Traçage chimique des eaux

automnes 2015 et 2016

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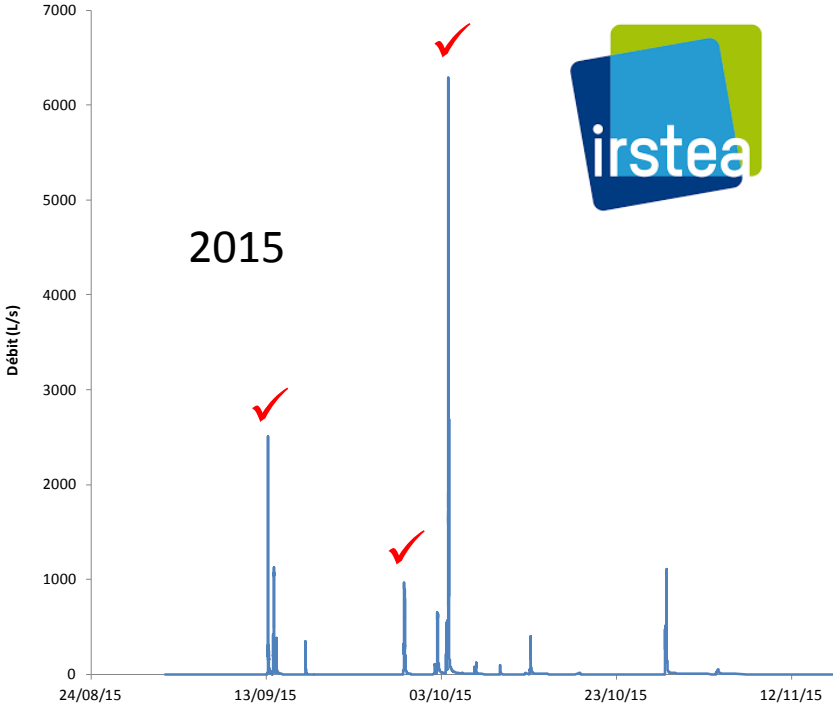
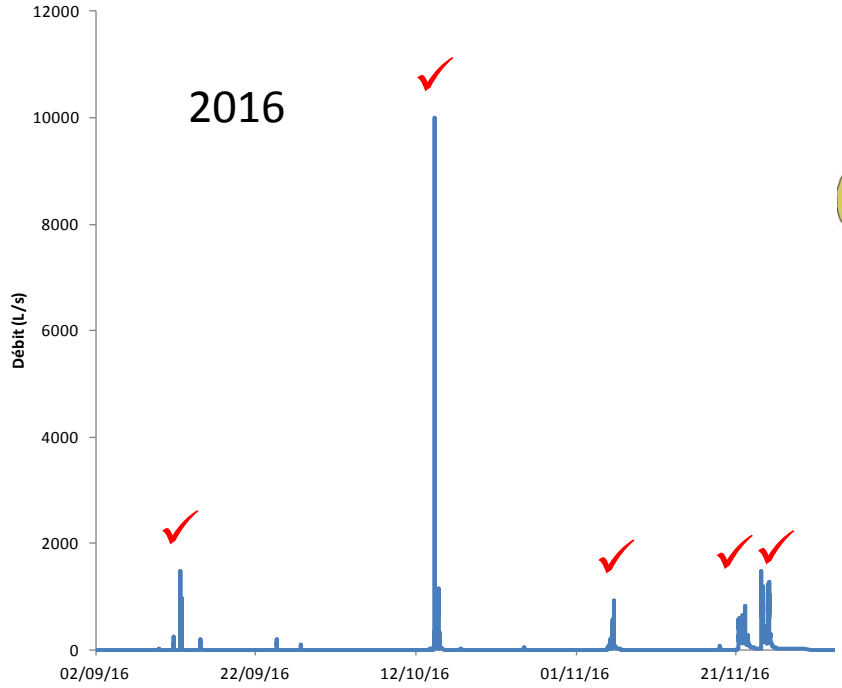
UMR 1114 INRA - UAPV
Environnement Méditerranéen et Modélisation des Agro-Hydrosystèmes





