

# The VSoil modelling platform

Nicolas Beudez, Nathalie Moitrier,  
Nicolas Moitrier, Cédric Nouguier

-

INRAE, UMR EMMAH, Avignon

26 March 2026



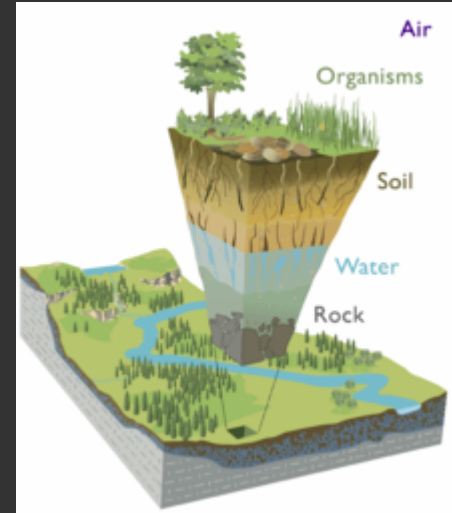
# 1) Context: the soil



The **soil** is at the heart of the 'critical zone'.

## Critical zone:

- extends from the **atmosphere** to the **unaltered rock**;
- is the site of numerous **exchanges**: water, solutes, gas, solids, energy, organisms;
- is the place where processes that **sustain life on Earth** take place.



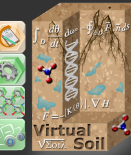
The 'critical zone'



It is essential to **understand** how the soil functions and **predict** its evolution for:

- sustainable agriculture,
- biodiversity preservation,
- water resource management,
- climate change mitigation,
- ...

## 2) Need to create models of soil functioning



**Digital models:** powerful tools for reproducing and studying **soil functioning**.

**Survey** (2006 – 2008) conducted within the 'Environment and Agronomy' department of INRA to identify the **needs** in terms of **soil functioning modelling**.



Scientists want:

- to develop models that **couple mechanisms**:
  - of different **natures**: water, solute, gas and heat transfers, earthworm dynamics, particle transport, ...;
  - at different **time** and **space** scales;
- models to be developed **easily** and **quickly**: use **available** and/or **new codes**;
- the development of models to be accessible to all: **coding reduced** as much as possible.

### 3) Technical barriers



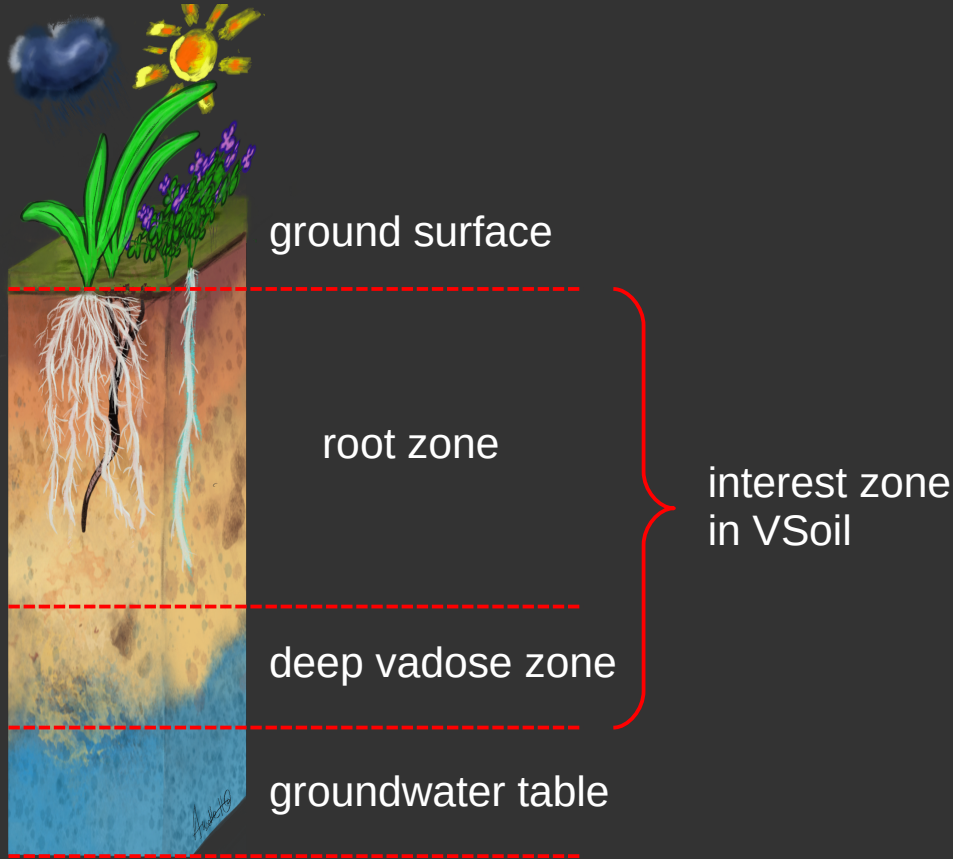
Need for **assistance** in the modelling chain:



**Different computer languages** (Fortran, C, C++, Java, Python, R, ...) for programming whose lack of standards **restrains the coupling** of existing models.

**Lack of assistance and support** for computer programming of simple and complex models.

## 4) VSoil: a powerful software platform to develop soil models



scale: soil pedon (a few m<sup>2</sup>)

VSoil: a modelling software platform for developing digital 1D models describing the physical, chemical and biological processes of soil in interaction with climate, plants and human actions.

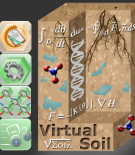
VSoil facilitates the coupling between these processes.



Creation of models of varying complexity from the assembly of existing or new computer codes.

VSoil is developed since 2009 at EMMAH (INRAE/Avignon University, France).

# 5) The architecture of VSoil



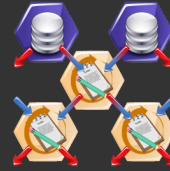
From concepts...



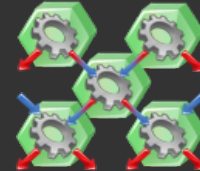
Phenomena (physical, chemical, biological) are called **processes** and are characterised by their **inputs** and **outputs**.



A **module** is a computer implementation of a process.



Processes and their inputs/outputs produce graphs called **skeletons**.



A **model** is an ordered set of modules.



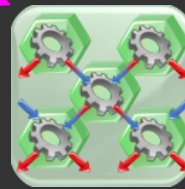
A numerical simulation.



vsoil-processes



vsoil-modules



vsoil-models



vsoil-player

... to software.

