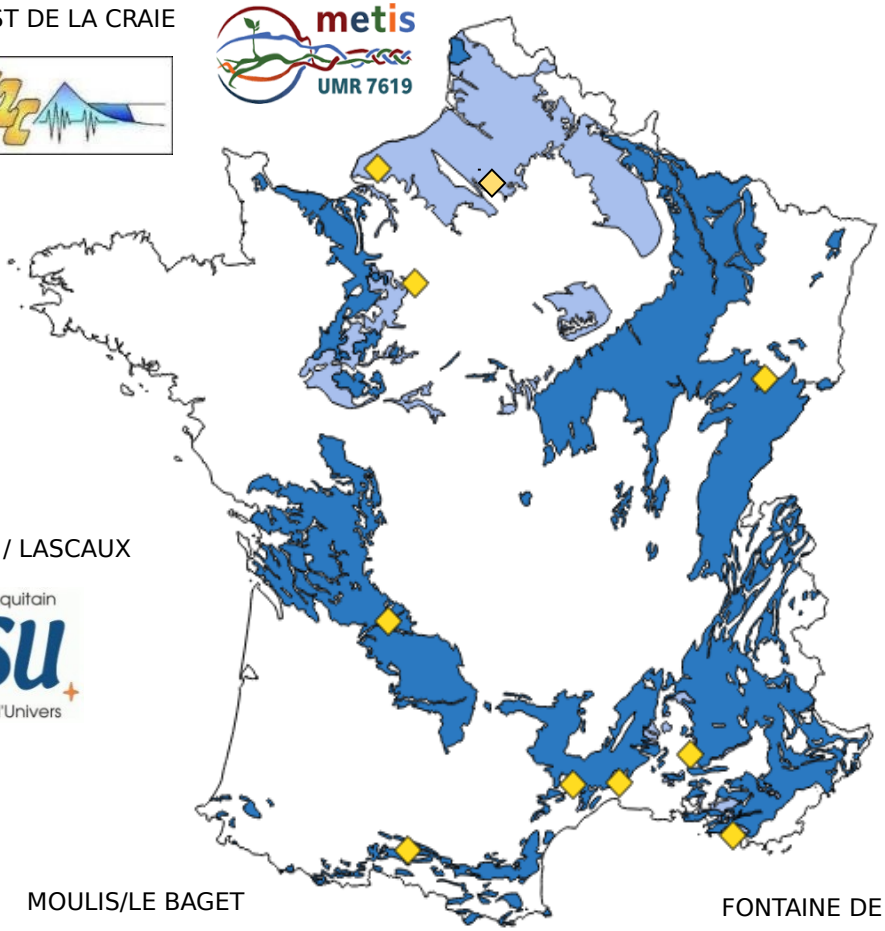
KARST AQUITAINS / LASCAUX

PORT MIOU

MOULIS/LE BAGET

FONTAINE DE NIMES

MEDYCYSS



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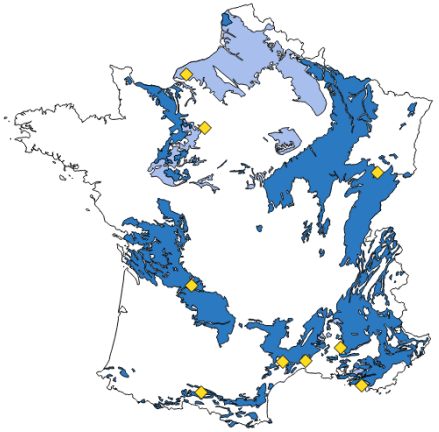