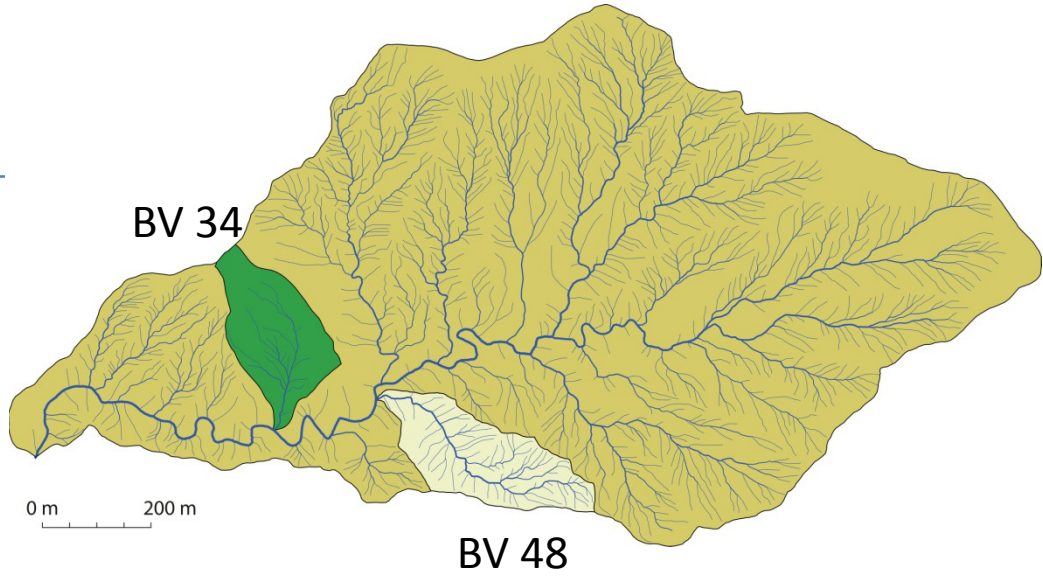
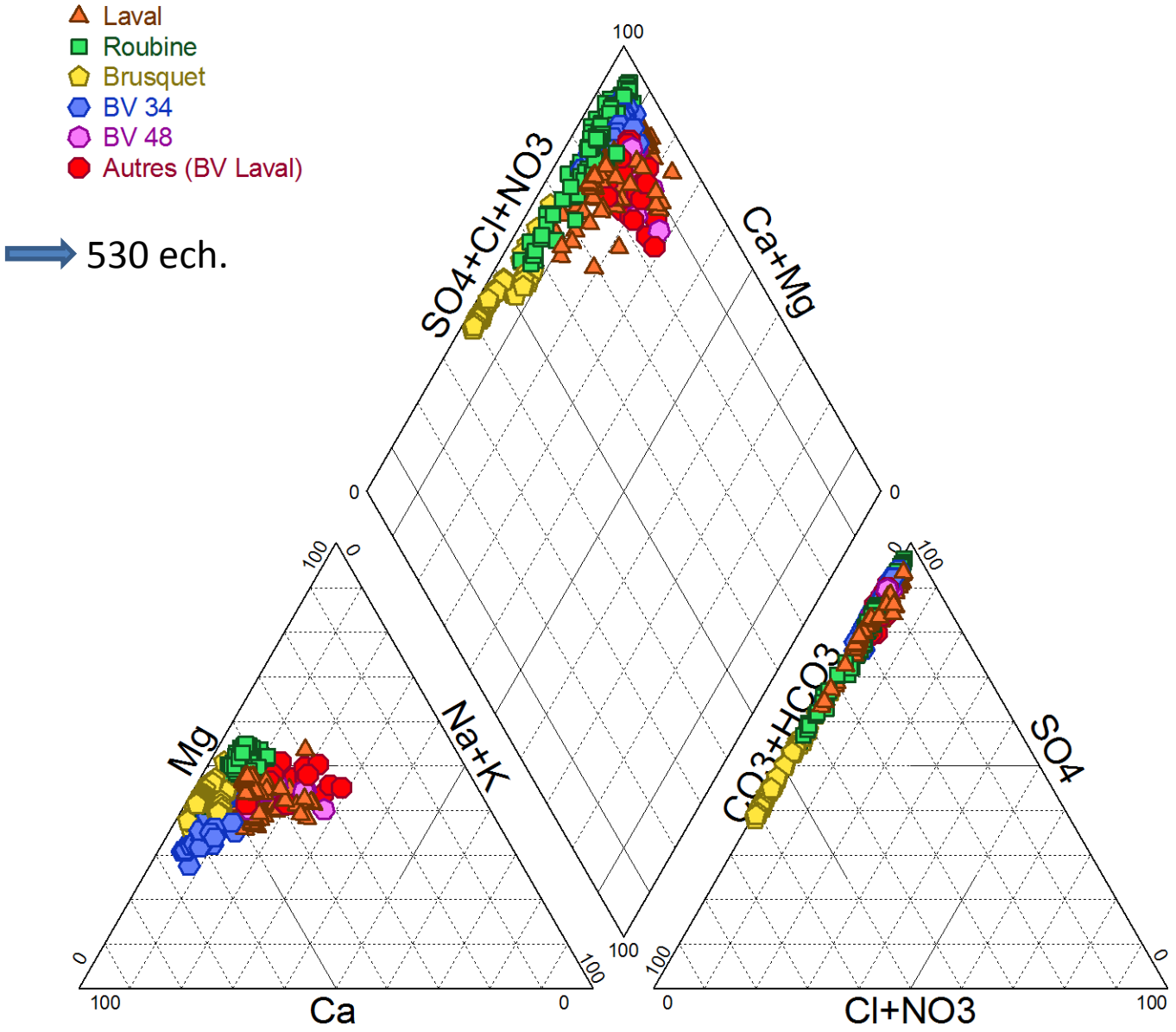
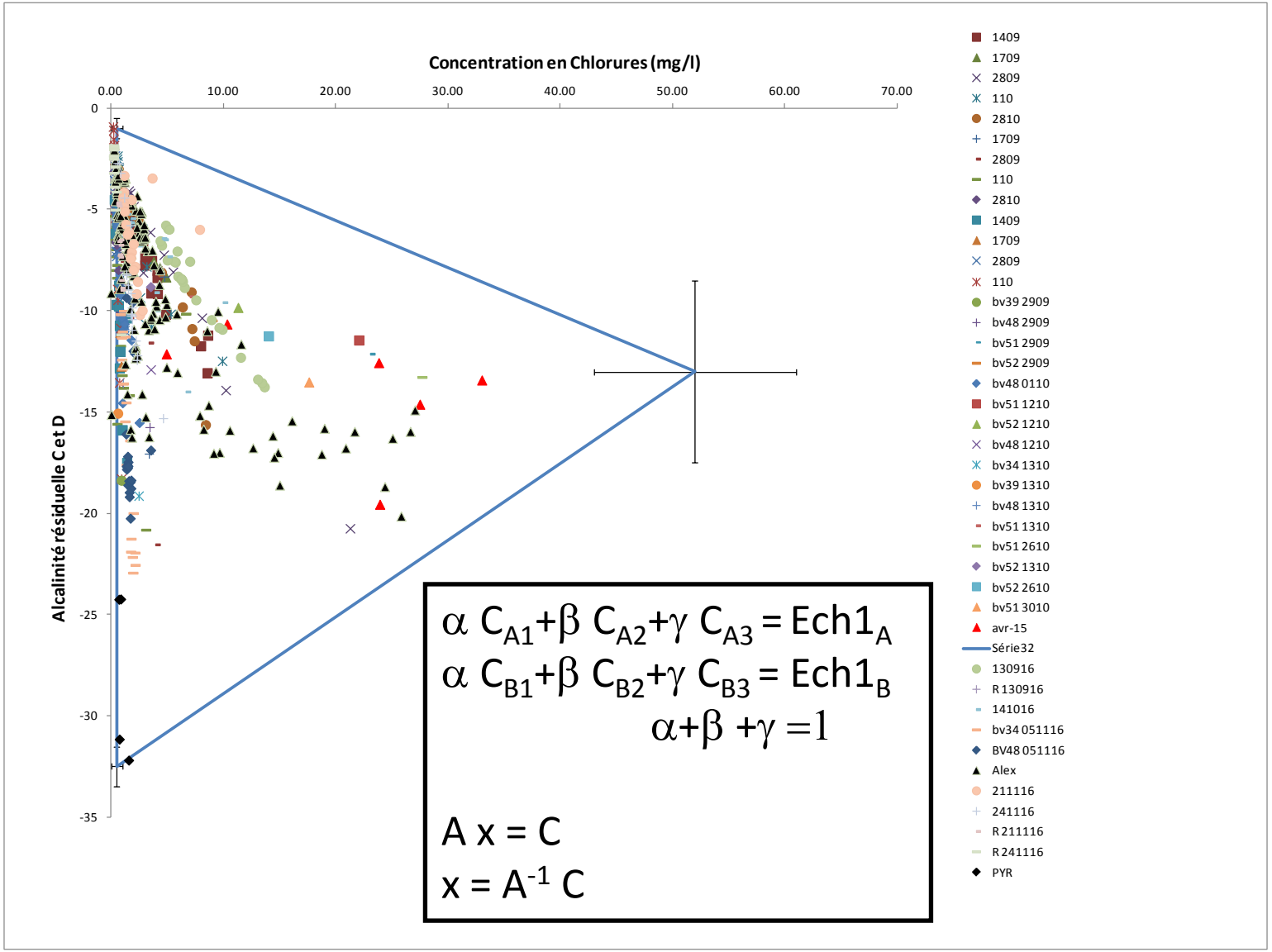


