

Interface to use SIMPLACE from R

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1 Introduction

This package provides methods to interact with the modelling framework SIMPLACE¹. SIMPLACE is written in Java (and some parts in Scala) so one can access it from R via **rJava**. The purpose of this package is to simplify the interaction between R and SIMPLACE, by providing functions to:

- initialize and configure SIMPLACE
- load a simulation (solution and project)
- parameterize the simulation
- run whole simulation or run it stepwise
- get simulation output and convert it to formats suitable for R

2 Installing the Simplace Framework

For installing SIMPLACE, please consult the webpage www.simplace.net. A brief guide to install SIMPLACE:

- If you don't have installed Java, please install an appropriate version of the (JRE or JDK) from java.com
- Download the console mode of SIMPLACE from www.simplace.net
- Unpack the zip archive to your disk. You have to unpack the whole directory **SIMPLACE** and the directory must not be renamed.
- Install the **simplace** package in R:
`install.packages('simplace', repos='http://r-forge.r-project.org')`

3 Basic Usage

The usage of SIMPLACE in R follows roughly this scheme:

- init SIMPLACE by providing the path to your simplace installation directory, your working directory and your outputs
- open a SIMPLACE project form a solution (and project) file
- create a list of simulation parameters you want to change
- create and run a Simulation

¹Scientific Impact assessment and Modelling **PL**atform for **A**dvanced **C**rop and **E**cosystem management - www.simplace.net

- get the result from the simulation
- convert the result to a R object (`data.frame`, `list` etc.)

4 Example

4.1 Run the simulation

```
> library(simplace)
> SimplaceInstallationDir <- "D:/java/simplace/"
> SimplaceWorkDir <- paste(SimplaceInstallationDir,"simplacerun/simulation/",sep="")
> SimplaceOutputDir <- paste(SimplaceInstallationDir,"simplacerun/output/",sep="")
> Solution <- paste(SimplaceWorkDir,"gk/solution/complete/Complete.sol.xml",sep="")
> simplace <- initSimplace(SimplaceInstallationDir,SimplaceWorkDir,SimplaceOutputDir)
> openProject(simplace, Solution)
> parameter <- list()
> parameter$enddate <- "31-12-1992"
> createSimulation(simplace,parameter)

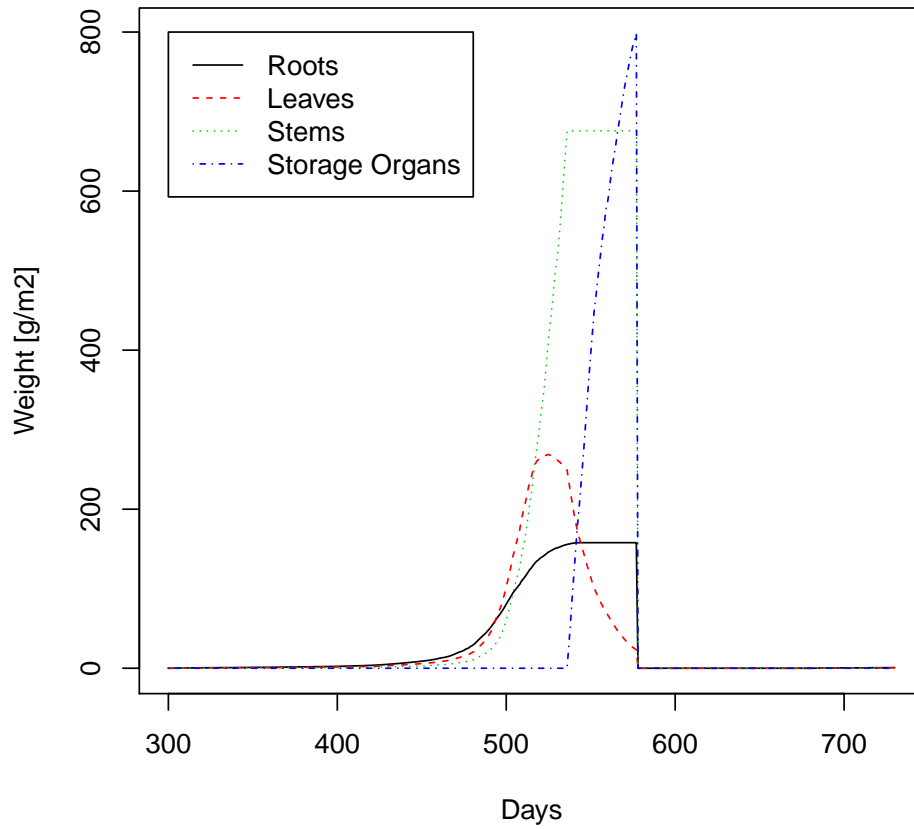
[1] "Java-Object{Simulation: testproject__TESTSIMULATION000}"

> runSimulations(simplace)
> simulationlist <- getSimulationIDs(simplace)
> result <- getResult(simplace,"DIAGRAM_OUT", simulationlist[[1]]);
> closeProject(simplace)
```

