Rfa

Interactive analysis of ALADIN files in R

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KMI

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Contents

- Introduction
- Basic use
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- Availability and Documentation

What is R?

- www.r-project.org : *R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS.*
- Main emphasis is on interactive analysis (but R scripts can be run in batch mode).
- Command line or GUI. I prefer the emacs R-mode (ESS).
- Highly extendible. Many specialised packages are freely available.
- Well documented.

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- Other people started using it.
- $\rightarrow$ clean up the code, write documentation.

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- Manipulate grid data and map information.
- → 2 packages: `Rfa` and `geogrid`.
- ... and a third: `Rgrib` (the GRIB parallel to Rfa), which also connects to geogrid.

Example 1: basic visualisation

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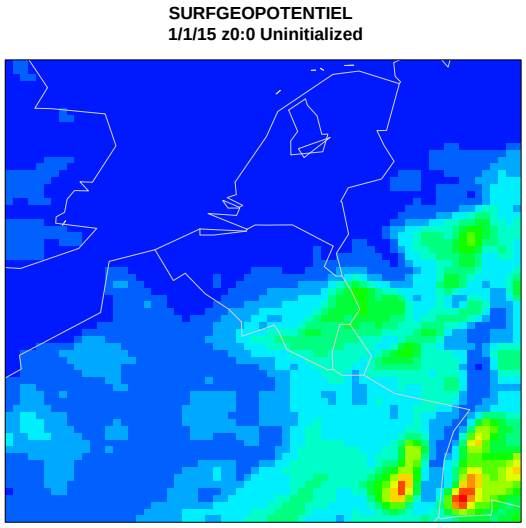
> f1=FAopen("~/OSLO/data/BE10_01")
> iview(FAdec(f1,"SPECSURFGEOP"))
```



Example 2: vector fields

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> f2=FAopen(“ERA40-BE10-20010115+12”)
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> vview(u2,v2,thinx=3)
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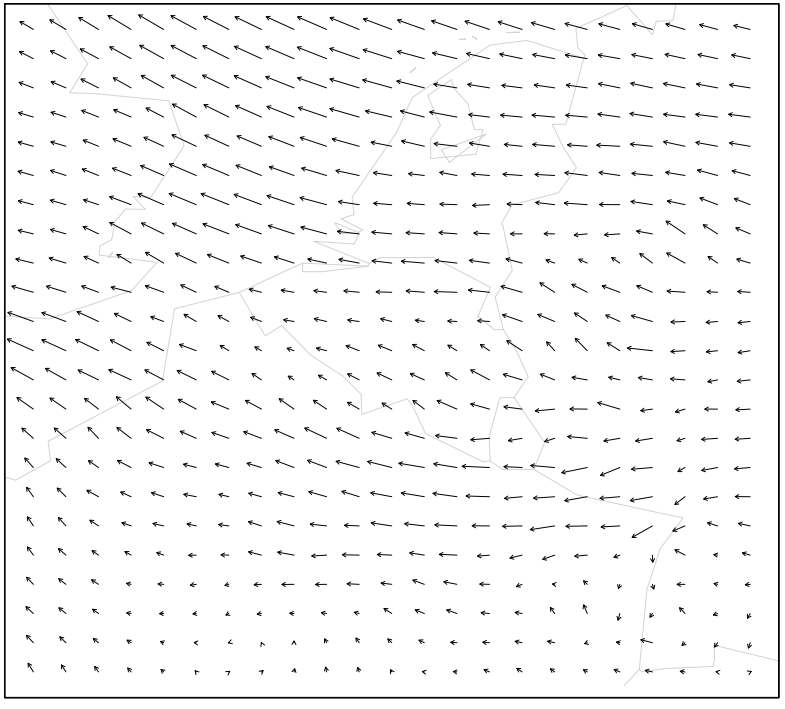

Example 3: variance

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> Tarr=array(NA,dim=c(10,67,67))
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filename=paste(“ERA40-BE10-200101”,i2a(day,2),”+12”)
Tarr[day„]=FAdec(filename,”CLSTEMPERATU”,clip=T) }
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> Tvar=apply(Tarr,c(2,3),var)
> iview(sqrt(Tvar),title=”STD(T)”,
mapcol=”black”,mapReso=”worldHires”)
```
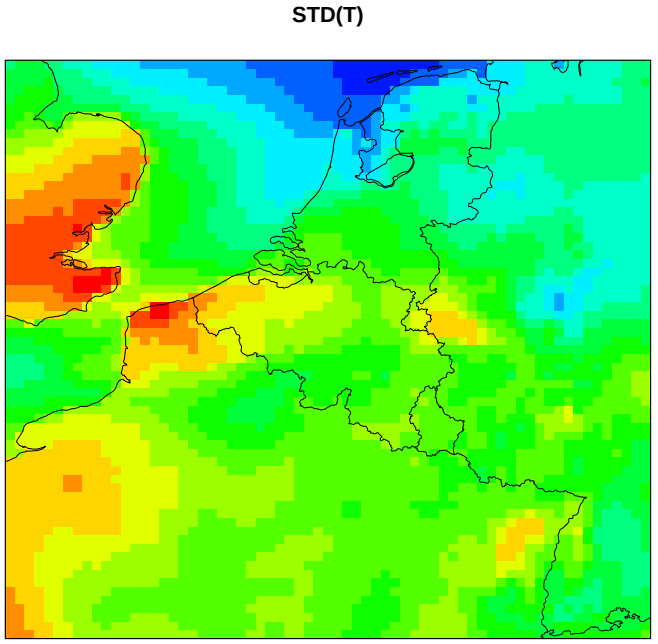
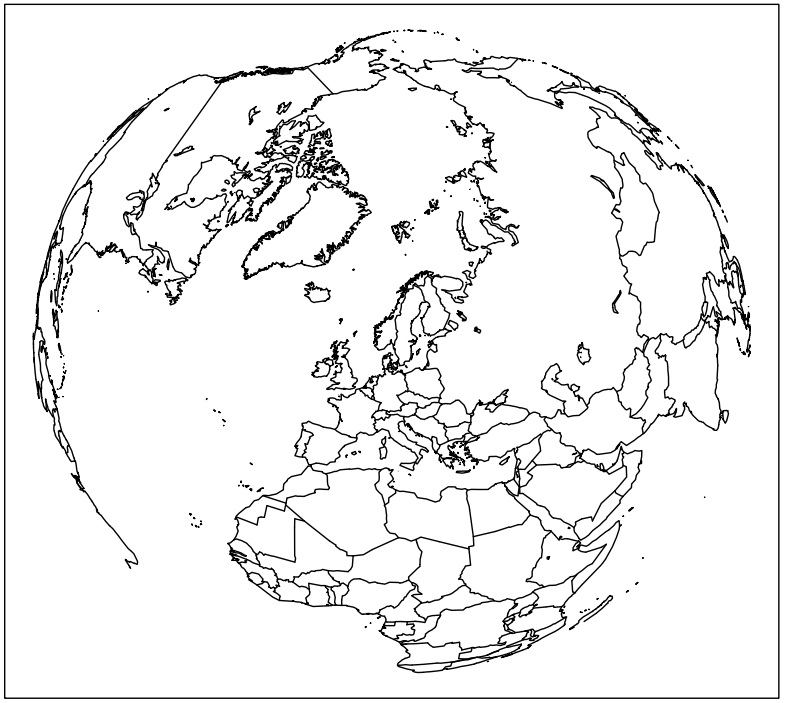



