



RIPLE



*« River PLatform for monitoring Erosion »
Plateforme de suivi hydrosédimentaire*

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RIPLE : Introduction



Context

- Difficulty to directly and continuously measure the water and sediment fluxes (bedload and suspension) in rivers with high suspended sediment concentrations (10 → 300g/l) and highly dynamic behaviour.
- Nowadays, there is no built-in device on the market to continuously monitor water and sediment fluxes.



Scientific issues

- Reduction of the uncertainty of water and sediment flux measurements .
- Improvement of knowledge in sediment transport and interactions between water, suspended sediment and bedload in rivers.
- Measurement of the fluxes of matter transported by water and sediment (contaminants, nutrients).
- Development of a tool in collaboration with academic and industrial partners.



RIPLE : Specifications

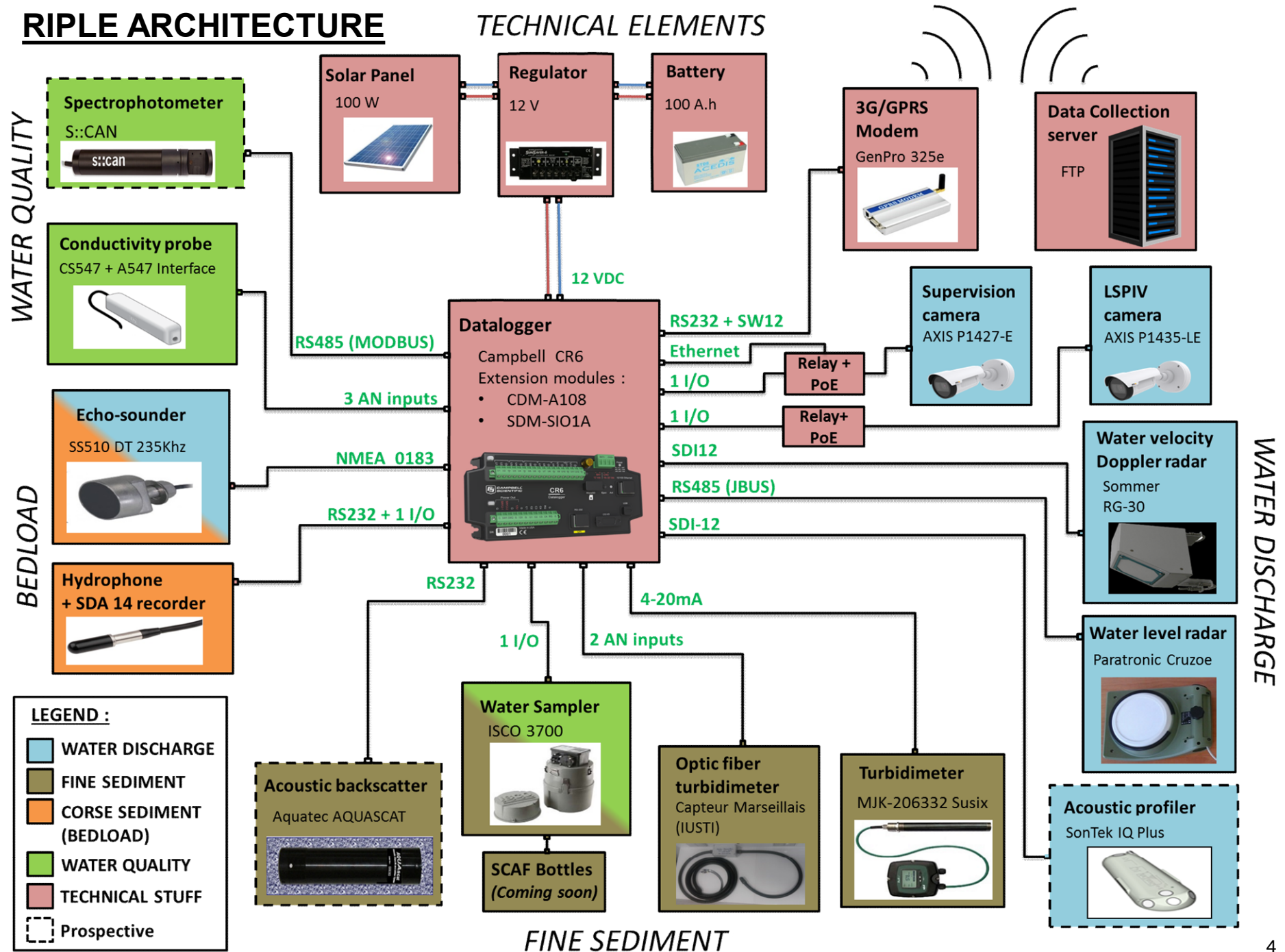


- **On –site installation :**
 - Mountain river, high flood discharge
 - Isolated site :
 - No electrical network → Energy autonomy
 - Use of mobile network for data transmission
 - Non-fixed site : the platform has to be easy to move
- **Instrumentation :**
 - Sampling frequency sufficient to observe floods
 - Integration of both standard (manufactured) and innovative instruments
 - Promote non-intrusive instruments
- **Platform's interfacing :**
 - Sending data every hour
 - Remote configuration
 - Sending SMS alerts (low battery voltage, water level threshold reached, ...)
- **Capitalization :**
 - J. Bois (12 months contract) : instrumental development
 - Y. Michielin (18 months contract) : Platform's development



RIPLE ARCHITECTURE

TECHNICAL ELEMENTS

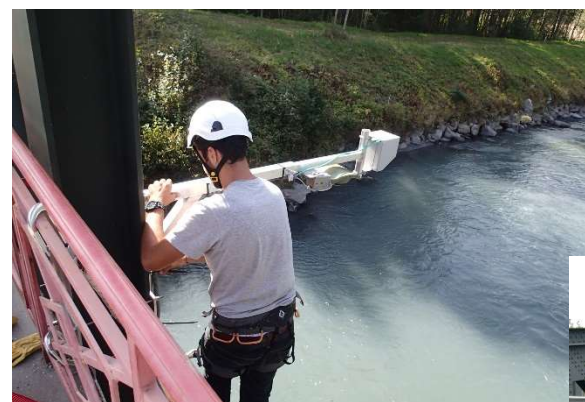
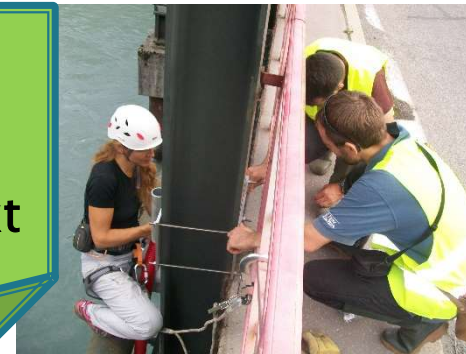




