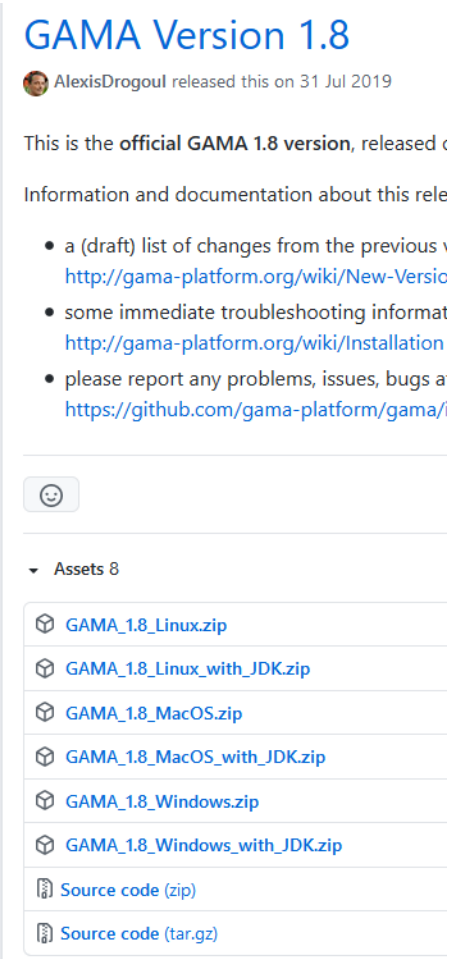
How to Do with the Miribel dataset

A) Installation

A1) Gama

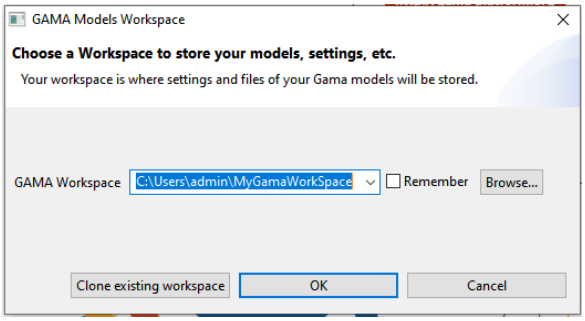
A1.1 Download Gama_1.8_Windows_with_JDK.zip : https://github.com/gama-platform/gama/releases.

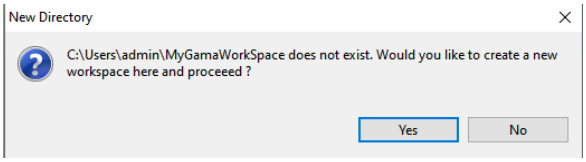


A1.2 Unzip GAMA_1.8.1_Windows_with_JDK.zip in …/Gama_1.8_Windows_with_JDK

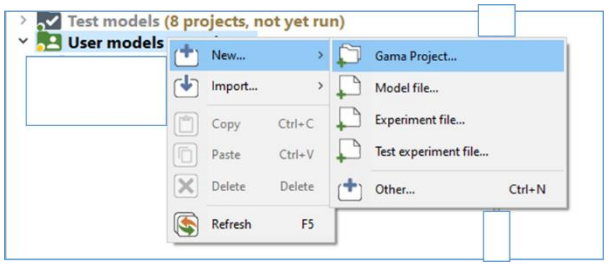
A1.3 Open …/GAMA_1.8_Windows_withJDK and launch Gama.exe. Choose a gama workspace

…./MyGamaWorkSpace





A1.4 Right click on User models, New, Gama Project. Create a project named OPALE (all capital letters required, strictly observe the spelling). Uncheck Create a model file, Finish.



A1.5. Exit Gama

A2) Matlab

A2.1. Download the Matlab runtime (select the Windows R2018b (9.5) 64-bits installer): https://fr.mathworks.com/products/compiler/matlab-runtime.html

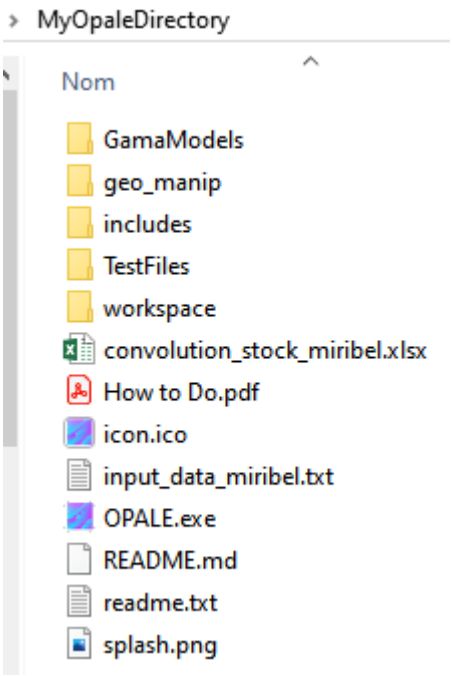
A2.2. Launch MCR_R2018b_win64_installer.exe