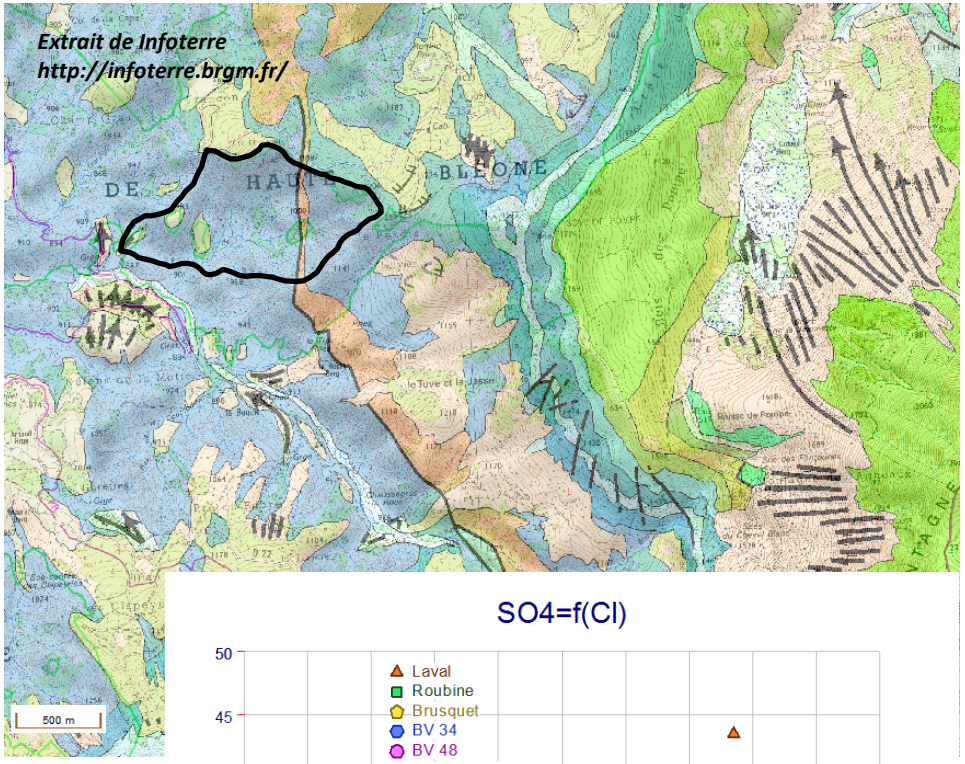
Diagramme de Piper

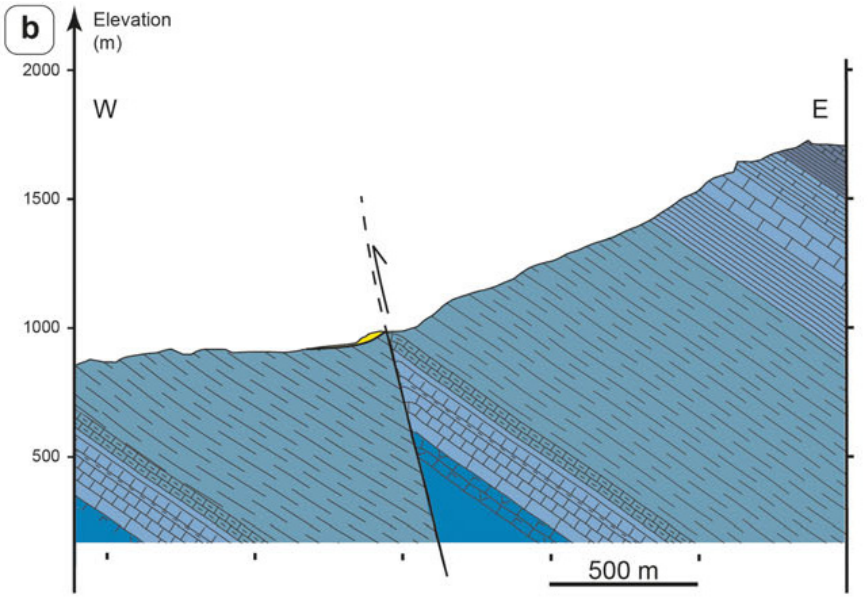


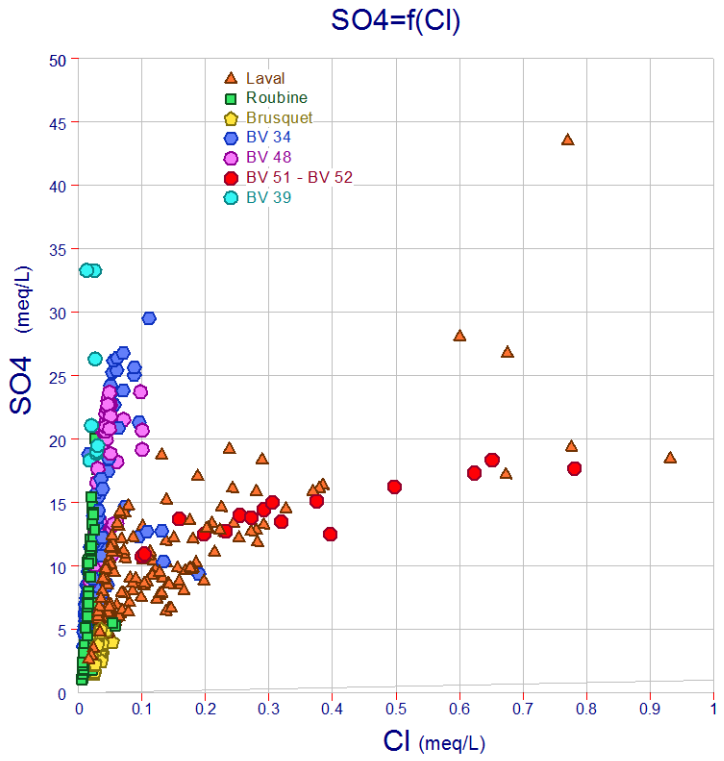


$$\alpha C_{A1} + \beta C_{A2} + \gamma C_{A3} = Ech1_A$$
$$\alpha C_{B1} + \beta C_{B2} + \gamma C_{B3} = Ech1_B$$
$$\alpha + \beta + \gamma = 1$$