RIPLE : Installation at Bourg d'Oisans

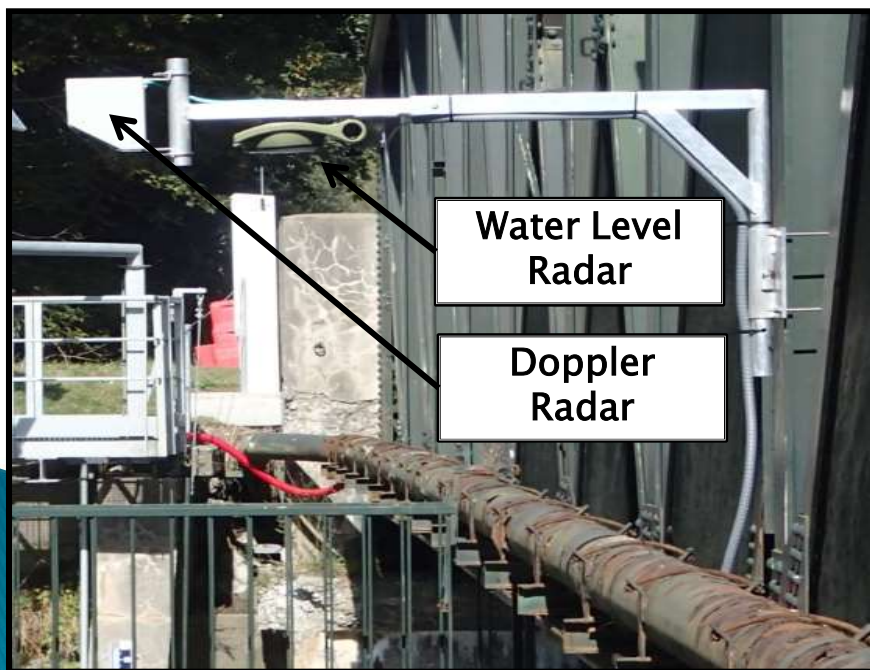
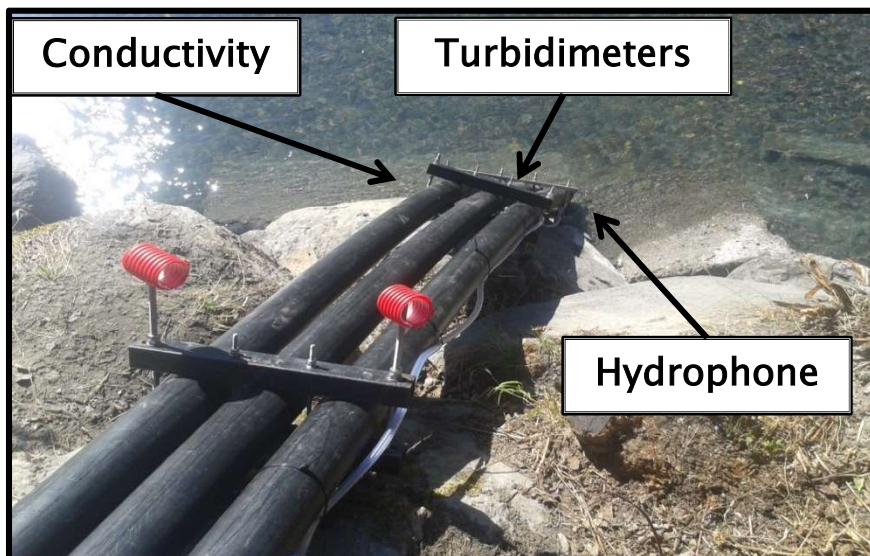


Manpower for on-site
installation: 15 man-days
~ 10 man-days for the next
installation