A3) OPALE

A3.1. Download OPALE executables and test files from : https://github.com/TipTop-PSDR/OPALE

Click Code ; Click Download ZIP

A3.2. Unzip OPALE-main.zip and subdirectory OPALE.zip and send all of them to …/MyOpaleDirectory



B) Configure the input file

B1) Edit the input_data_miribel.txt.

B1.1. Make the following changes

*input_data_miribel.txt - Bloc-notes

Fichier Edition Format Affichage Aide

```
...\MyGamaFolderName\GAMA_1.8_Windows_with_JDK
...\MyGamaWorkSpace
...\MyOpaleDirectory\TestFiles\mnt
...\MyOpaleDirectory\TestFiles\bois\Couverts Ligneux.shp
...\MyOpaleDirectory\TestFiles\rpg\RPG2016_Miribe_idexploit_complet.shp
%
...\MyOpaleDirectory\TestFiles\routes\roads.shp
...\MyOpaleDirectory\TestFiles\limite_bv\lim_bv.shp
...\MyOpaleDirectory\TestFiles\landuse_decoupe\clc_miribel.shp
...\MyOpaleDirectory\TestFiles\riviere\Fos.shp
...\MyOpaleDirectory\TestFiles\sol\sols_miribel.shp
...\MyOpaleDirectory\TestFiles\met_miribel_2016.csv
...\MyOpaleDirectory\TestFiles\debit_miribel.csv
...\MyOpaleDirectory\TestFiles\carac_sols.csv
MIRIBEL
```

B1.2. Do not change line 6 and the 15th last line. Verify the 9th line spelling.

B1.3. Save the file in …MyOpaleDirectory/MyInputFile.txt

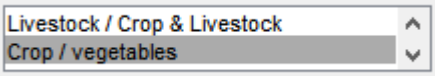
C) Run OPALE

C1) LULCC Programs

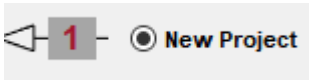
C1.1. launch …/MyOpaleDirectory/OPALE.exe

C1.2. Select the push button « EN »

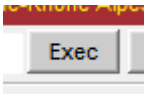
C1.3. Select Crop/Vegetables in the list box



C1.4. Select the « New Project » button of the central workflow

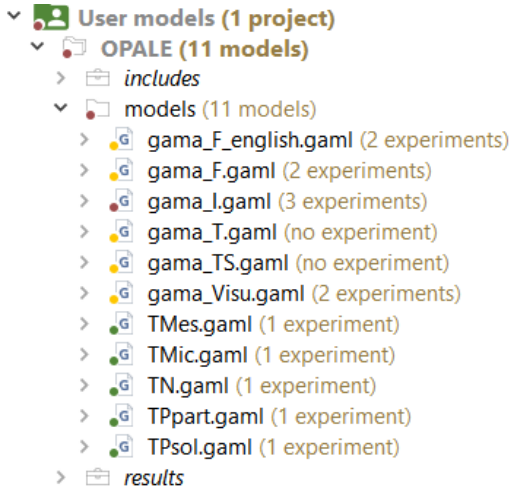


C1.5. Click the Exec button

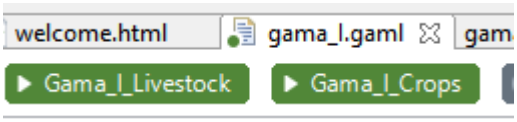


C1.6. Select the input data file …/MyInputFile.txt

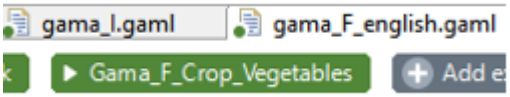
C1.7. Accept messages and Wait for the automatic launch of the Gama Platform. After the the first launch, wait a while until the copying of Opale User models is finished



C1.8. Execute the Gama_I_Crops program



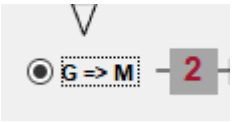
C1.9. Close the experiment. Select the the Gama_F_english tab and launch the Gama_F_Crop_Vegetables experiment



C1.10. Wait during the instantiating of agents. Run the experiment when ready

C1.11. Exit the gama Platform after completion

C1.12. Select the G=>M button in the central workflow to transfer data to the matlab environment



C1.13. Click the Exec button

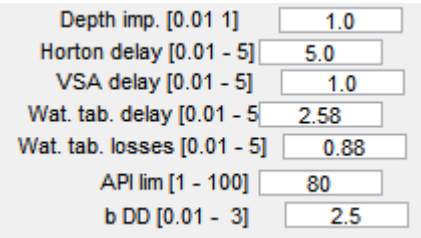
C1.14. Save results in …MyOpaleDirectory/workspace/MyFile

C2) WMWL Programs

C2.1. Contextual optimization.