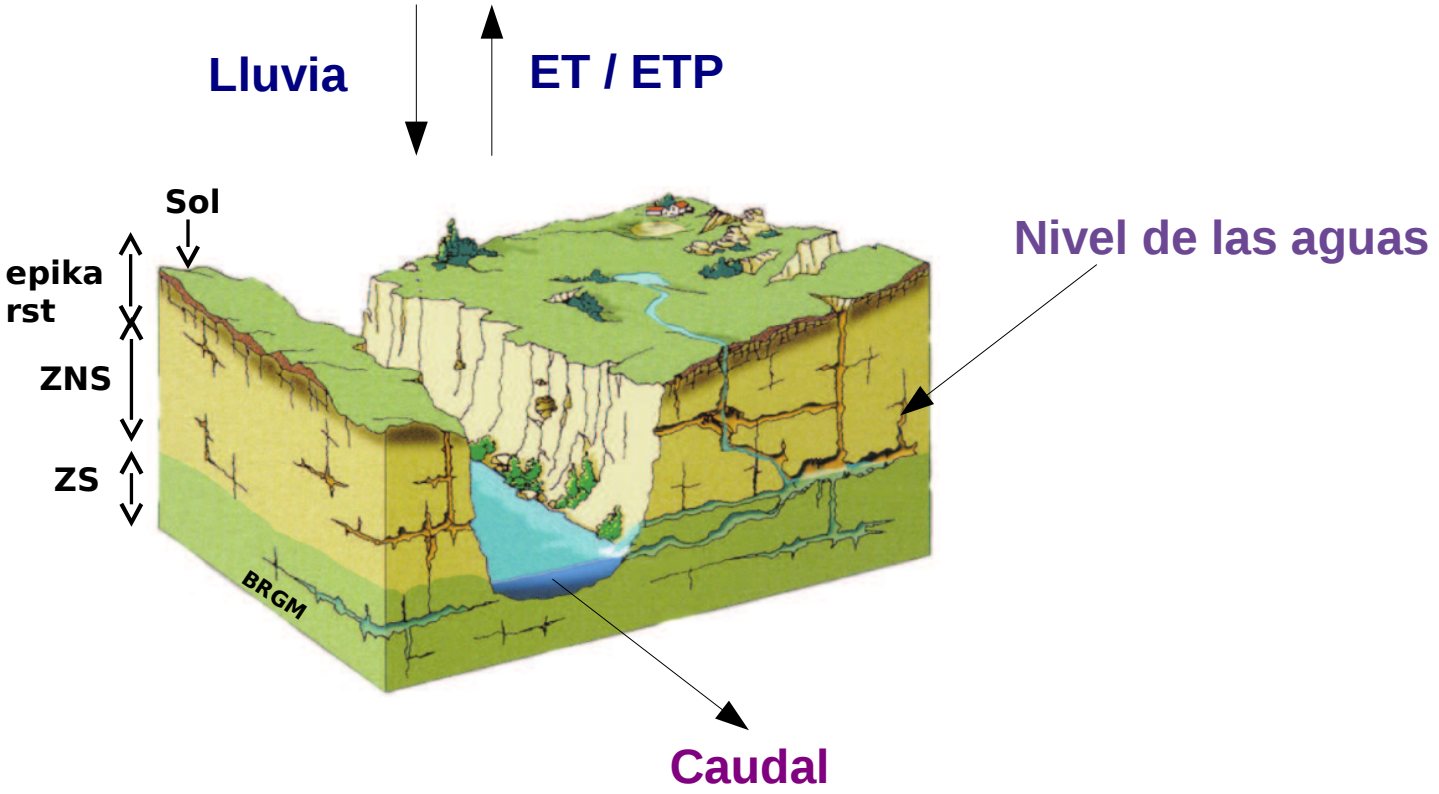
Tarea 1: Monitoreo a largo plazo





- Conductividad electrica
- T°
- *Turbidity*
- *fluorescence*

- Aniones, cationes majores
- T°
- $^{2}D/^{18}O$, ^{13}C, $^{87}Sr/^{86}Sr$
- *Micro-organisms*