## 6) The VSoil software components: vsoil-processes



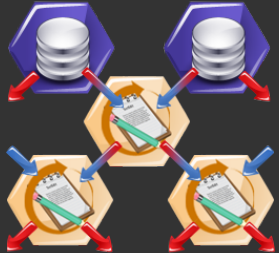
Phenomena are called **processes** (examples: bioturbation, evapotranspiration, heat transport and balance, organic matter dynamics, water flow and balance, ...). They are characterised by their **inputs** and **outputs**.



Some processes are **external**.



Interactions between processes are detected using **inputs** and **outputs**.



Processes with their inputs and outputs produce graphs: **skeletons**.

### **vsoil-processes**

**Open lists of variables and processes**

**Guide for naming variables**

**Automatic creation of skeletons**

**Provides information for coding and assembly of modules**

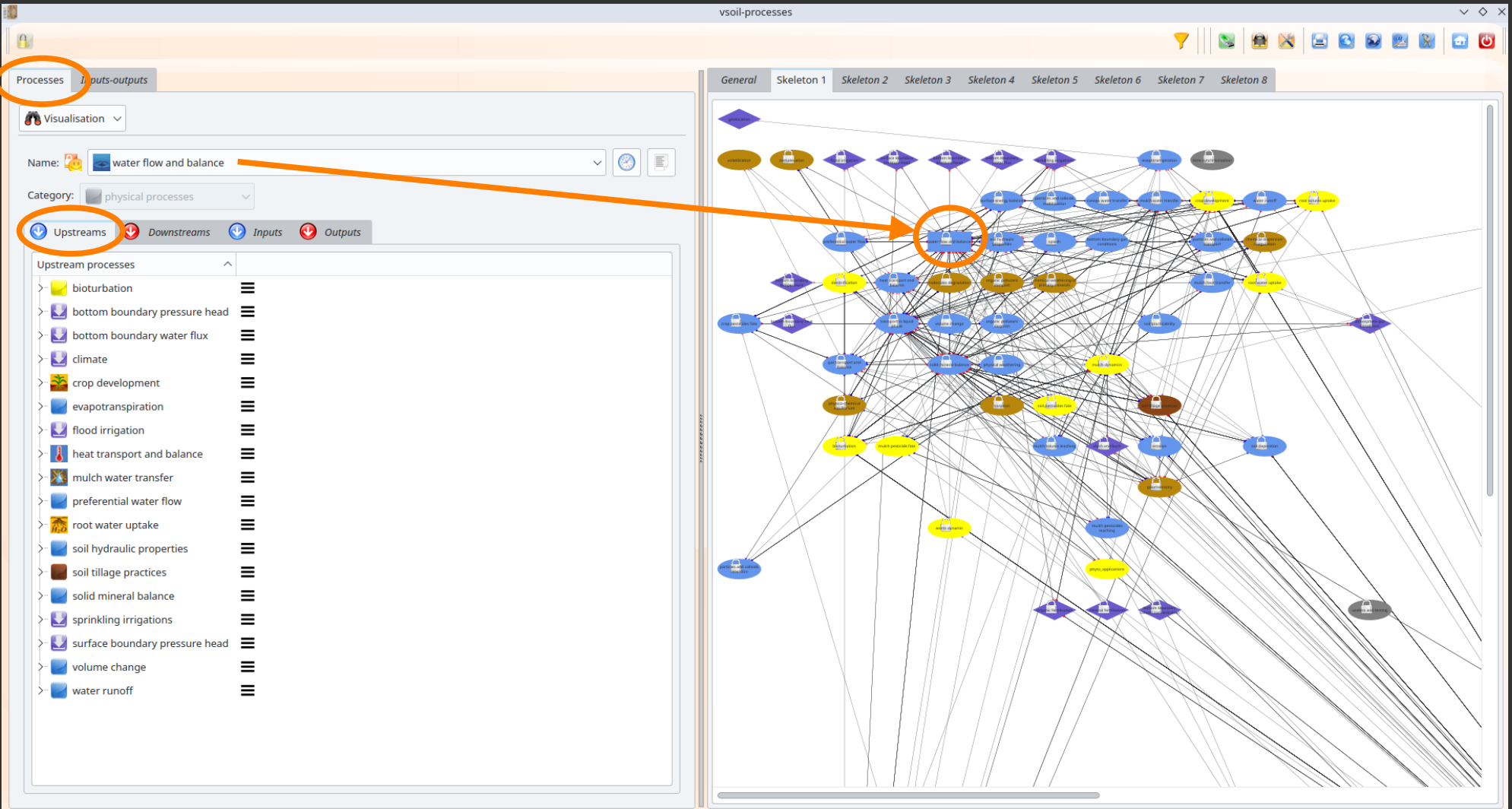
**60 official processes**

## 6) The VSoil software components: vsoil-processes

The screenshot displays the VSoil software interface, specifically the 'vsoil-processes' window. The 'Processes' tab is selected, and the 'Outputs' sub-tab is active. The 'Name' field is set to 'water flow and balance', and the 'Category' is 'physical processes'. The 'Outputs' list on the left includes 25 variables, each with a unit. An orange arrow points from the 'Outputs' sub-tab to a circled node in the process network diagram on the right.

| Outputs                                                  | Unit       |
|----------------------------------------------------------|------------|
| root water volumetric uptake rate yearly                 | m3.m-2     |
| soil air maximum volumetric content                      | m3.m-3     |
| soil air volumetric content                              | m3.m-3     |
| soil bottom water capillary flux                         | m.s-1      |
| soil bottom water capillary flux time cumulated          | m          |
| soil bottom water capillary flux yearly                  | m          |
| soil bottom water volumetric flux density time cumulated | m3.m-2     |
| soil evaporation flux yearly                             | m          |
| soil fluid bulk density                                  | kg.m-3     |
| soil fluid pore velocity                                 | m.s-1      |
| soil hydraulic conductivity values                       | m.s-1      |
| soil immobile water volumetric content                   | m3.m-3     |
| soil infiltrability minimum                              | m.s-1      |
| soil infiltration cumulated                              | m          |
| soil mobile water volumetric content                     | m3.m-3     |
| soil pressure head gradient                              | NA         |
| soil profile pressure head                               | m          |
| soil root zone water amount                              | m          |
| soil saturation index                                    | ratio0-1   |
| soil saturation index cell                               | ratio0-1   |
| soil surface evaporation to maximum evaporation ratio    | ratio0-1   |
| soil surface evaporation volumetric flux density         | m3.m-2.s-1 |

