



**HAL**  
open science

## Teaching soil erosion in high schools. A coherent set of experiments showing processes and factors

Baptiste Algayer, Marie-Josée Broussaud, Alban Caillette, Christine Cottard, Laurence Desfougères, Jean-Yves Dupont, Charles-Henri Eyraud, Françoise Morel-Deville, Vincent Voisin, Nathalie Pajon-Perrault, et al.

### ► To cite this version:

Baptiste Algayer, Marie-Josée Broussaud, Alban Caillette, Christine Cottard, Laurence Desfougères, et al.. Teaching soil erosion in high schools. A coherent set of experiments showing processes and factors. 4. International Congress EuroSoil 2012, Jul 2012, Bari, Italy. 2012. hal-02810579

**HAL Id: hal-02810579**

**<https://hal.inrae.fr/hal-02810579>**

Submitted on 6 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Teaching soil erosion in high schools. A coherent set of experiments showing processes and factors.

**Baptiste Algayer<sup>a</sup>, Marie-Josée Broussaud<sup>b</sup>, Alban Caillette<sup>c</sup>, Christine Cottard<sup>bc</sup>, Laurence Desfougères<sup>c</sup>, Jean-Yves Dupont<sup>c</sup>, Charles-Henri Eyraud<sup>b</sup>, Françoise Morel-Deville<sup>b</sup>, Vincent Voisin<sup>b</sup>, Nathalie Pajon-Perrault<sup>b</sup>, Patricia Quincé<sup>c</sup>, Aude de Quillacq<sup>c</sup>, Frédéric Darboux<sup>a</sup>**

<sup>a</sup> INRA, UR 0272 Science du sol, Centre de recherche d'Orléans, CS 40001 – Ardon , F-45075 Orléans Cedex 2, France.

<sup>b</sup> French Institute for Education (IFÉ), École normale supérieure de Lyon, BP 7000, F-69342 Lyon cedex 07, France

<sup>c</sup> Institute for Research on Science Teaching (IRES), Université d'Orléans, BP 6759, F-45067 Orléans Cedex 2, France.

Contact : [Baptiste.Algayer@orleans.inra.fr](mailto:Baptiste.Algayer@orleans.inra.fr)