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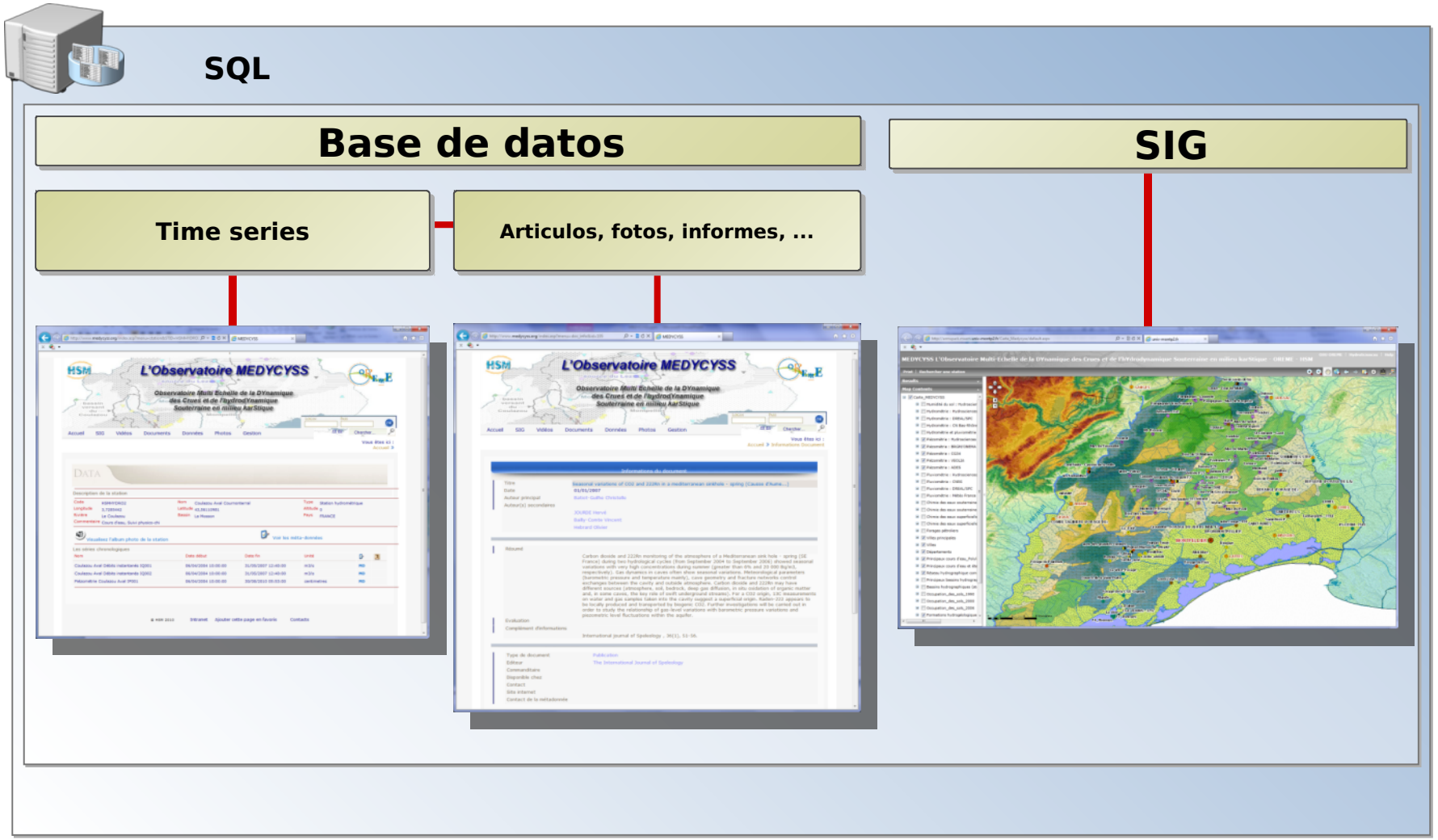
Tarea 2 : Compartir los datos



