Interface to use SIMPLACE from R

Gunther Krauss

December 3, 2013

1 Introduction

This package provides methods to interact with the modelling framework SIMPLACE[1]. 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

---

[1]**S**cientific **I**mpact assessment and **M**odelling **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] "testproject__TESTSIMULATION000"

> runSimulations(simplace)
> simulationlist <-getSimulationIDs(simplace)
> result <- getResult(simplace,"DIAGRAM_OUT", simulationlist[[1]]);
> closeProject(simplace)
```
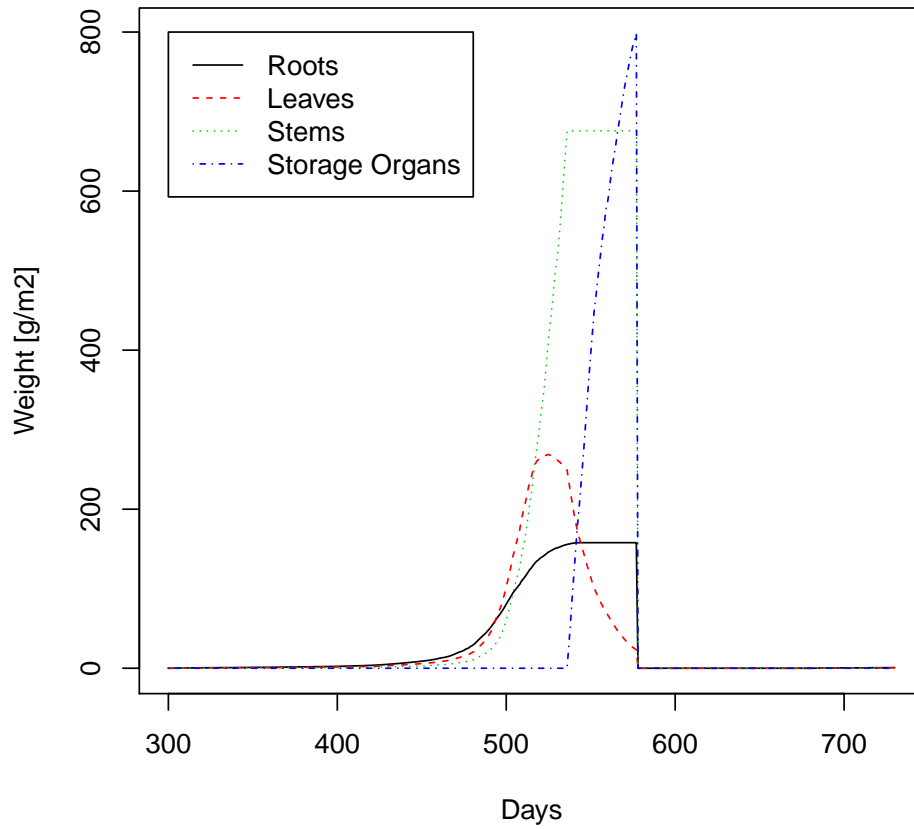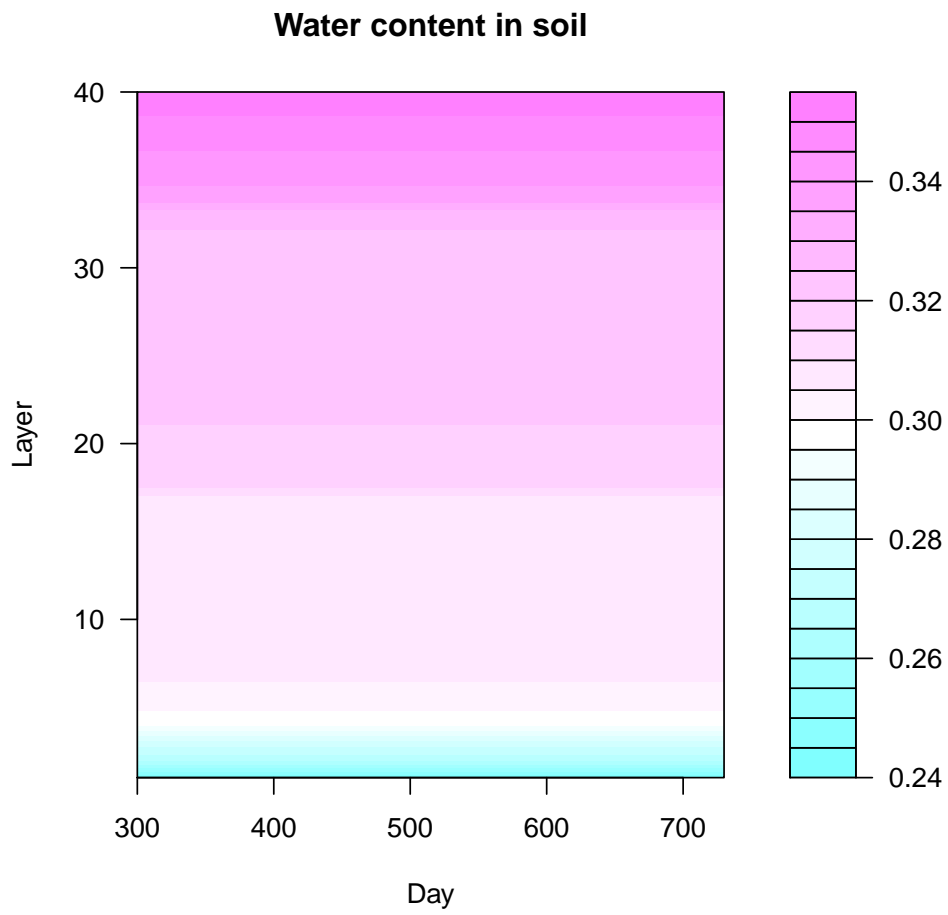
4.2 Get the result and plot it

```
> 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")
```

Water content in soil

Contents