$$A\,x = C$$
$$x = A^{-1}\,C$$





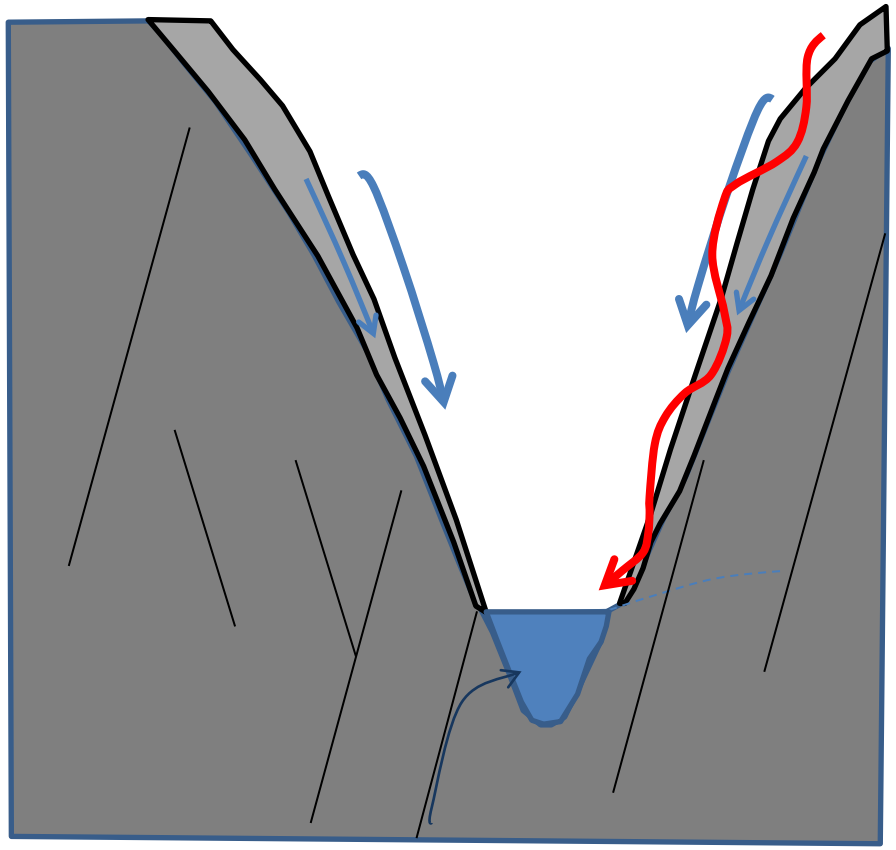


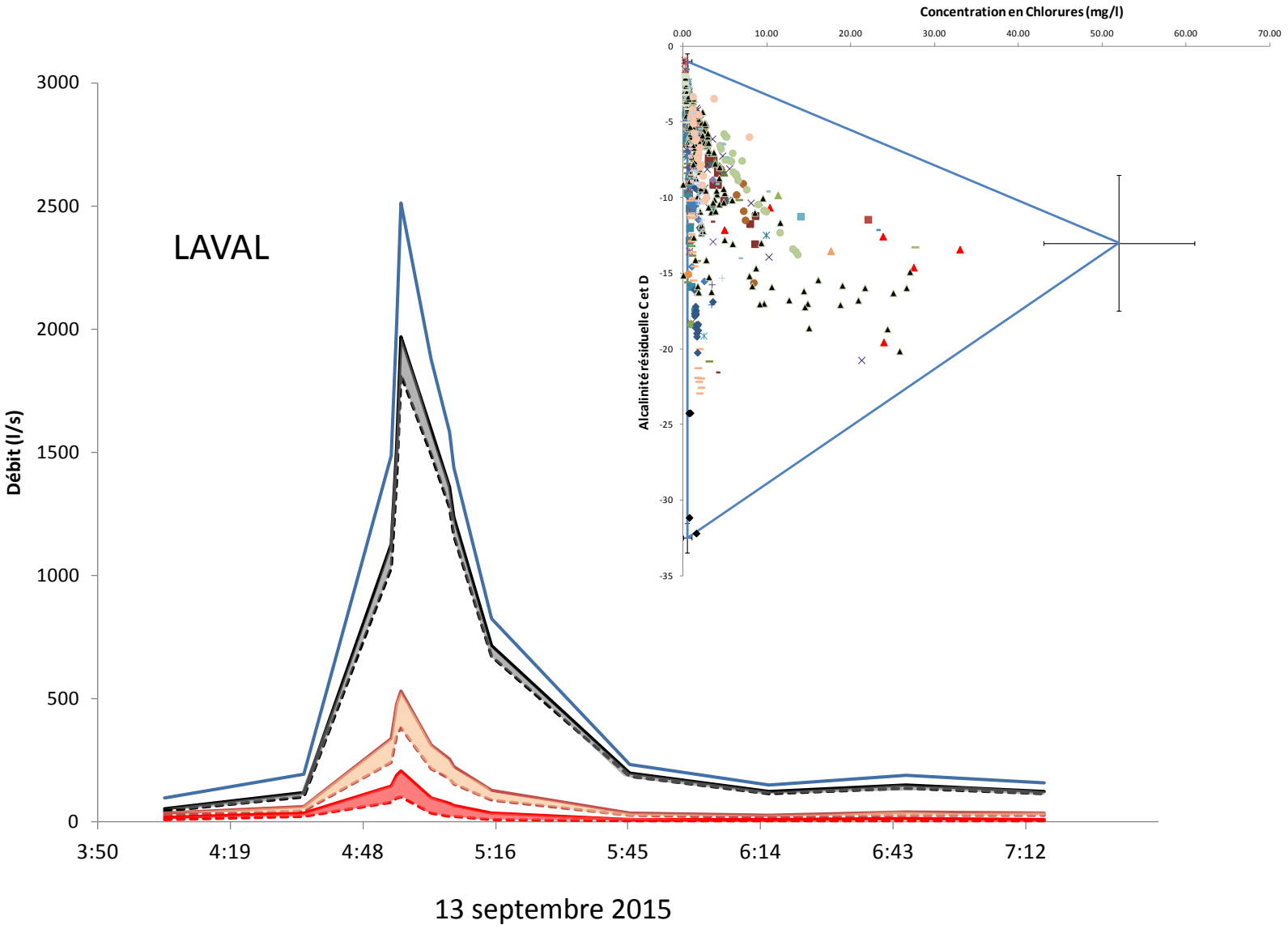
External Zone