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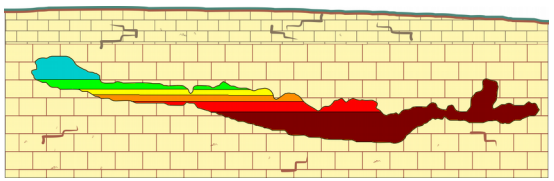
Tarea 3: Intercambio de conocimientos multidisciplinarios

Geofísica
MRS, PS, gravimetry

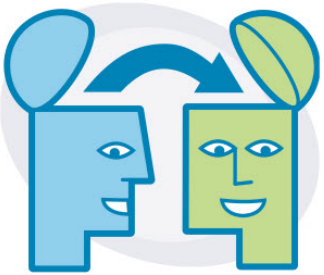
Hidroquímica
Trazadores naturales y artificiales
Caracterización conductos y volumenes de flujo lento

Aerología

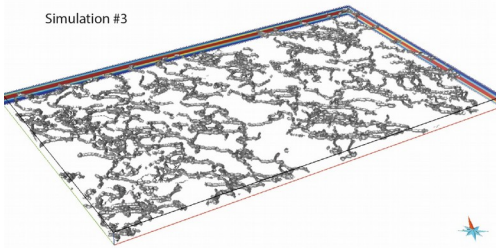


Houillon, 2016

Pruebas de bombeo

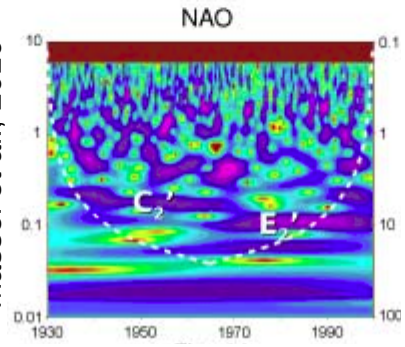


Modelado de la karstogenesis



Jouves, 2016

Analisis Funcional
Procesando señales



Massei et al., 2010

Modelizacion Matematica de flujo
- 1D hasta 3D

- X Petrofisica
- X Karstogenesis
- X Geomorfologia
- X Cosmogenesis

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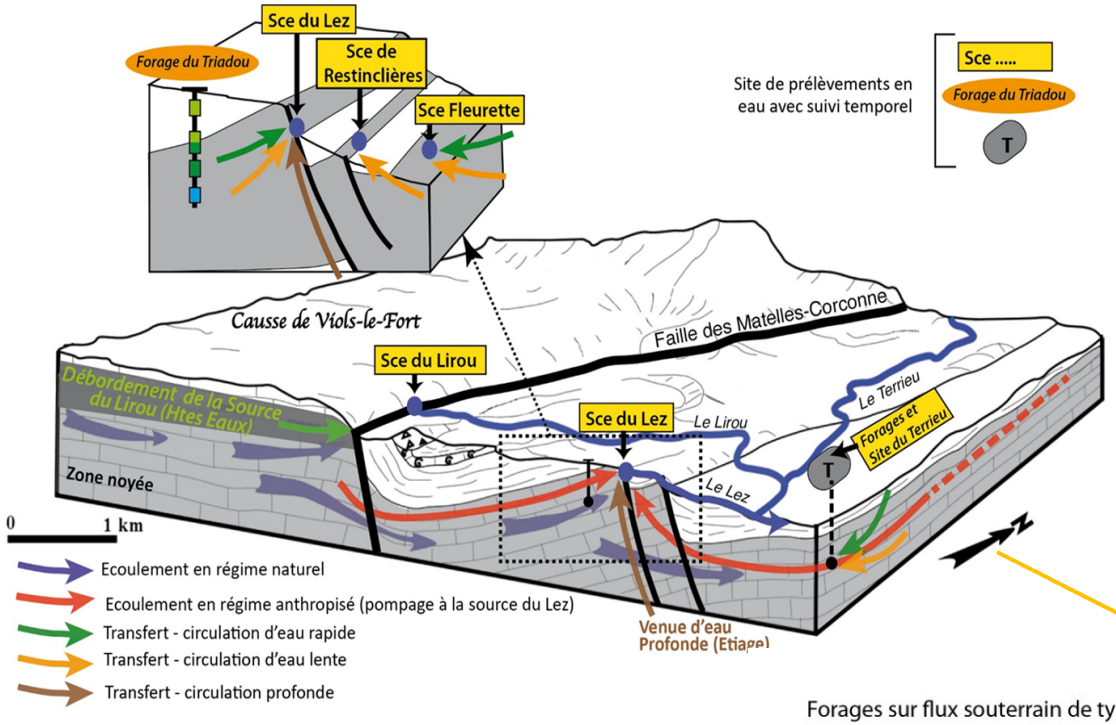
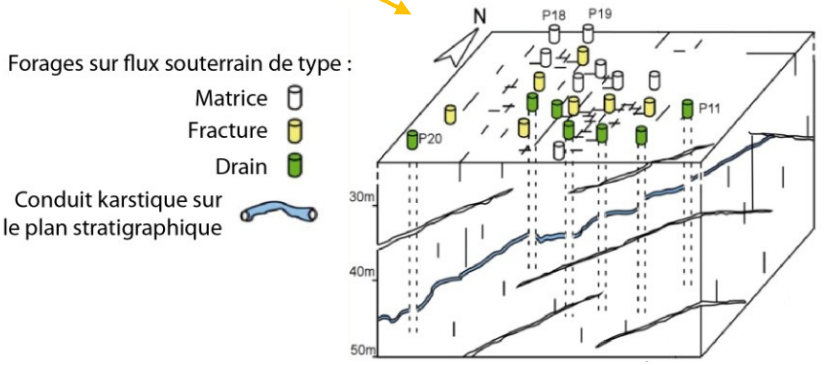
Wells close to the spring may have little connection to it, whereas wells located far but along discontinuities may be closely connected and more vulnerable to contamination



Regional scale

- Anthropogenic forcings
- Seasonal temporary scale
- Daily temporary scale
- Various hydrologic conditions