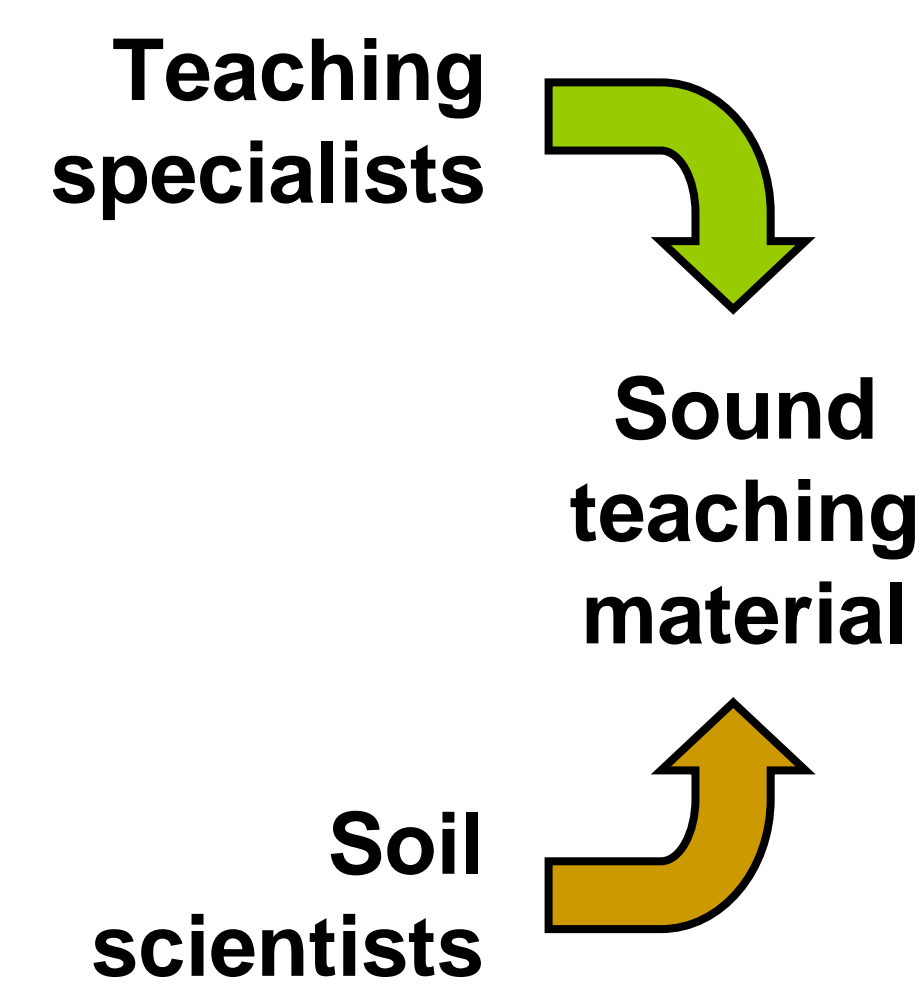
## The need for soil erosion teaching

The national program for French high schools requires teaching about soils. Because **soils are new in the curriculum**, "Life and Earth sciences" teachers have a limited knowledge about soils. Hence, **pedagogic resources need to be expanded**.



Most teachers and students have never paid attention to soil erosion

## A collaboration between soil scientists and teaching specialists



- Soil scientists know about soil erosion.
- Teaching specialists know about teaching.

Collaboration between soil scientists and teaching specialists is needed to build pedagogic resources about soils that teachers can use in the classroom.

## Experiments for the classroom

The description of the experimental set is made available to teachers. It requires only easy-to-find and cheap materials.

### A procedure for splash

Factors: Drop size and aggregate size

### A procedure for interrill erosion

Factors: Soil cover and rainfall intensity



This experimental set allows to use the knowledge acquired in both **physics** and **biology-geology** courses.



**For now, no procedure for rill erosion...**

We are looking for ideas to experiment with the factors of rill erosion.

**Suggestions welcome!**

## A movie showing an experiment and its dataset

Because not all classrooms will go to a soil lab, we have to bring them the lab!

### The movie



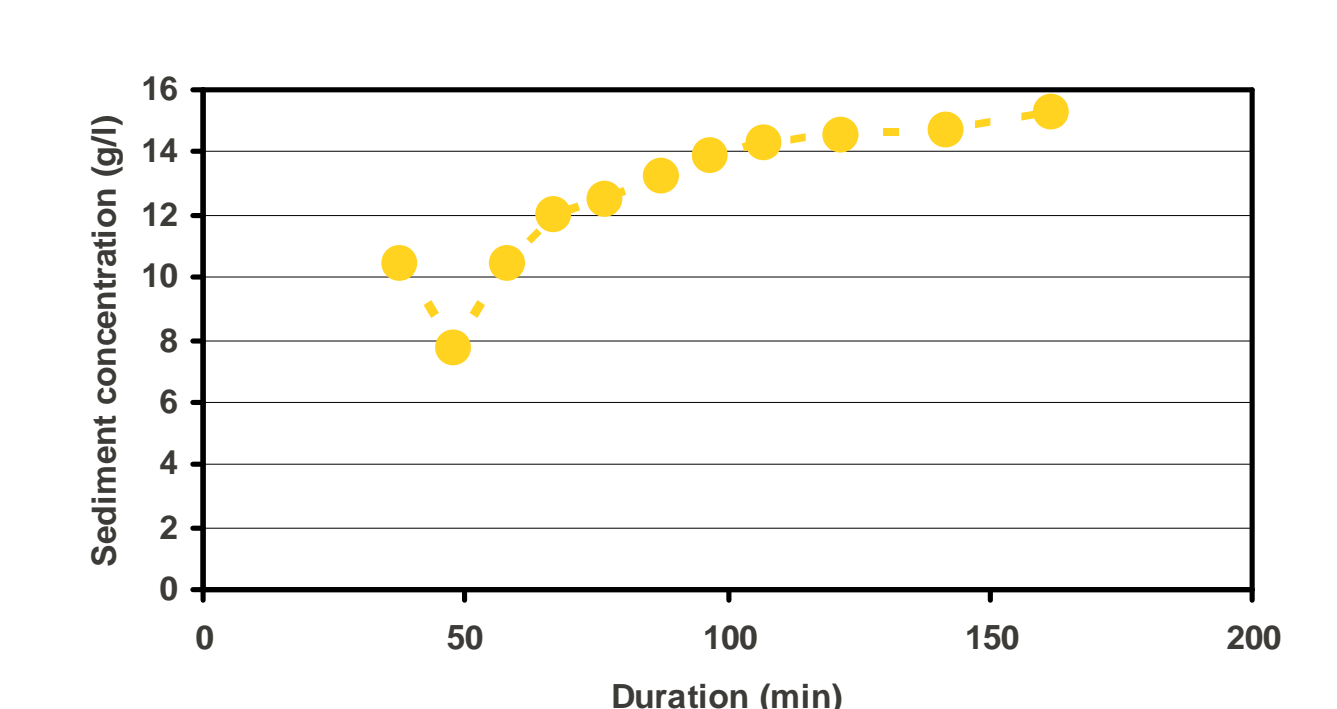
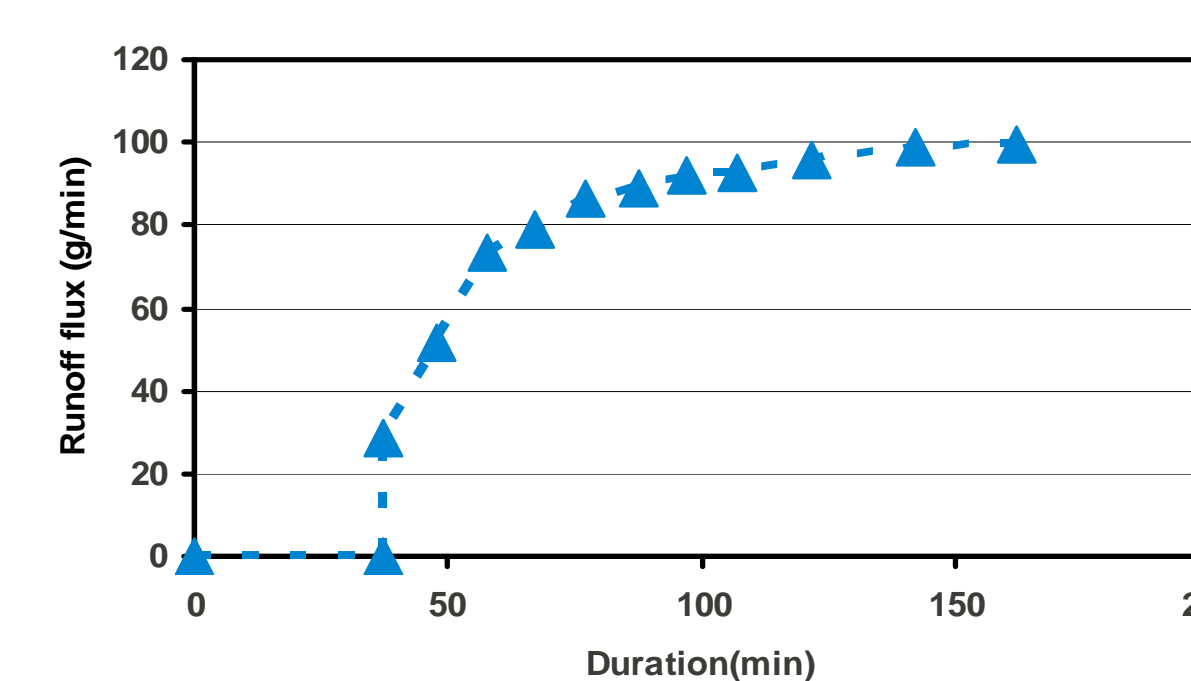
The movie shows a laboratory experiment under rainfall simulation.