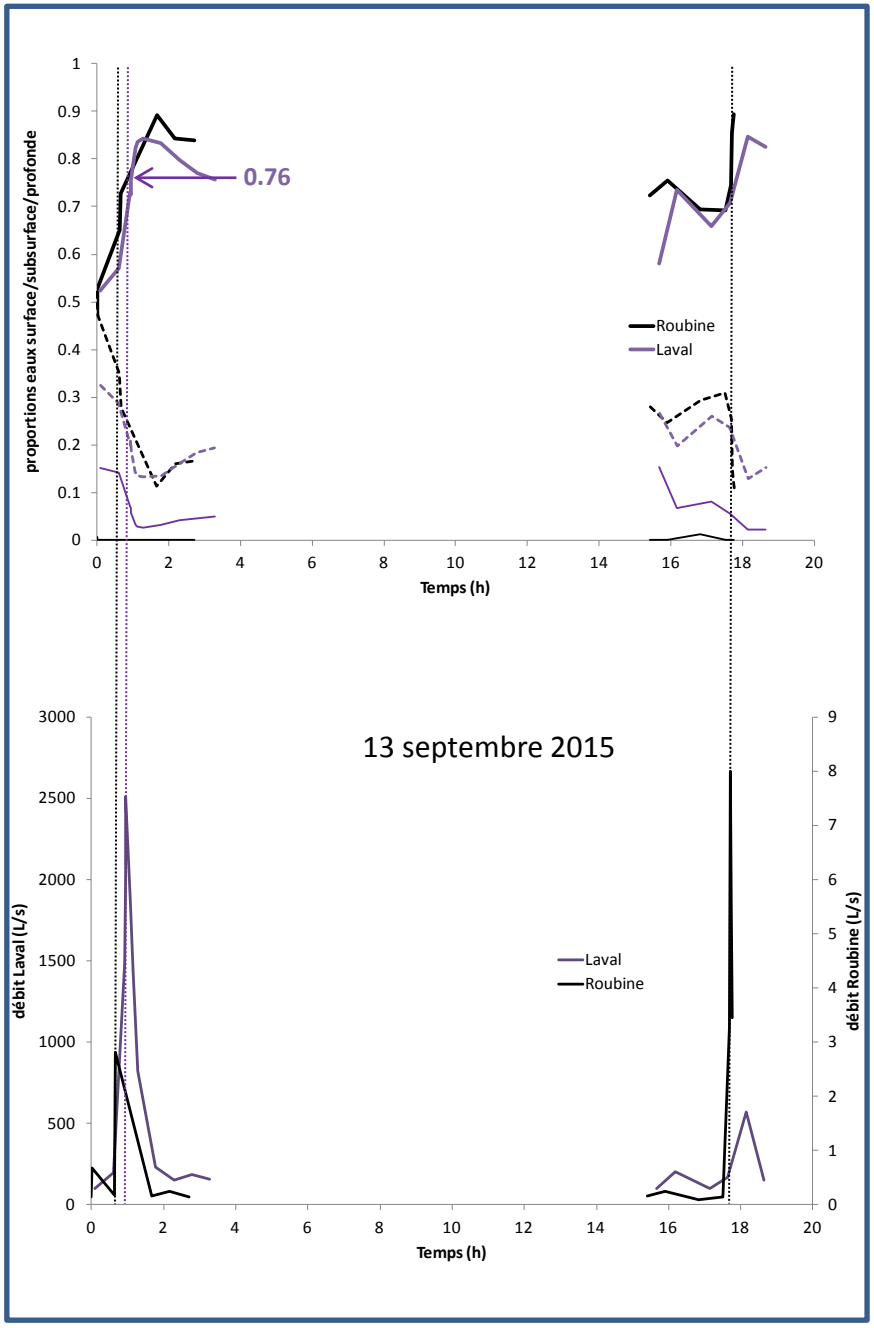
Cretaceous
- Hauterivian (argillaceous limestones)
- Valenginian (yellow marls)