RIPLE : Installation at Bourg d'Oisans

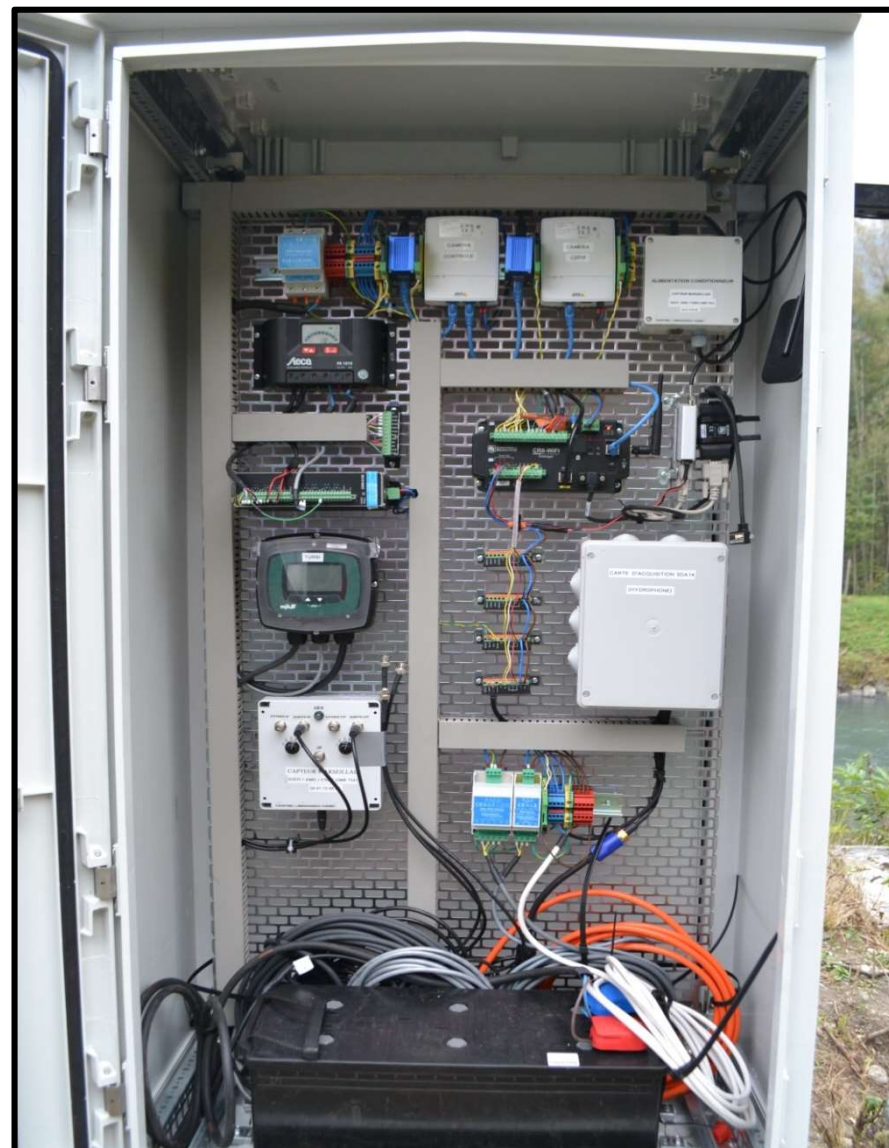




RIPLE : Installation at Bourg d'Oisans



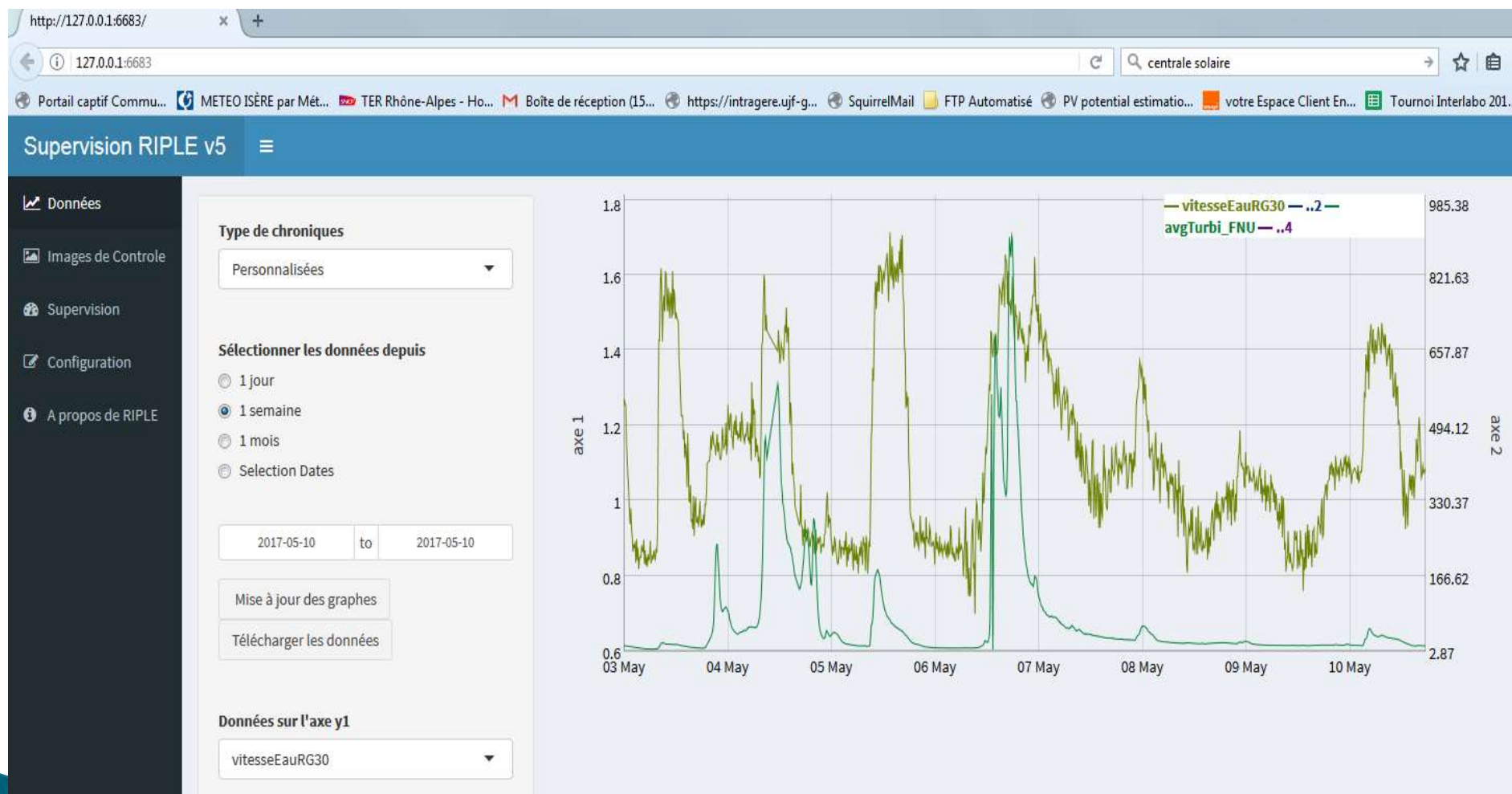
Electronic cabinet, ISCO sampler, PV



Inside the electronic cabinet

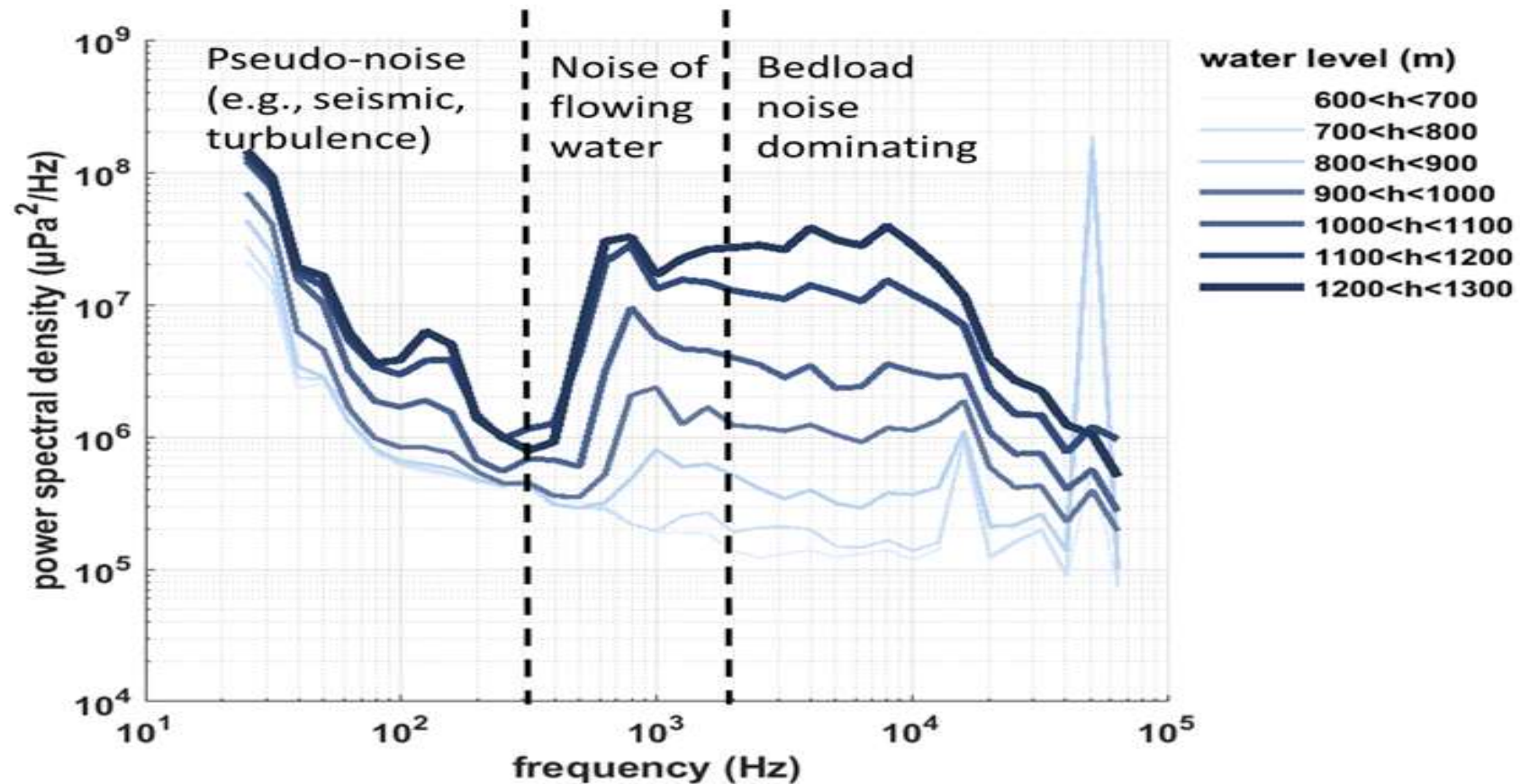


RIPLE : User Interface



RIPLE : First Results

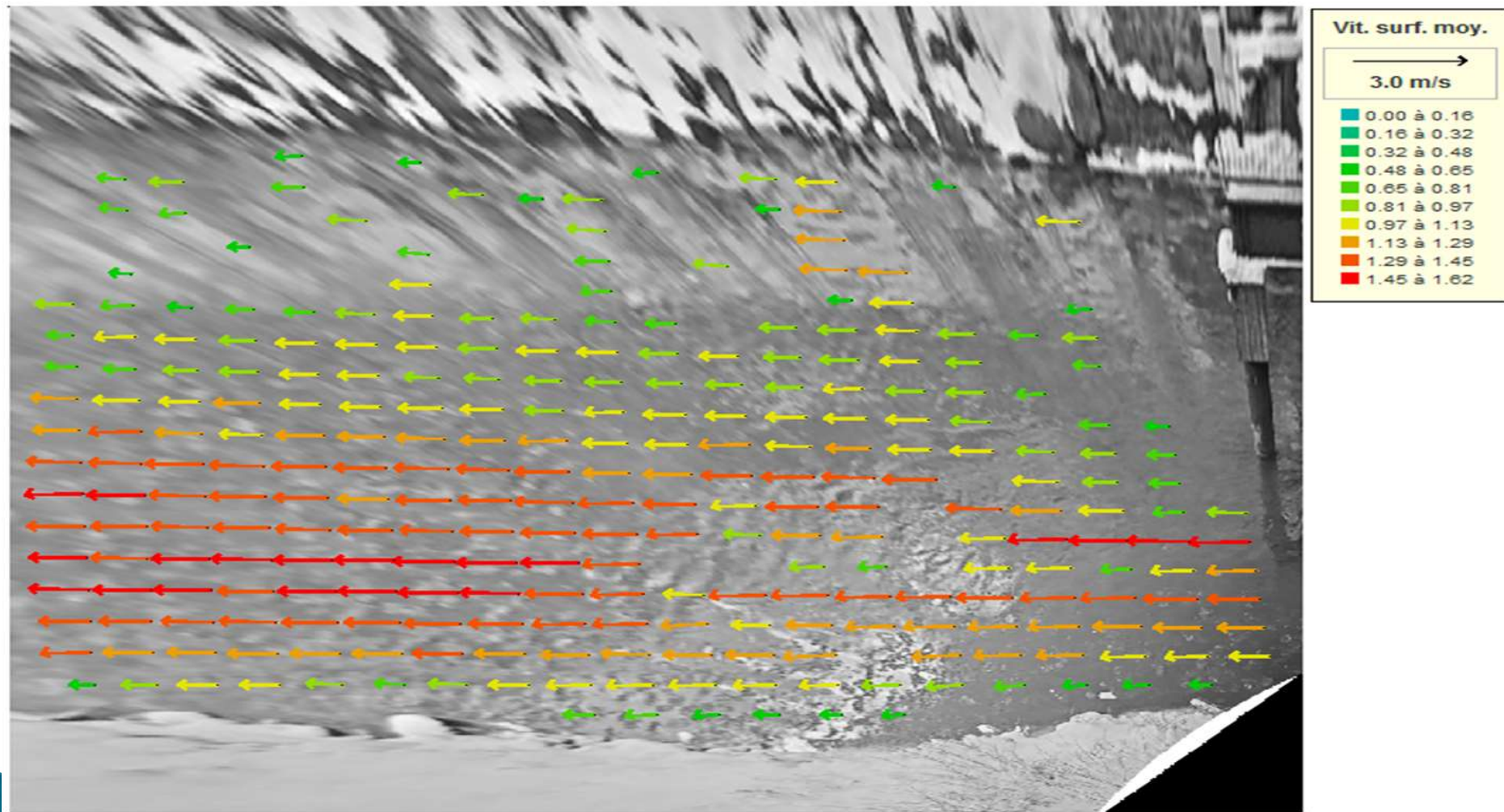
BEDLOAD : Hydrophone



→ Geay T. (2013).
 Mesure acoustique du transport de
 sédiments par charriage dans les rivières.