## 6) The VSoil software components: vsoil-processes



## 6) The VSoil software components: vsoil-processes

The screenshot displays the vsoil-processes software interface, which is divided into two main panels. The left panel is titled "Inputs-outputs" and contains several configuration options. The "Name:" field is set to "soil water volumetric content", and the "Unit:" is "m3.m-3". The "Location:" section has radio buttons for "surface", "profile" (selected), "layer", "bottom", "none", and "none (vector)". Below this, a "List of processes using the selected variable as:" shows a list of processes: "Output", "water flow and balance", "random\_soil\_moisture", "Richards\_Pastis", "steady\_water\_flow", and "swf\_dynamic\_grid\_example\_cpp". The right panel shows a complex network diagram with numerous nodes (circles and diamonds) connected by lines, representing the relationships between different processes in the model. The nodes are color-coded (blue, yellow, brown, purple) and labeled with process names. The top of the interface has a menu bar with "Processes" and "Inputs-outputs" tabs, and a toolbar with various icons. The bottom of the interface has a status bar with "vsoil-processes" and a window title bar.

Processes: Inputs-outputs

Visualisation

Name: soil water volumetric content

Unit: m3.m-3

Constraint: none

Location:

- ☐ surface
- ☒ profile
- ☐ layer
- ☐ bottom
- ☐ none
- ☐ none (vector)

Single value (scalar)

Arrays of values (tagged)

Arrays of values (misc)

List of processes using the selected variable as:

- Output
- water flow and balance
- random\_soil\_moisture
- Richards\_Pastis
- steady\_water\_flow
- swf\_dynamic\_grid\_example\_cpp

General Skeleton 1 Skeleton 2 Skeleton 3 Skeleton 4 Skeleton 5 Skeleton 6 Skeleton 7 Skeleton 8

10

## 6) The VSoil software components: vsoil-modules



A **module** corresponds to a modelling, a numerical method, ...

It is a computer code (Fortran, C++).

A module is linked to a process.



Several modules may be available for a process.



A module uses some of the inputs  of its process and must produce at least one output .

### **vsoil-modules**

**Parameters**

**Coding assistance**

**Compilation**

**Tests**

**Graphs**

**Standardised languages:  
Fortran / C++**

**148 official modules**

## 6) The VSoil software components: vsoil-modules

vsoil-modules: forest\_soil\_practicability

Process
Module
Inputs/outputs
Parameters
Code editor
Upstream modules
Initialisation
Execution
Plots

Module parameters

|    | Name                              | Desc. | Type                 | Unit     | Min.      | Max.      | Pref. min               | Pref. max            | Default               | Vector (array) | LD |  |   |   |  |  |
|----|-----------------------------------|-------|----------------------|----------|-----------|-----------|-------------------------|----------------------|-----------------------|----------------|----|--|---|---|--|--|
| 1  | interest_layer_minimum_depth      |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.0000000000000000 m  | size 2         |    |  | + | - |  |  |
| 2  | interest_layer_intermediate_depth |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.2500000000000000 m  | size 2         |    |  | + | - |  |  |
| 3  | interest_layer_maximum_depth      |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.5999999999999998 m  | size 2         |    |  | + | - |  |  |
| 4  | interest_period_starting_date     |       | date (YYYY-MM-DD)    | NA       |           |           |                         |                      | 2000-01-01            | size 2         |    |  | + | - |  |  |
| 5  | interest_period_ending_date       |       | date (YYYY-MM-DD)    | NA       |           |           |                         |                      | 2000-01-01            | size 2         |    |  | + | - |  |  |
| 6  | rainy_period_maximum_length       |       | integer (signed)     | NA       | -infinite | +infinite | 1                       | 10                   | 4                     | size 2         |    |  | + | - |  |  |
| 7  | dry_period_length                 |       | integer (signed)     | NA       | -infinite | +infinite | 1                       | 10                   | 3                     | size 2         |    |  | + | - |  |  |
| 8  | daily_rainfall_threshold          |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.0005000000000000 m  | size 2         |    |  | + | - |  |  |
| 9  | cumulative_rainfall_threshold     |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.0100000000000000 m  | size 2         |    |  | + | - |  |  |
| 10 | saturation_index_threshold        |       | ratio (range [0;1])  | ratio0-1 | 0.000000  | 1.000000  | 0.000 ratio0-1          | 1.000 ratio0-1       | 0.750 ratio0-1        | size 2         |    |  | + | - |  |  |
| 11 | cumulative_ET0_threshold          |       | real (decimal value) | m        | -infinite | +infinite | 0.0000000000000000 m    | 0.0000000000000000 m | 0.0060000000000000 m  | size 2         |    |  | + | - |  |  |
| 12 | matrix_potential_threshold        |       | real (decimal value) | m(H2O)   | -infinite | +infinite | -500.0000000000000000 m | 0.0000000000000000 m | -3.2999999999999998 m | size 2         |    |  | + | - |  |  |

If you need external data files, you can add it here.
Add user external data file

Remove
Edit
Name

## 6) The VSoil software components: vsoil-modules

The screenshot displays the VSoil software interface, specifically the 'vsoil-modules: forest\_soil\_practicability' window. The interface is divided into several sections:

- Process Bar:** Located at the top, it includes tabs for Process, Module, Inputs/outputs, Parameters, Code editor, Upstream modules, Initialisation, Execution, and Plots. The 'Code editor' tab is currently active.
- Check and Save:** Below the process bar, there are buttons for 'Check code' (with a green checkmark icon), 'Save source codes' (with a floppy disk icon), and a dropdown menu for 'Language coding web resources'.
- Virtual soil global variables:** This section contains a 'Time' button, a 'Previous time inputs' button, and a 'grid change' checkbox.
- Variable Lists:** On the left, there are three expandable lists: 'Inputs', 'Inputs (previous time)', and 'Outputs'. Each list contains a description of the variable and its corresponding 'Variable name'.
- Code Editor:** The right side of the interface shows a code editor with C++ code. A green circle highlights the 'Compute section' dropdown menu. The code includes comments and function calls related to soil simulation and interest period handling.