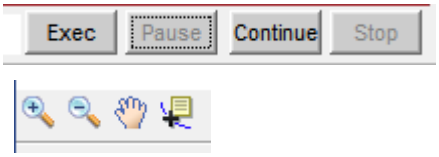
C2.1.1.Select the Contextual button

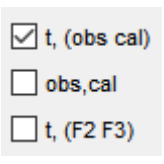
C2.1.2. Enter parameter values k_m (depth imp.), c_1 (Horton delay), c_2 (VSA delay), c_3 (Wat tab losses), λ (Wat tab delay), b (b DD) and API max (API lim).



C2.1.3. Click Exec, select …/workspace/MyFile.mat

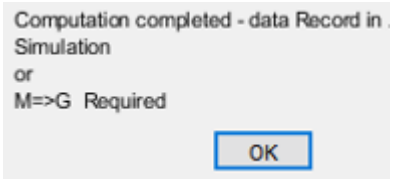
C2.1.4. Click the Pause/Continue button to zoom in/out and examine the plot data with top tools





C2.1.5. Check obs,cal or t(F2,F3) to change plots

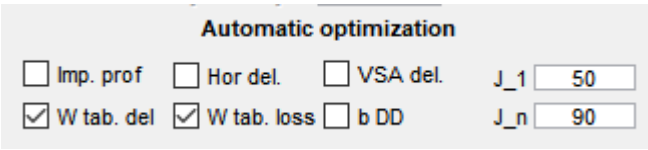
C2.1.6. Run Computations until completion. Click OK



C2.2. Automatic optimization.

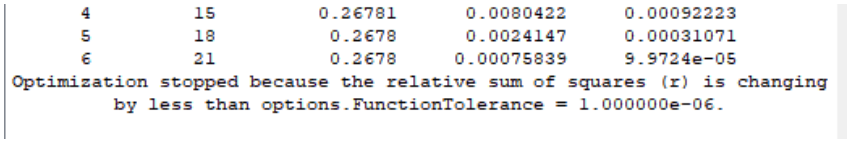
C2.2.1. Select the Automatic button

C2.2.2 Choose the set of optimized parametres and define the calibration period (Julian date J_1=50, J_n=90)



C2.2.3 Click the Exec button, select the …/workspace/MyFile.mat file.

C2.2.4 wait until the lowering of f(x) is less than the tolerance limit. Click OK to close the pop up menu.



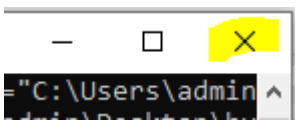
C2.2.5 Open the …/MyOpaleDirectory/workspace/Temp/YYYYDDMMHHmm_optimX.csv file where optimized parameters values are saved

C2.3. Changes landscape Interfaces.

C2.3.1. Select the Interfaces button. Select the FS check box. Click the Exec button. Select the …/workspace/Myfile.mat file

C2.3.2. Select the new FS file …\MyOpaleDirectory\TestFiles\bois\nouvelles_bandes_enherbees\bandes_enherbees40.shp.

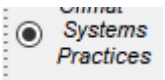
C2.3.3. Verify there is no error messages with SAGA libraries run in the command windows. Close the command window to pursue the OPALE treatment



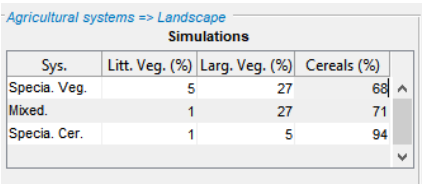
C2.3.4. Note the address of the matfile results …/MyOpaleDirectory/workspace/New_Infra_GRASS_MyFile.mat

C2.4. Changes farming systems or Cultural practices.