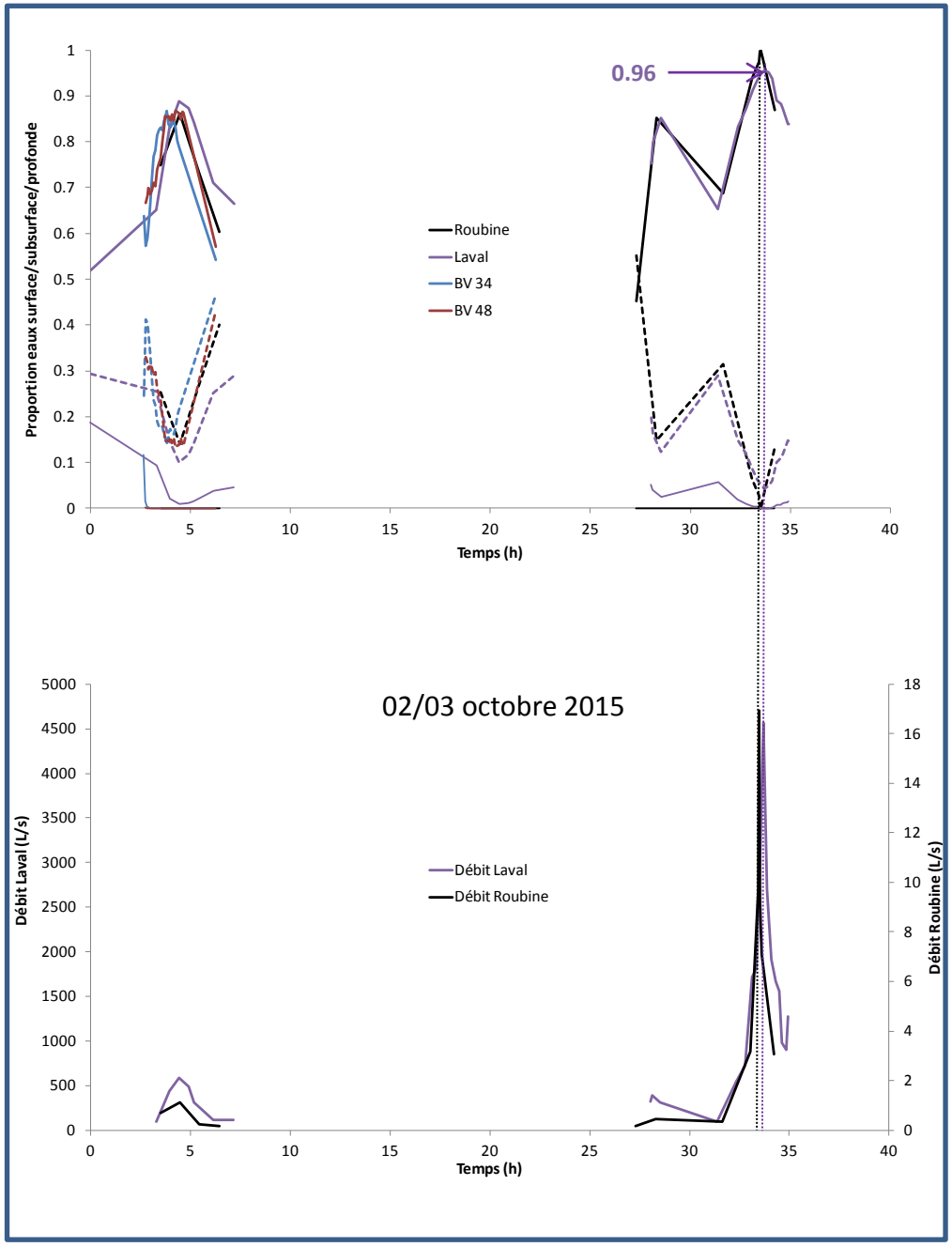
Jurassic
- Berrasian (argillaceous limestones, conglomerats)
- Kimmeridgian-Tithonic (thin limestones)
- Middle and Upper Oxfordian (marls and limestones)
- Bathonian to Lower Oxfordian ("Terres Noires")
- Bajocian (argillaceous limestones)
- Toarcian (marls and argillaceous limestones)
- Domerian (marls and limestones)
- Lower Lias (oyster limestones, siliceous limestone)
- Hettangian (big banks limestone)

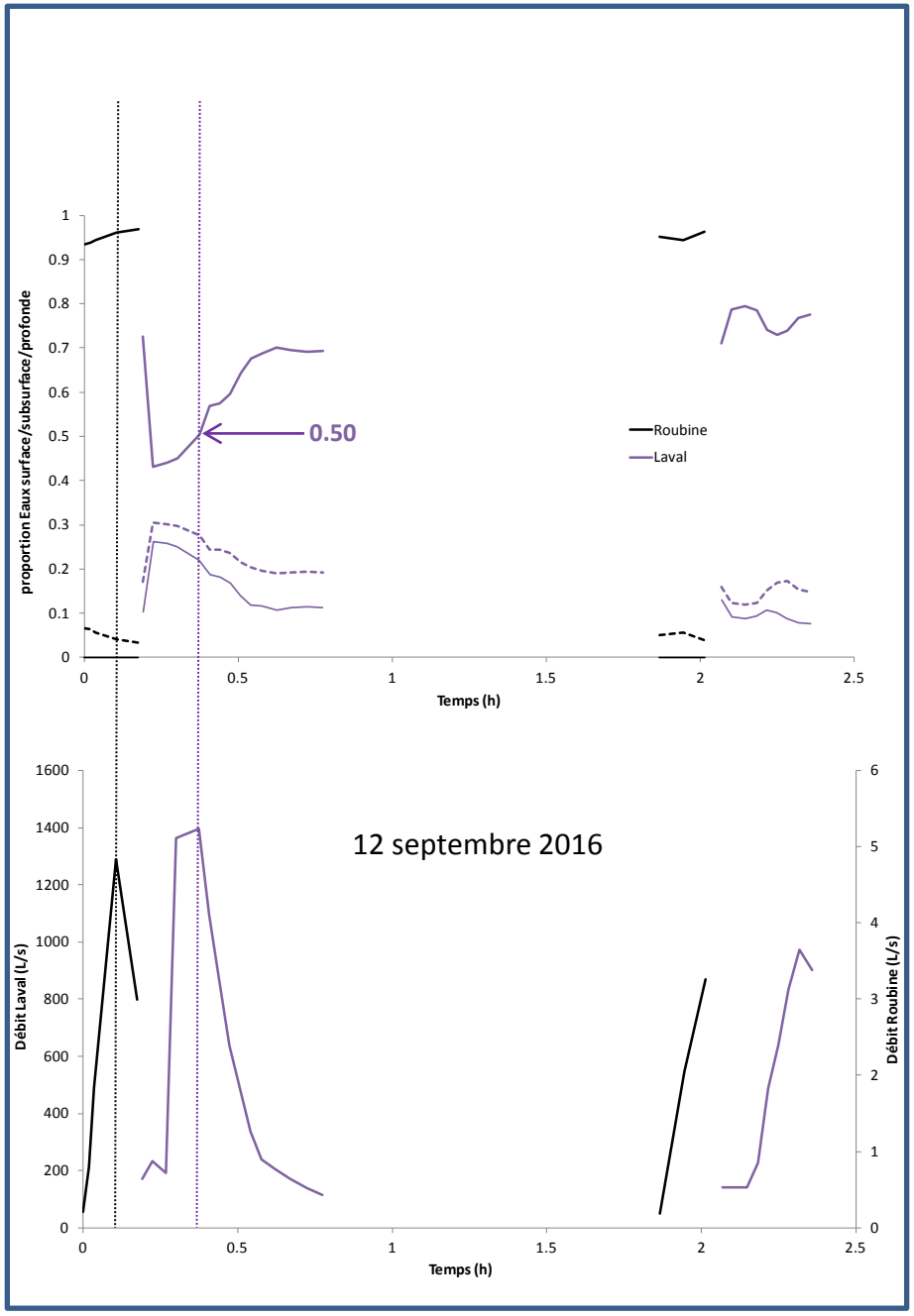
Triassic
- Triassic (dolomites, argillites, gypsum and sandstones)