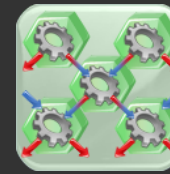
**Variable Lists:**

| Name                                                                          | Variable name                                |
|-------------------------------------------------------------------------------|----------------------------------------------|
| <b>Inputs</b>                                                                 |                                              |
| crop maximum evapotranspiration volumetric flux density daily cumulated       | pet_daily_cumulated                          |
| rain height daily cumulated                                                   | rain_height_daily_cumulated                  |
| soil hydraulic                                                                | soil_hydraulic                               |
| soil saturation index                                                         | soil_sat_index                               |
| soil water volumetric content                                                 | soil_water_vol_content                       |
| <b>Inputs (previous time)</b>                                                 |                                              |
| valid_crop maximum evapotranspiration volumetric flux density daily cumulated | valid_pet_daily_cumulated                    |
| valid_rain height daily cumulated                                             | valid_rain_height_daily_cumulated            |
| <b>Outputs</b>                                                                |                                              |
| interest soil layers drying slope time average                                | int_soil_layer_drying_slope_time_average     |
| interest soil layers practicable days number                                  | int_soil_layer_prac_days_number              |
| interest soil layers practicable days percentage                              | int_soil_layer_prac_days_percentage          |
| interest soil layers saturation index                                         | int_soil_layer_sat_index                     |
| interest soil layers saturation index daily average                           | int_soil_layer_sat_index_daily_average       |
| interest soil layers saturation ratio daily average                           | int_soil_layer_sat_ratio_daily_average       |
| soil practicable days number                                                  | soil_prac_days_number                        |
| soil practicable days percentage                                              | soil_prac_days_percentage                    |
| <b>Outputs (previous time)</b>                                                |                                              |
| valid_interest soil layers drying slope time average                          | valid_int_soil_layer_drying_slope_time_a...  |
| valid_interest soil layers practicable days number                            | valid_int_soil_layer_prac_days_number        |
| valid_interest soil layers practicable days percentage                        | valid_int_soil_layer_prac_days_percentage    |
| valid_interest soil layers saturation index                                   | valid_int_soil_layer_sat_index               |
| valid_interest soil layers saturation index daily average                     | valid_int_soil_layer_sat_index_daily_aver... |

**Code Editor:**

```
1 // Force outputs to NAN value outside the period of interest.
2 initializeOutputs(grid, int_soil_layer_sat_index, int_soil_layer_sat_index_daily_average, int_soil_layer_sat_ratio_daily_average,
3 int_soil_layer_prac_days_percentage, int_soil_layer_drying_slope_time_average, soil_prac_days_number, soil_
4
5 // Current simulation time is outside the period of interest.
6 if (!isSimulationTimeInInterestPeriod(t, vsoil_time->reference(), interest_period_starting_date, interest_period_ending_da
7
8 // Current simulation time is included in the period of interest.
9
10 interestPeriodAlreadyReached = validInterestPeriodAlreadyReached;
11
12 if (!interestPeriodAlreadyReached)
13 {
14     performInitializationsWhenFirstTimeInInterestPeriod(soil_sat_index, int_soil_layer_sat_index, int_soil_layer_sat_index_dail
15 int_soil_layer_sat_ratio_daily_average, int_soil_layer_prac_days_nu
16 int_soil_layer_drying_slope_time_average, soil_prac_days_number,
17
18     interestPeriodAlreadyReached = true;
19     return;
20 }
21 // Current simulation time is not the first simulation time to reach the period of interest. Updates calculations over the
22
23 // Time variables.
24 timeElapsedInDay = validTimeElapsedInDay + dt;
25 numberOfElapsedDays = validNumberOfElapsedDays;
26 if (day_changed) ++numberOfElapsedDays;
27
28 // True if soil is practicable (interest soil layers are simultaneously practicable), false otherwise.
29 bool soilIsPracticable = true;
30
31 // Loop over the interest soil layers.
32 for (InterestSoilLayer * const interestLayerPtr : orderedInterestSoilLayers)
33 {
34     const int interestLayerId = interestLayerPtr->getId();
35
36     // Calculates the space average saturation index of the current interest soil layer.
37     interestLayerPtr->calculateAverageSaturationIndex(soil_sat_index);
38     int_soil_layer_sat_index[interestLayerId] = interestLayerPtr->getAverageSaturationIndex();
39 }
```

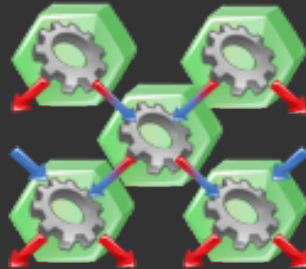
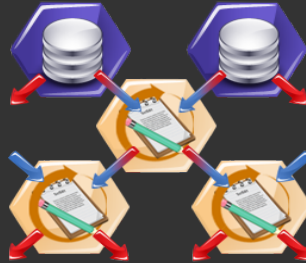
## 6) The VSoil software components: vsoil-models



For each  
process...



... a module  
is selected.



A **model** is an ordered set  
of modules.