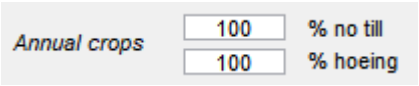
C2.4.1. Select the Systems button and click the Exec Button



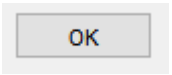
C2.4.2. Select the original project …/workspace/Myfile.mat file or the project modified in C2.3



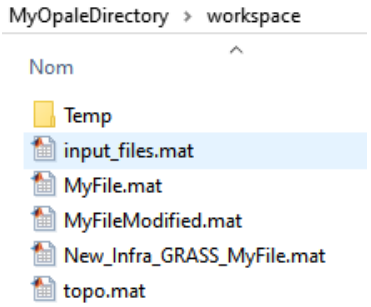
C2.4.3. Modify the % of agricultural systems or the % of no till or the % hoeing or the two/three of them.



C2.4.4. Click the OK button to pursue the OPALE treatments



C2.4.5. Give a new name to the project : MyFileModified.mat. This latter is saved in …MyOpaleDirectory/workspace and can be treated as before in C.2.1, C.2.2, C.2.3.

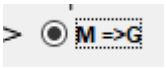


C3) SSMT Programs Surface and Subsurface transfer functions (SSTFs)

C3.1 Transfer functions for suspensions

C3.1.1 Verify parameter values (§ C2.1.1 & C2.1.2)

C3.1.2. Select the M=>G button. Click The Exec Button

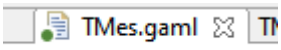


C3.1.3. Enter the date of the beginning of the transfer period to be studied

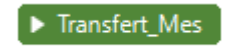
C3.1.4. Click the Exec button. Choose the …/workspace/MyFile.mat file

C3.1.5. Accept the opening of the Gama platform

C3.1.6. Load the Tmes.gaml model (SM transfer) (for suspended matter)



C3.1.7. Run the TMes.gaml model



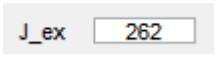
C3.1.8. Alternatively run the TMic.gaml model (for suspended microorganisms)

C3.1.9. Open the …/MyGamaWorkspace/OPALE/results/Suspended Matter.csv file in an excel sheet (With MS Office2016: Navigate to the “Data” tab. Click on the “From Text” button, Click “Import.”)

Note the eta value, the tau days, the number of particles reaching the outlet and the SSTF function

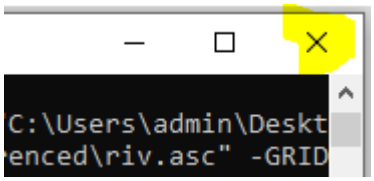
eta	0.04495606	
day	nb part	FT
1	401.7182989	0.78144281
2	112.3542525	0.21855719
3	0	0
4	0	0
5	0	0

C3.1.10 Enter the date of the beginning of a new transfer period to be studied



C3.1.11. Repeat §C3.1.4 (if needed §C3.1.5, §C3.1.6.)

C3.1.12 Verify there is no error messages with SAGA libraries run in the command windows. Close the command window to pursue the GAMA treatment.



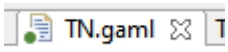
C.3.1.13. Run the TMes.gaml (idem §C3.1.7)

C3.2 Transfer functions for solutes

C3.2.1 Repeat steps §C3.1.1, §C3.1.2, §C3.1.3, §C3.14 (and §C.3.1.5 if the Gama platform is closed)

C3.2.2. Select the M=>G button. Click the Exec button.

C3.2.3 Load the TN.gaml model (solute transfer for Nitrogen)

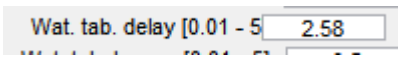


C3.2.4 Run the TN.gaml model

C3.2.5 Alternatively Run the TPsol model (Soluble P transfer)

C4) Groundwater Transfer functions (GTFs)

C4.1. Note the power-law parameter for deep water transfer



D) SSMT Validation

D1. Open the …/MyOpaleDirectory/convolution_stock_miribel.xlxs file

	η	0.029				*d*	0.00004		τ	1	2	3	4	5
	k	7835		obs(ntu)	ntu mg/L	*u*	0.135161	3.9528179	FTESS(τ)	0.78144281	0.21855719	0	0	0
SURF ($m^3.s^{-1}$)	S(t)	M(t)	ηS(t)M(t)		2.04104589	flowntu	cal(ntu Tonnes/jour)							
0.0067457	0.1973	0.02107072	0.9445902	1	5.03202185	0.159498507	0.099768	0.00356768		0.74	0.21	0.00	0.00	0.00

D2. Copy the SSTF values from the imported Suspended Matter.csv file (§3.1.9)

D3. Transpose and Paste the copied values in cells M2..AA2

D4. Copy the eta value from the imported Suspended Matter.csv file in cell E1

D4. Use the solver to optimize the unit conversion factor u