 PhD, University of Grenoble. 163 p.

RIPLE : First Results

WATER DISCHARGE : LSPIV (*Large Scale Particle Image Velocimetry*)



→ Fudaa : <https://forge.irstea.fr/projects/fudaa-lspiv>



RIPLE : Conclusion & Perspectives



In the near future...

- Test of the platform during hydrologic events.
- Estimation of water flow with the combination of water velocity measurements (LSPIV, Doppler Radar) and water level measurements (Time of flight Radar, Echo sounder)
- Estimation of the bedload with hydrophone records and compare the results with the echo sounder measurements.
- Integration of new instruments : SCAF bottles, new water sampler (PASS), spectrophotometer and multibeam acoustic Doppler.
- Installation on another site.





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THANK YOU FOR YOUR ATTENTION

We thank :

- IGE's technical department for their considerable help, and particularly :
Hélène Guyard (IRD), Romain Biron (IRD), Bernard Mercier (CNRS), Guilhem Frèche (CNRS), Baptiste Lemaire (UGA) , Jean-Marie Miscioscia (UGA), Frédéric Cazenave (IRD)
- The scientific partners for their expertise on each instrument :
 - SCAF : Cédric Legoût (UGA), Nicolas Gratiot
 - Hydrophone : Thomas Geay (UGA), Philippe Belleudy (UGA)
 - PASS Sampler : Norbert Silvera (IRD)
 - LSPIV : Alexandre Hauet (EDF-DTG), Jérôme Le Coz (IRSTEA)
 - Optic fiber turbidimeter : Laurence Bergougoux (IUSTI Marseille)