### **vsoil-models**

**Module selection**

**Generation of the main**

**Generation of the GUI**

**Execution**

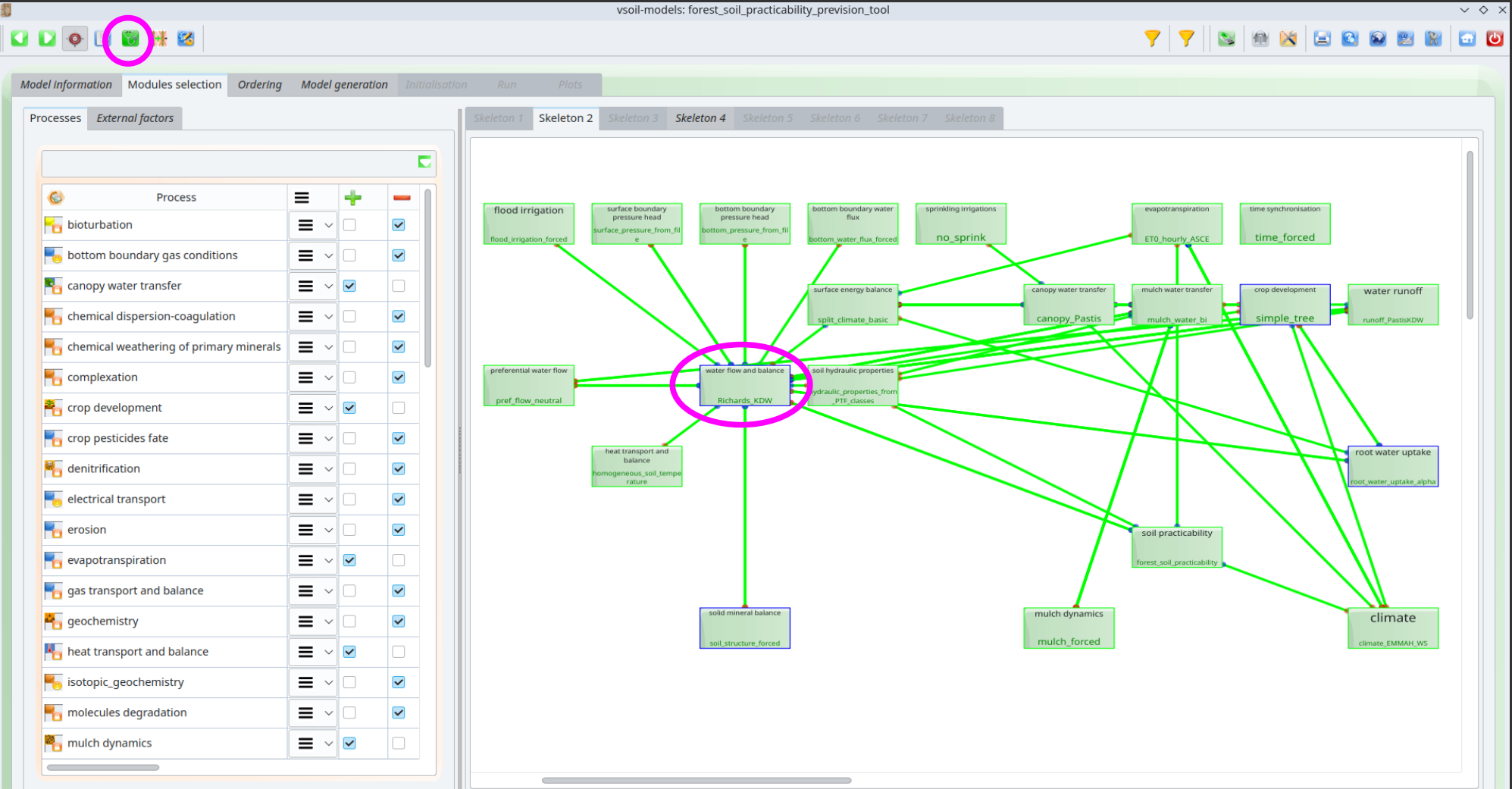
**Visualisation**

**Backup**

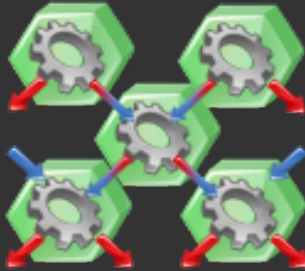
**Modification**

**20 official models**

## 6) The VSoil software components: vsoil-models



## 6) The VSoil software components: **vsoil-player**



A model already built.



Simulations, visualisation of results, ...

### **vsoil-player**

**Use available models**

**Run simulations**

**Archive simulations**

**View saved results**

**Compare simulation results**

**Perform sensitivity analysis  
and parameter estimation**

## 6) The VSoil software components: vsoil-player

vsol-player: forest\_soil\_practicability\_previson\_tool

Compilation Initialisation Run Plots

Load configuration file Save configuration file Reset values Export run Prepare run

Time Grid Modules: time\_forced Databases Statistical Miscellaneous

Load layers Save layers Reset values

Grid gap min 1.00000e-04 m max 1.00000e+00 m

Append layer Remove last layer

Layer and grid properties

Depth 1.00000e-01 m

Grid 10 point(s)