Field site scale

Well Test– Harmonic pumping – Tracer tests

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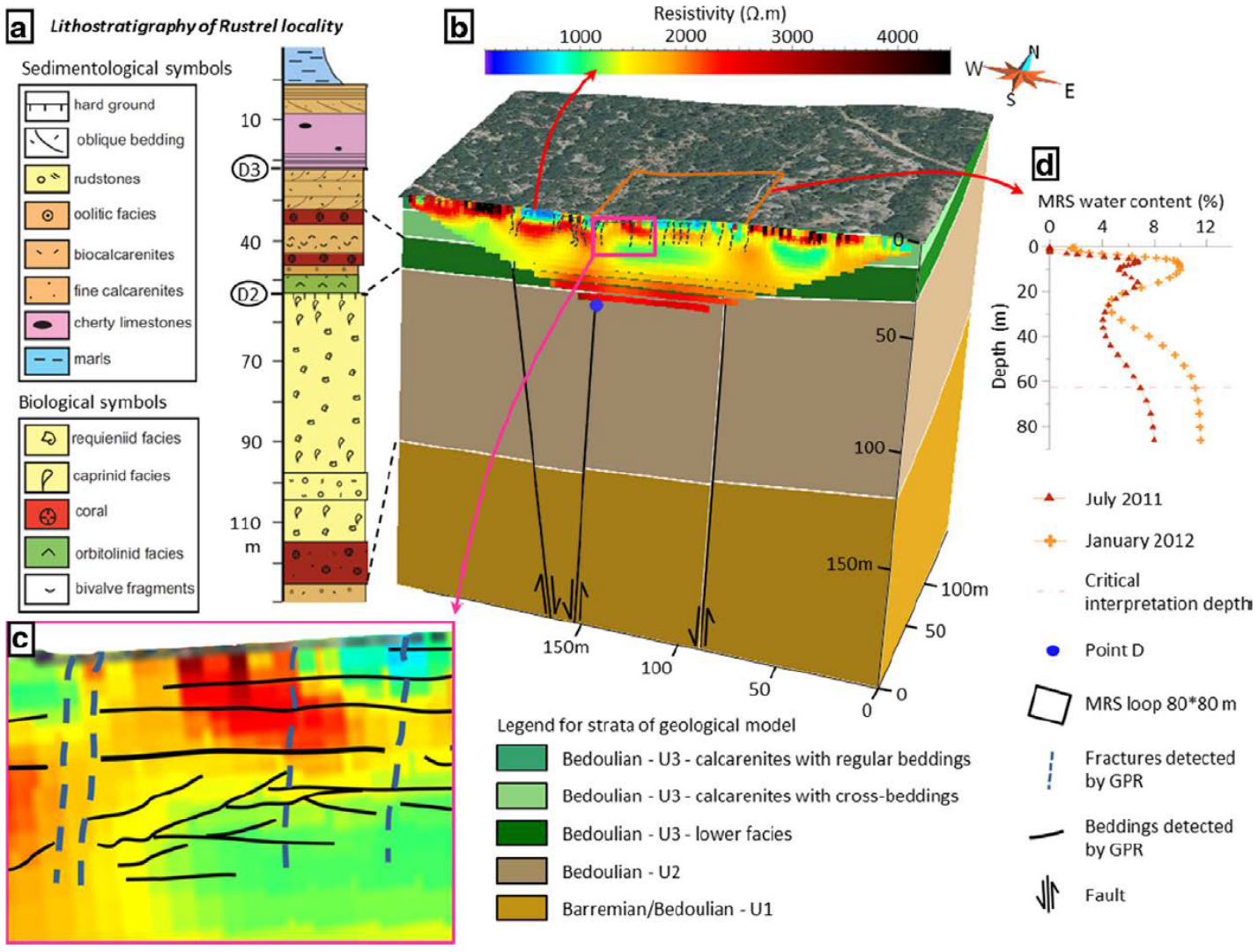
Some springs dry up in summer, other still give water...