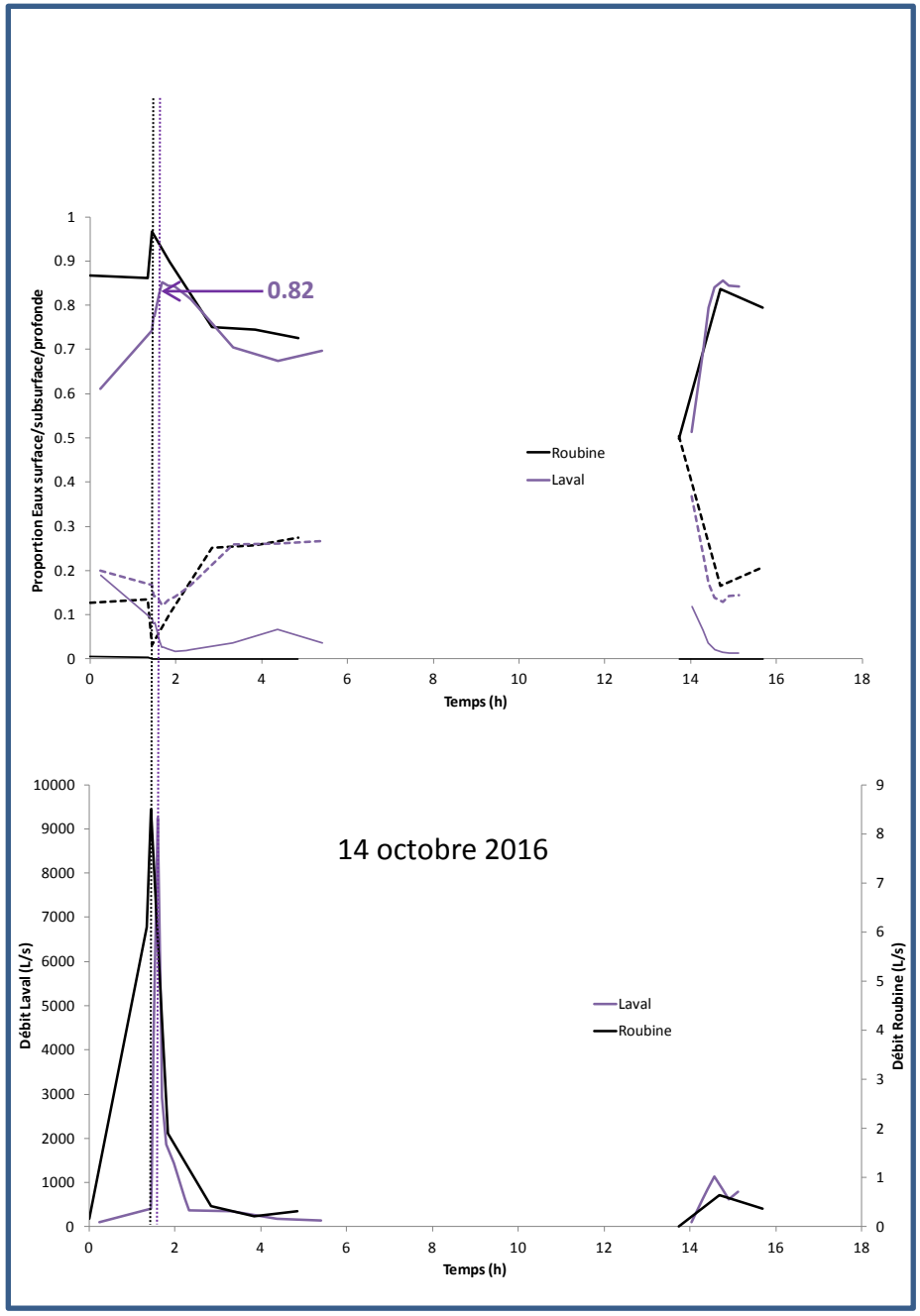


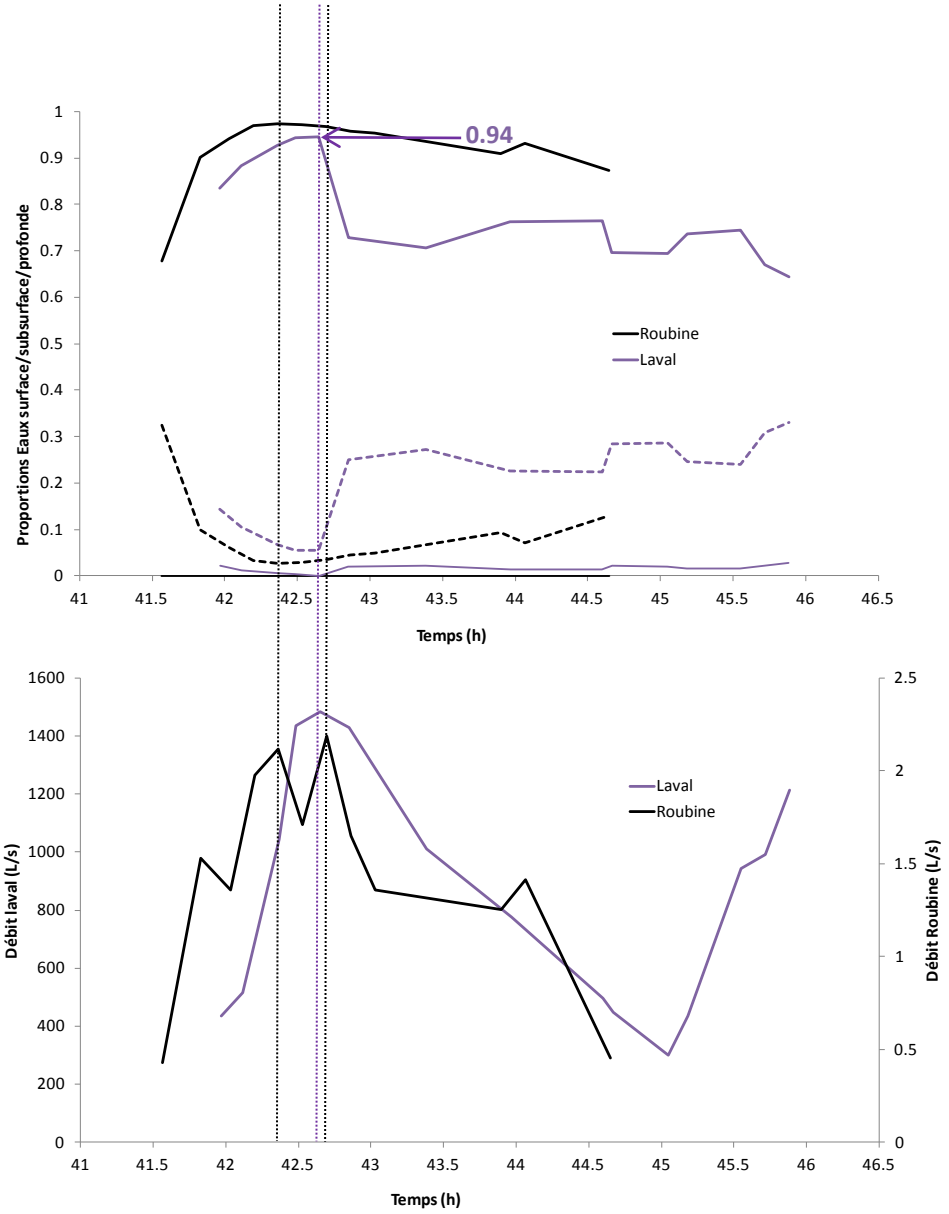

LAVAL
Débit (l/s)
3000
2500
2000
1500
1000
500
0
3:50
4:19
4:48
5:16
5:45
6:14
6:43
7:12
13 septembre 2015
Concentration en Chlorures (mg/l)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
Alcalinité résiduelle Cet D
0
-5
-10
-15
-20
-25
-30
-35


proportions eaux surface/subsurface/profonde
0.76
Roubine
Laval
Temps (h)
13 septembre 2015
débit Laval (L/s)
débit Roubine (L/s)
Laval
Roubine
Temps (h)


Proportion eaux surface/subsurface/profonde
0.96
Roubine
Laval
BV 34
BV 48
Temps (h)
02/03 octobre 2015
Débit Laval (L/s)
Débit Roubine (L/s)
Débit Laval
Débit Roubine
Temps (h)


proportion Eaux surface/subsurface/profonde
0.50
Roubine
Laval
Temps (h)
Débit Laval (L/s)
Débit Roubine (L/s)
12 septembre 2016


Proportion Eaux surface/subsurface/profonde
0.82
Roubine
Laval
Temps (h)
Débit Laval (L/s)
Débit Roubine (L/s)
14 octobre 2016