Distribution Linear

Layers definition

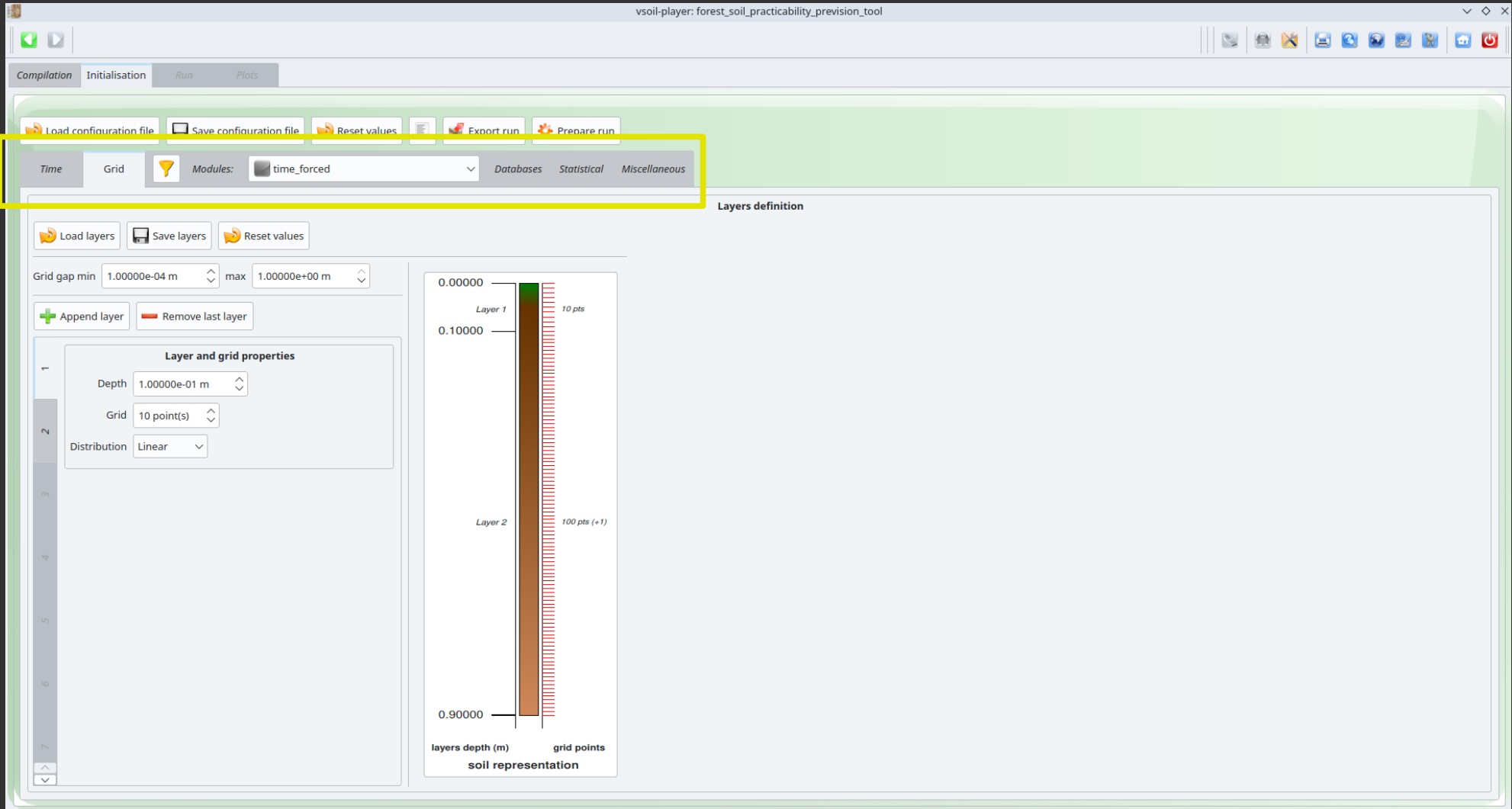
0.00000 0.10000 0.90000

Layer 1 10 pts

Layer 2 100 pts (+1)

layers depth (m) grid points

soil representation



## 6) The VSoil software components: vsoil-player



## 7) Particular features of VSoil



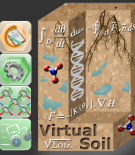
### 7.1) Interfacing with R software environment



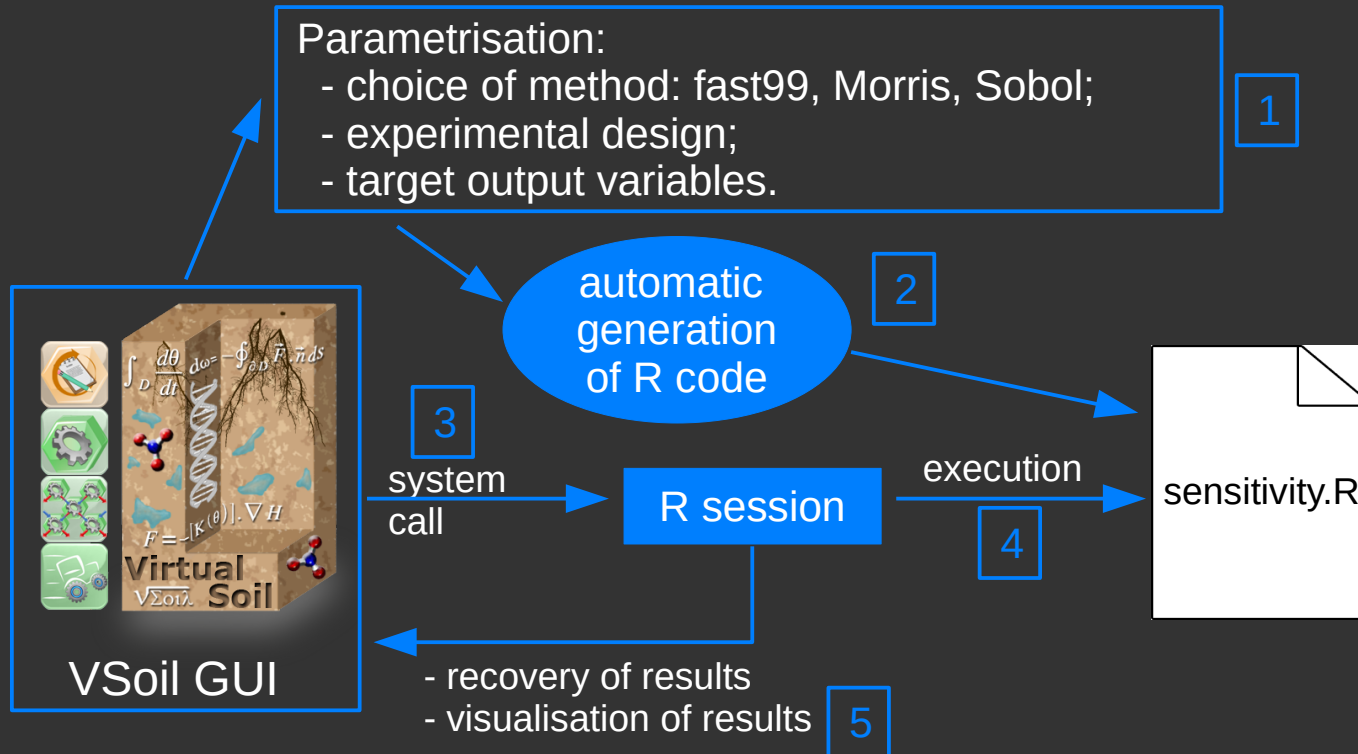
- For using **model exploration** tools:
  - several **sensitivity analysis** methods: fast99, Morris, Sobol (*sensitivity*);
  - various algorithms for **parameter estimation**:
    - Levenberg-Marquardt (*minpack.lm*);
    - SCE-UA (Shuffle Complex Evolution – Uncertainty Analysis) (*rtop*);
    - DREAM (DiffeRential Evolution Adaptative Metropolis) (*dream*);
    - DREAMzs (Differential Evolution Adaptative Metropolis) (*BayesianTools*).
- For running **multi-simulations**.