### The dataset

INRA		Nom de la manip.		Date	UR SOLS	
Baptiste		Baptiste		23 / 03 / 16	UR SOLS	
Nom de rattachement	Débit du prélèvement (mm)	Fin du prélèvement (min)	Masse terre (g)	Masse terre + eau + sédiments (g)	Masse terre + sédiments (g)	
Baptiste R-M-O1	58	58	42,02	74,17	42,15	
Baptiste R-M-O2	65	59	43,43	75,00	41,57	
Baptiste R-M-O3	55	61	44,09	74,61	41,52	
Baptiste R-M-O4	63	61	43,64	74,33	40,69	
Baptiste R-M-O5	72	61	44,58	74,47	41,89	
Baptiste R-M-O6	74	61	43,01	74,14	40,13	
Baptiste R-M-O7	82	61	44,84	74,50	41,66	
Baptiste R-M-O8	102	61	44,10	74,01	41,91	
Baptiste R-M-O9	112	61	43,44	73,90	41,46	
Baptiste R-M-O10	133	61	43,07	73,63	41,57	
Baptiste R-M-A1	153	61	43,52	73,53	41,01	

The dataset is used as teaching material.

The students plot the data:



The teacher guides the students in explaining the results.

Teaching about soil erosion becomes **more than teaching about soil**: It is an opportunity to teach the scientific method!

*The basis was a real scientific experiment that got published in a peer-reviewed journal.*

## Outcome

- This work is the base of a new dynamic of collaboration between teaching institutions and researchers.
- Teaching material is available for all teachers
- More material could be built in the future (rill erosion...)

## Acknowledgements

The authors are thankful to Lionel Cottenot (UR Sols) for his help in setting up the demonstration day.