Wikiprint Book

Title: Regional-Continental domain selections

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Regional-Continental domain selections

In this example we will load data for Europe for the variable surface (2m) minimum temperature (`var = tasmin`), for the first two members (`members = 1:2`) of the CFSv2 hindcast (dataset = `CFSv2_seasonal_16`), considering the wintertime (DJF, `season = c(12,1,2)`) for the 10-year period 2001-2010 (`years = 2001:2010`), according to the forecast of previous September (`leadMonth = 3`). The original variable is stored as 6-hourly data for this particular dataset. Instead of loading the whole 6-hourly time series, or filtering by a particular time as in the ?previous example we will retrieve the daily mean values, by setting the argument `time = "DD"`, that internally computes the daily mean from the 6-hourly instantaneous values.

```
> ex2 <- loadECOMS(dataset = "CFSv2_seasonal_16", var = "tasmin", members = 1:2, lonLim = c(-15,35), latLim = c(32, 75), s
[2014-06-17 12:47:49] Defining homogeneization parameters for variable "tasmin"
NOTE: daily mean will be calculated from the 6-h instantaneous model output
[2014-06-17 12:47:49] Defining geo-location parameters
[2014-06-17 12:47:49] Defining initialization time parameters
[2014-06-17 12:47:54] Retrieving data subset ...
[2014-06-17 12:54:33] Done
> print(object.size(ex2), units = "Mb")
35 Mb
```

In this case, the data are stored in a 4D-array, with the dimensions indicated by the `dimensions`attribute:

```
> str(ex2$Data)
num [1:902, 1:54, 1:47, 1:2] 17.4 16.4 17.4 18.7 18.4 ...
- attr(*, "dimensions")= chr [1:4] "time" "lon" "lat" "member"
```

This is an example on how to plot the members selected as spatial means for the 10-year period. Note that this example uses the library `fields`, not attached on load of the `ecomUDG.Raccess` package:

```
> library(fields) # Install if not available to reproduce the example
> member1 <- apply(ex2$Data[,,,1], FUN = mean, MARGIN = c(2,3))
> member2 <- apply(ex2$Data[,,,2], FUN = mean, MARGIN = c(2,3))
> x <- ex2$xyCoords$x
> y <- ex2$xyCoords$y
> par(mfrow = c(1,2))
> image.plot(x,y,member1, asp = 1, main = "Member 1")
> world(add = TRUE)
> image.plot(x,y,member2, asp = 1, main = "Member 2")
> world(add = TRUE)
```

It is possible to load now the reference observations for the spatio-temporal domain selected, using the same values in the corresponding arguments:

```
> ex2.obs <- loadECOMS(dataset = "WFDEI", var = "tasmin", lonLim = c(-15,35), latLim = c(32, 75), season = c(12,1,2), year
[2014-06-17 16:28:13] Defining homogeneization parameters for variable "tasmin"
[2014-06-17 16:28:13] Defining geo-location parameters
[2014-06-17 16:28:13] Defining time selection parameters
[2014-06-17 16:28:32] Done
> print(object.size(ex2.obs), units = "Mb")
60.6 Mb
```

This is the map of the observed mean minimum surface temperature observed for DJF 2001-2010:

```
> observed <- apply(ex2.obs$Data, FUN = mean, MARGIN = c(1,2))
> x.obs <- ex2.obs$xyCoords$x
> y.obs <- ex2.obs$xyCoords$y
> image.plot(x.obs, y.obs, observed, asp = 1, xlab = "", ylab = "", main = "Mean minimum surface temp observed")
> world(add=TRUE)
```

Note that WFDEI provides data for land areas only, and its spatial resolution is much higher that CFS (1º vs 0.5º). In order to compare both datasets, it is first necessary to put them in the same grid (i.e., to interpolate). We use the bilinear interpolation algorithm of package `fields` to this aim, included in the function `interp.surface.grid`:

```
> obs.regridded <- interp.surface.grid(obj = list(x = x.obs, y = y.obs, z = observed), grid.list = list(x = x, y = y))
> par(mfrow = c(1,2))
> image.plot(member1 - obs.regridded$z, asp = 1, main = "Bias Member 1")
> image.plot(member2 - obs.regridded$z, asp = 1, main = "Bias Member 2")
```