(Carriere et al., 2016)



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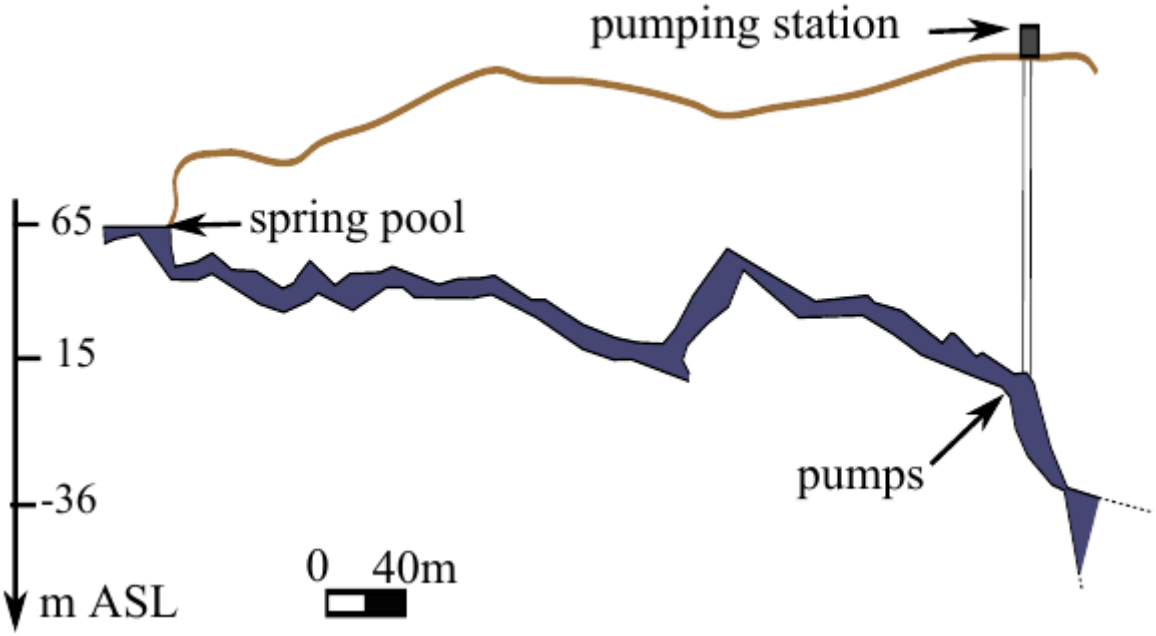
Lez spring example : understanding karstogenesis allows water supply for > 100 000 inhabitants


