Notes: COSvis

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Introduction

COSvis is an R based visualisation tool for **COSEROreg**. It is still in its infancy and currently maintained by Daniel Klotz. We hope that it will soon grow into a nice and usefull tool.

The purpose of this document is to collect notes regarding its usage and future developements. It is structured as following: Firstly, in *1. Overview* the program requirements and structure is presented. In *2. Setup* a short help for the program-usage is given. Section *3. Control Options* gives a list of the options for manipulation the program output. Finally, *4. Developement* gives an overview of the future plans regarding the program.

1. Overview

COSvis makes extenstive use of R-packages. To date, the following packages are in use: *dplyr*, *ggplot2*, *gridExtra*, *hydroGOF*, *shiny* & *xts* (see: 2. Setup). The "program" comprises the following files:

```
* folder::"APP"
    + file::"calculations.R"
    + file::"server.R"
    + file::"ui.R"
    + folder::"www"
          - file::"bootstrap.CSS"
          - ...
* file::"COSvis_notes.pdf"
* file::"COSvis_notes.Rmd"
* file::"start.R"
* file::"readme.md"
```

Furthermore, the code is currently not DRY (but aspires to be so, asap!). In this case DRY is an acronym DRY and stands for "Don't Repeat Yourself"; which is a programming paradigm that tries to minimize the amount of repeated code, while pertaining legibility. Currently the entire calculations are done before the App/Visualsiation itself runs. In future versions this will be done more smartely. Nevertheless, parts of the code have allready been optimised with regards to calculation-speed, e.g.: Most "big" loops have been transformed in [a-z]pply statements or vectorized directly.

2. Setup

1. Download & install the R programming language from from https://www.r-project.org/ (It might also be usefull to get and IDE, such as Rstudio).
2. Open R & install the needed packages:

```
install.packages("shiny")
install.packages("hydroGOF")
install.packages("ggplot2")
install.packages("xts")
install.packages("dplyr")
install.packages("grid")
install.packages("gridExtra")
install.packages("dygraphs")
```

3. Open start.R in your COSvis folder and set up the options according to your will (see: ctrl-Cheatsheet).
4. Now you can either
    - copy the start.R and paste it into your R command window, or
    - execute start.R from the IDE of your choice

3. Control Options

The control options are defined in the start.R file, within the variable `ctrl`.

Variable	Usage	Format
`ctrl`	Containts the control-options of **COSvis**	list
`ctrl$pathtoCosero`	Path to the **COSEROreg** folder	string::path
`ctrl$pathtoApp`	Path to App folder in **COSvis**	string::path
`ctrl$ofoldername`	Path to output folder in **COSEROreg**	string::folder
`ctrl$ctrl_span`	timespan for the header year	{integer::year1,integer::year2}
`ctrl$colors`	colors for the pltos	{string::col1,. . . ,string::col4}
`ctrl$clr_NSEmid`	midpoint of the color scale for the NSE	real::value
`ctrl$yearName`	string for the x-axis title of the hydrological years	string::Name

4. Developement

4.1 Scheduled Updates

- Use gitHub as versioning and distribution tool
- Make **COSvis** drier
- Visualisation for Water Balance

4.2 Wishlist/Ideas

- More dynamic read-in for files
- Make it possible to reload files from within the App