24 novembre 2016

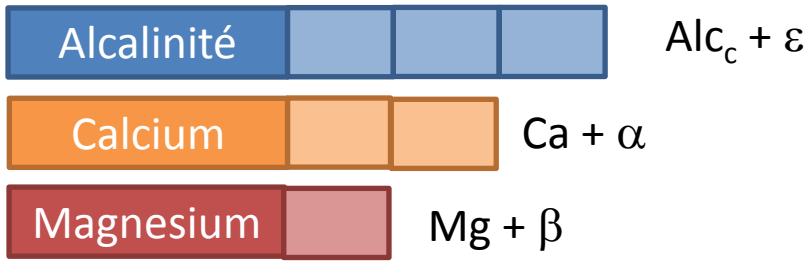
	LAVAL				ROUBINE			
	Qmax	**% eaux surface**	**% max**	**dec (h) / Q**	**Qmax**	**% eaux surface**	**% max**	**dec (h) / Q**
14/09/2015	2510	76	84	0.32 / 825	8	85	89	0.05 / 3.45
28/09/2015	960	88	90	0.5 / 320	16.7	96	96	0
03/10/2015	4570	96	96	0	16.92	99.7	100	0.064 / 9.16
13/09/2016	1395	50	79	1.77 / 141	4.83	96	97	0.07 / 2.99
14/10/2016	9241	82	86	13.1 / 871	8.49	97	97	0
05/11/2016					2.34	69	79	0.43 / 1.91
21/11/2016	590	88	92	-2.16 / 473	0.96	88	88	0
24/11/2016	1484	94	94	0	2.19	97	97.4	0.33 / 2.12

Notion d'alcalinité résiduelle

$$Alc\ C+D\ (meq/l) = Alc_c - (Ca)^{2+} - (Mg)^{2+}$$

Dissolution ➡ $Alc_{c,e} = Alc_{c,i} + \varepsilon$; $(Ca)_e^{2+} = (Ca)_i^{2+} + \alpha$; $(Mg)_e^{2+} = (Mg)_i^{2+} + \beta$

$$Alc\ C+D_e = Alc_{c,i} - (Ca)_i^{2+} - (Mg)_i^{2+} + \varepsilon - \alpha - \beta$$



$Alc_c + \varepsilon$

$Ca + \alpha$

$Mg + \beta$

➡ $Alc\ C+D_e = Alc\ C+D_i$