« Low water»


Overflowing bowl




Underground supply plant

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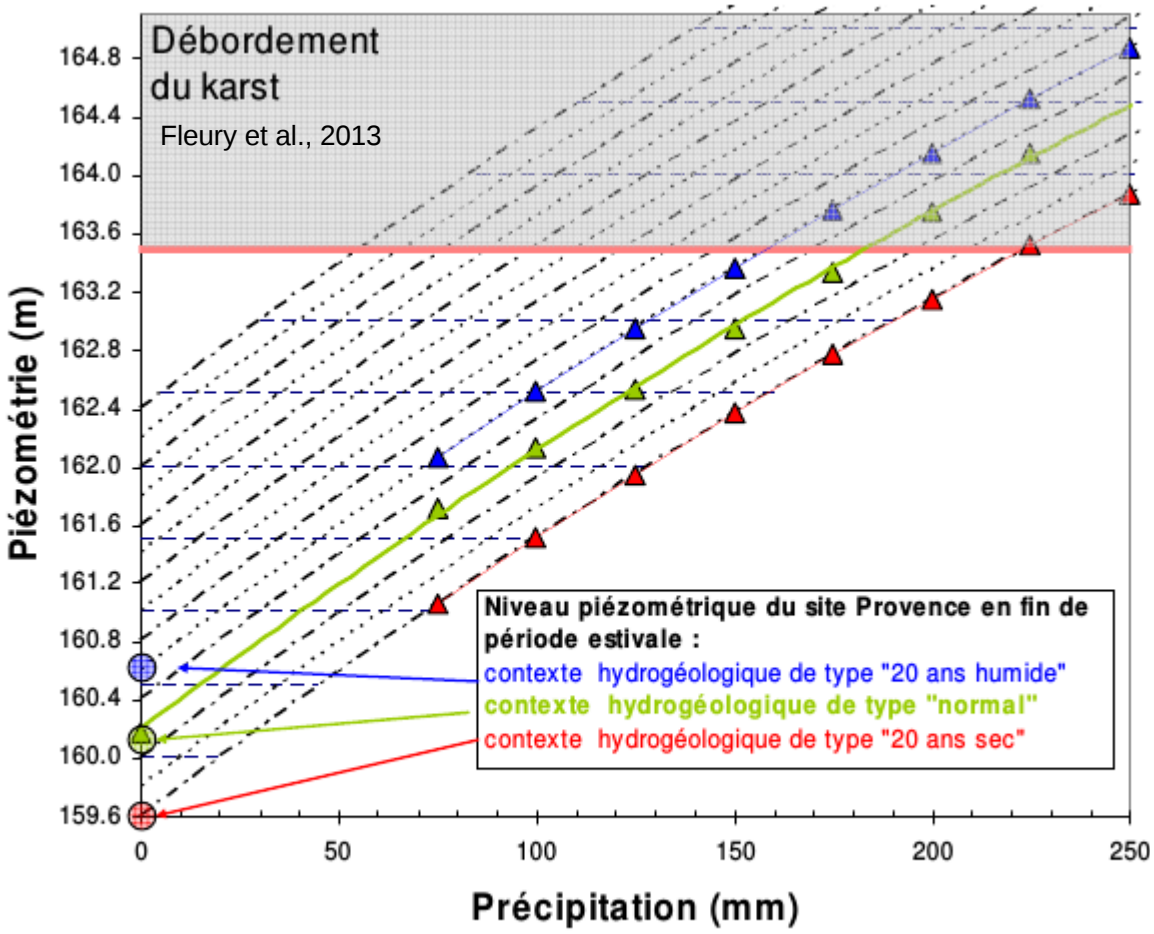
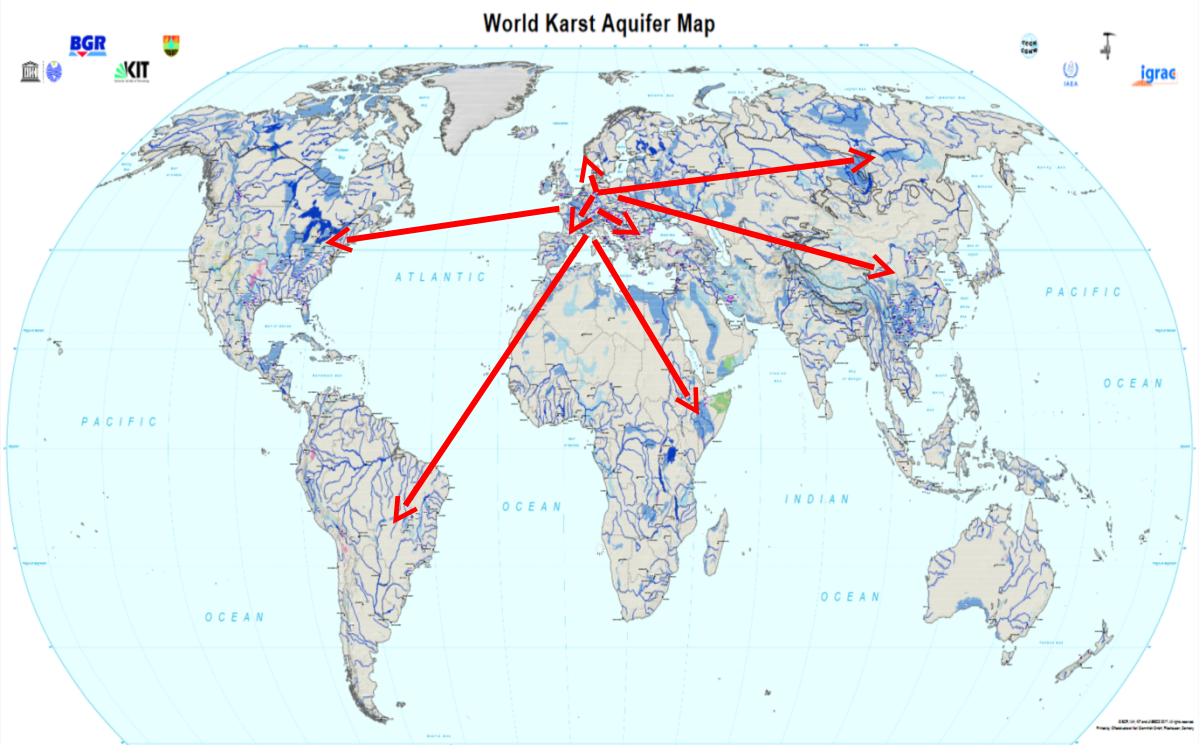
Fontaine de Nîmes example : devasting floods could be predicted thanks to hydrodynamics monitoring & modelling



SNO KARST : what's next ?

Enlarge the network to other well instrumented sites in karst catchments ?
→ on the basis of country initiative ? Institution initiative ? Personal initiative ?



Chen et al., 2017, Hydrogeology Journal

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Thanks for your attention