## 7) Particular features of VSoil

### 7.1) Interfacing with R software environment



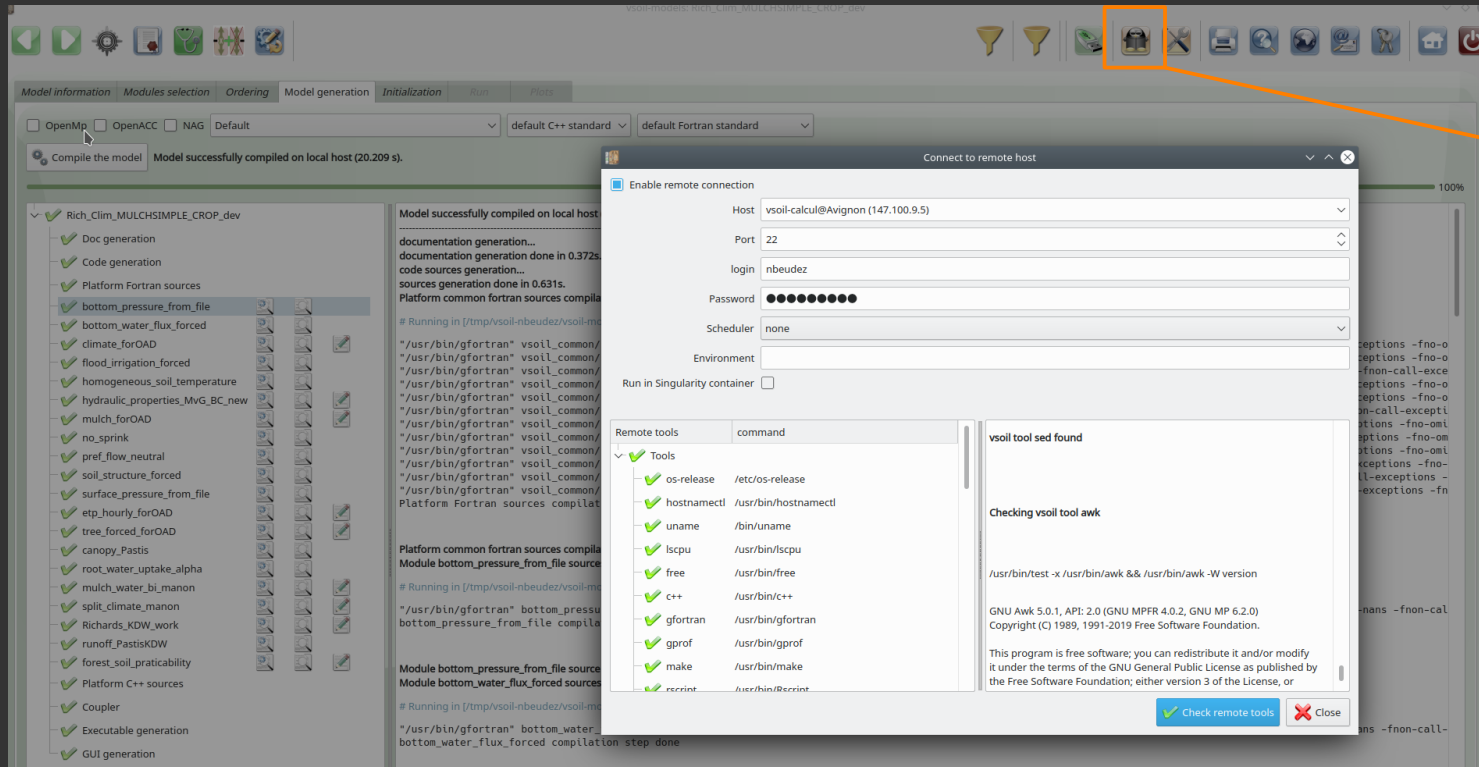
- Example of scenario: **sensitivity analysis**



# 7) Particular features of VSoil

## 7.2) Ability to run calculations on remote environments

- Linux server 'vsoil-calcul': Ubuntu 24.04, 56 cores, 92 GB RAM.
- Compatible with clusters.

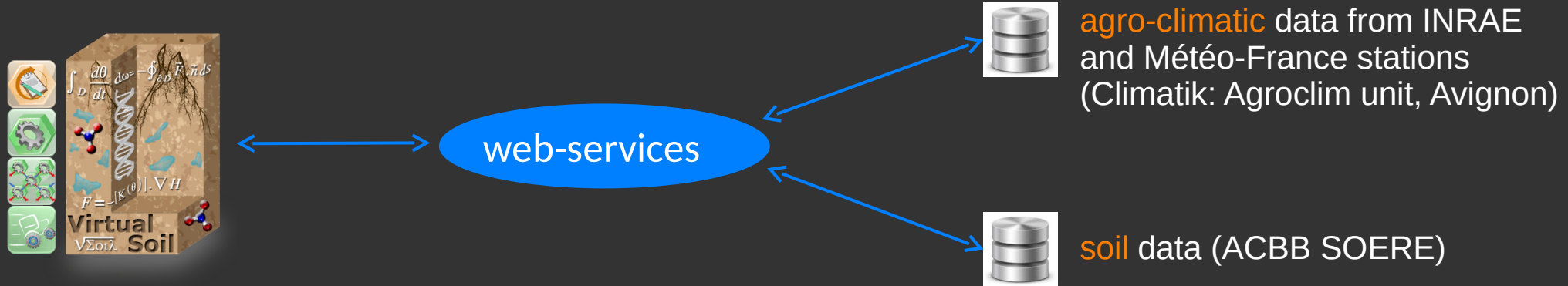


remote connection  
activation

## 7) Particular features of VSoil



### 7.3) Connecting to databases



SOERE: Long-term Observation and Experimentation System for Environmental Research (« Système d'Observation et d'Expérimentation sur le long terme pour la Recherche en Environnement »)

ACBB: Agro-ecosystem, Bio-geochemical Cycle and Biodiversity (« Agro-écosystème, Cycle Bio-géochimique et Biodiversité »)

# 7) Particular features of VSoil

## 7.4) Filter for exploring VSoil objects



Filter

Official & User | Input & output | All units | All locations | Array Tagged & Array misc & scalar | All constraints

potential evapotranspiration

☒ Name ☒ Description

Criteria result: 1 / 1203 In/Out

Final result: 1 / 1203 In/Out

Show results for: In/Out

Display: Final results only

| Name                                                           | Size            |
|----------------------------------------------------------------|-----------------|
| Inputs & Outputs                                               | Total: 1 / 1203 |
| crop maximum evapotranspiration volumetric flux density Penman |                 |
| Models                                                         | Total: 44 / 74  |
| Modules                                                        | Total: 17 / 308 |
| ETP_SGEN                                                       |                 |
| ETP_from_file                                                  |                 |
| ETP_from_file_debug                                            |                 |
| MIPP_ETP                                                       |                 |
| MIPP_energy_fake                                               |                 |
| Maize_STICS                                                    |                 |
| PET_hourly_ASCE                                                |                 |
| etp_forced                                                     |                 |
| etp_from_file_hourly_work                                      |                 |
| etp_hourly_forOAD_with_etp_calculated_or_read                  |                 |
| etr_from_file                                                  |                 |
| lec_etp                                                        |                 |
| no_evapotranspiration                                          |                 |
| split_climate                                                  |                 |
| split_climate_SGEN                                             |                 |
| split_climate_basic                                            |                 |
| split_climate_new                                              |                 |
| Processes                                                      | Total: 3 / 74   |
| crop development                                               |                 |
| evapotranspiration                                             |                 |
| surface energy balance                                         |                 |

Criteria Criteria

Mode Filter everything Ok

## 8) New features (since October 2024)



- **Windows applications** based on **WSL (Windows Subsystem for Linux)**:
  - access to R-based tools (model exploration + multi-simulations) on Windows;
  - faster calculations.
- Simplified **import function**.
- '**Stop and resume**' function: stop a simulation, save its state and restart with different datasets.
- 'time\_forced': a **new module** for **forcing simulation times** on calendar dates (hour, day, month, year) or dates read from file.
- Identification of **referent scientists** for modules and models.