4.2 Get the result and plot it

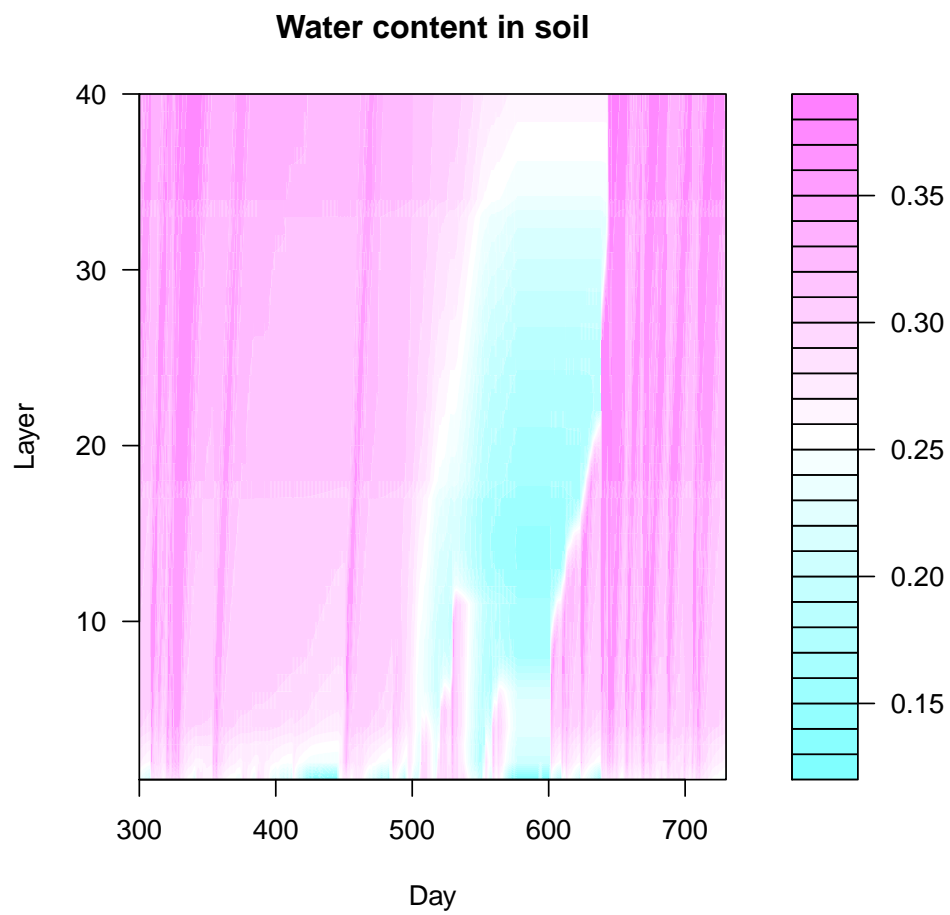
```
> resf <- resultToDataframe(result)
> dates <- 300:730
> weights <- resf[dates,
+               c("TOP_LINE_Roots", "TOP_LINE_Leaves", "TOP_LINE_Stems", "TOP_LINE_StorageOrgans")]
> matplot(dates,weights,type="l",xlab="Days",ylab="Weight [g/m2]",main="Simulated Biomass")
> legend(300,800,legend=c("Roots", "Leaves", "Stems", "Storage Organs"),lty=1:4,col=1:4)
```

Simulated Biomass



4.3 Get arrays and plot them as contour plot

```
> resultlistexp <- resultToList(result,expand=TRUE)
> water <- resultlistexp$BOTTOM_ARRAY_VolumetricWaterContent
> wmat <- do.call(rbind,water)
> wmatpart <- wmat[dates,]
> filled.contour(dates,1:dim(wmatpart)[2],wmatpart,
+               xlab="Day", ylab="Layer", main="Water content in soil")
```



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