## 9) Work in progress



- **Web-service** providing access to **weather data**:
  - **forecasts**: 7-day, historical, seasonal, climate change scenarios, other scenarios, etc.;
  - unrestricted, direct (live) access via VSoil models.
- **Online demo** versions of models:
  - with **extremely user-friendly** interfaces;
  - **daily forecasts** for different types of soil and locations, for various purposes: drying rates, vehicle accessibility.

## 10) Additional information



- Some **technical specifications**:
  - **Linux / Windows support**;
  - **Apache 2 licence (open source)**;
  - software versioning: Apache subversion;
  - continuous integration tool: Jenkins;
  - languages: C++ / Qt (software) and C++ / Fortran (modules);
  - **728 variables, 60 processes, 148 modules and 20 models**;
  - naming of variables: OBOE ontology;
  - files format: XML (configuration files) and CSV (output files);
  - **external libraries used in modules: Gimli (geophysics), LAPACK (numerical computation).**
- **Distribution strategy**: 2 to 3 stable versions per year.

## 10) Additional information



- Examples of **collaborations**:

- **INRAE**: EMMAH (Avignon), CEREGE (Aix-en-Provence), LISAH (Montpellier), FARE (Reims), ECOSYS (Palaiseau), Info&Sols (Orléans);
- **ONF** (Chambéry);
- Gustave Eiffel University (Champs-sur-Marne), Ghent University (**Belgium**), National Autonomous University of Mexico (**Mexico**);
- **Groupe Roullier** (Saint-Malo).

➡ **Examples of realisations** in upcoming presentations!

## 11) VSoil in summary



1. VSoil makes **modelling accessible** to people who are not comfortable with computer programming. The modeller:

**focuses on his core business:**

- manufacturing bricks (modules);
- assembling bricks graphically;
- analysing simulation results.



is **relieved** of all technical tasks that do not fall within his area of expertise.

2. VSoil facilitates the **sharing** and **reuse** of **new developments** within the platform's user community (new features, distribution of VSoil objects, import/export system).

3. VSoil encourages **collaborations** between scientists from **different fields**.

# 12) Resources

Website: <https://vsoil.hub.inrae.fr/>

[Project](#)[Software platform](#)[Project life](#)[Download](#)[Documentation](#)[Communications](#)[Contact](#)[All sections](#)

## Welcome to the VSoil project!

VSoil (for Virtual Soil), is a **modelling software platform** supported by the **"Agroécosystèmes" division of INRAE** and developed and hosted by **EMMAH laboratory**. It is a tool to **help develop numerical models** describing the **physical, chemical and biological processes of the soil** in interaction with the **climate, plants and anthropic actions**. By **facilitating the coupling between these processes**, the platform makes it possible to **develop complex models from assemblies of existing or new codes**.

We advise you to read the [What you can do with VSoil](#) page before using VSoil in order to know more about what VSoil is, the capabilities it has and the functionalities it offers.

Look also at the top of this page to access more informations about the VSoil project: description of the [project](#) and the [software platform](#), informations about the [project life](#), procedures to [download](#) the VSoil software suite (on Linux and Windows), access to [documentations](#) of the VSoil software suite (including some tutorials) and how to [contact](#) us.

You can find below all the **news about the VSoil project**: new stable versions of VSoil software suite, new collaborations (projects, thesis, ...).

## News

- A **new stable version** of VSoil software suite (VSoil 20250929) is available. The main changes introduced in this version are: (1) several **modules** were translated into **C++ language**, (2) when a model is detected to need **time synchronisation** with calendar dates, then the **vsoil-models** software adds automatically the default time synchronisation module (that can be removed or changed), (3) modules can now ask **programmatically** to **save outputs** on current time step and (4) **'soil practicability'** was added to the list of available processes. See the [Technical news](#) page for more details about this version and the [Download](#) page to download and install it. 29/09/2025
- An article written by **Hamza Chaïf et al.** was recently published in *Journal of hydrology*. See the [Communications](#) page for more details. 08/07/2025
- **Claude Doussan** (INRAE, EMMAH, Avignon) presented a poster entitled **'Caractérisation des propriétés hydrauliques du sol par inversion jointe électrique-hydraulique'** at the **GEOFCAN 2025 symposium** (4-6 June 2025, Avignon, France). This poster illustrates the work done by **Ismail Djellouli** (Sorbonne University, Paris) and **Julien Ardouin** (Savoie Mont Blanc University) during 2 master's internships he supervised and involving the VSoil platform (see [here](#) for more details about Ismail's and Julien's work). 10/06/2025
- **Nicolas Beudez** (VSoil team, INRAE, EMMAH, Avignon) presented the VSoil modelling software platform in a **poster** at the **EGU General Assembly 2025** (Vienna, Austria, 27 April to 2 May 2025). **Cécile Dagès** (INRAE, LISAH, Montpellier) also presented a **poster** illustrating the **MIPP model** and its application to estimate the environmental impact of pesticides in a Mediterranean wine-growing watershed. See the [Communications](#) page for more details. 06/05/2025



# 13) The VSoil team



## Team members:

- scientific team:



**Nicolas Beudez**

scientific computing engineer  
scientific lead

- software team:



**Nicolas Moitrier**

research software engineer –  
operational manager



**Nathalie Moitrier**

software design  
engineer

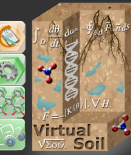


**Cédric Nougulier**

software design  
engineer

## To contact us:

- [vsoil@inrae.fr](mailto:vsoil@inrae.fr) ==> scientific team
- [vsoil-support@inrae.fr](mailto:vsoil-support@inrae.fr) ==> software team
- Discord server



Thank you for your attention