Extendible

- many more functions are already implemented (biperiodicisation, inverse projections, zooming into a grid)
- The power lies in writing special functions for particular projects.
- R offers almost unlimited possibilities in statistical tools.
- Several packages already exist online, specifically for meteorological applications (verification, soundings, climatology, (statistical) downscaling...)

New domains

```
> orthoglobe(10.8,59.9)
```



New domains

```
> orthoglobe(10.8,59.9)
> newdom=Make.domain(“lambert”,c(10.8,59.9),
c(200,200),c(15000,15000),59.9,10.8)
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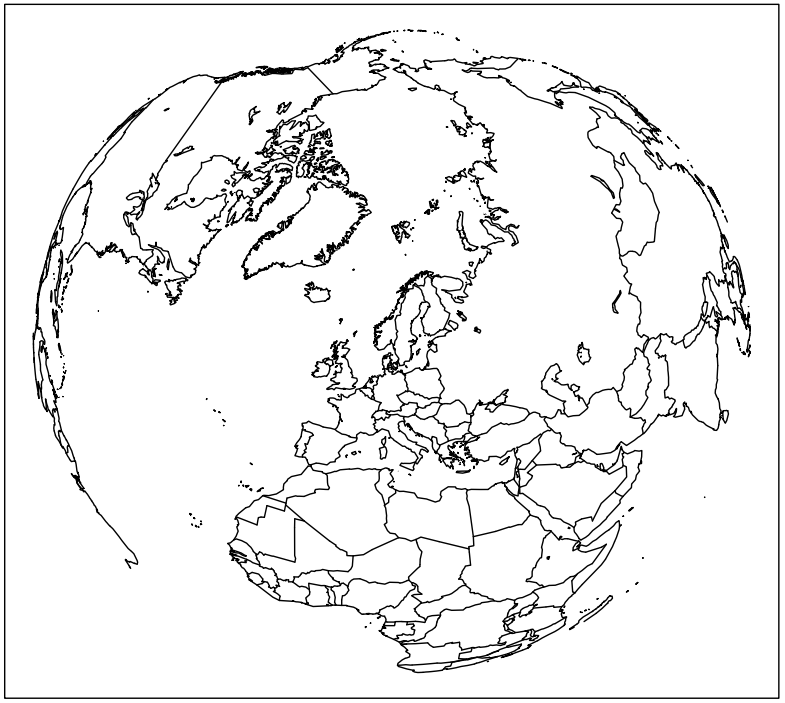

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> plot(newdom,add=T,col=”green”)
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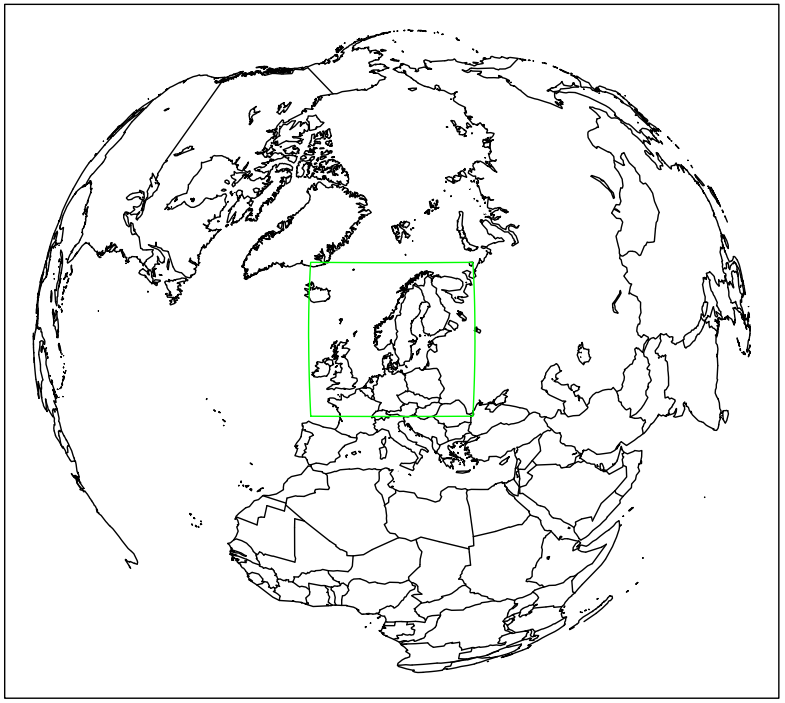

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c(200,200),c(15000,15000),59.9,10.8)
> plot(newdom,add=T,col=”green”)
> ttt=as.geofield(matrix(rnorm(40000),ncol=200),domain=newdom)
> iview(ttt)
```

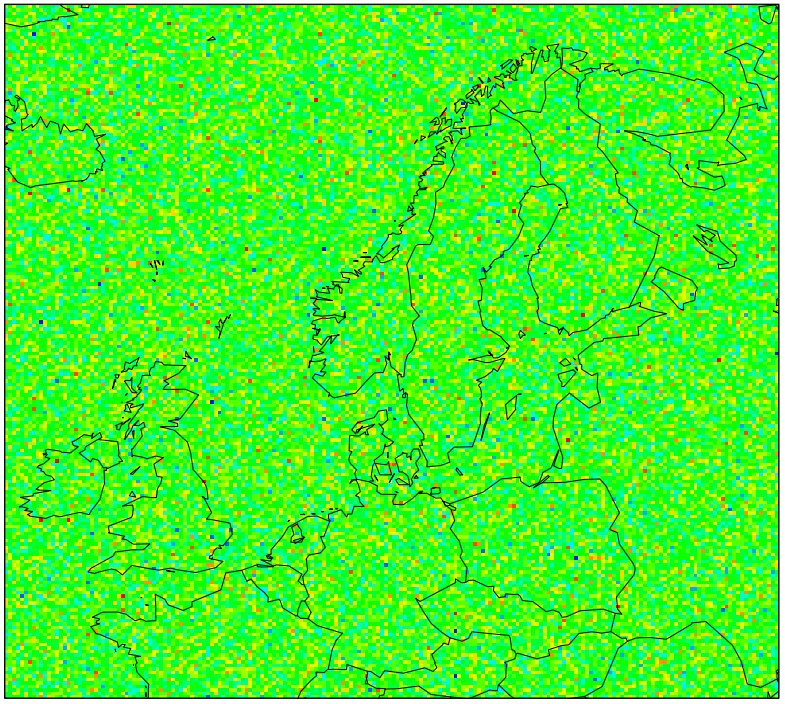

Creation of new domains & FA files

- Different projections are allowed (lambert, LatLon, (rotated) mercator)
- Existing fields can be interpolated to the new domain.
- It is possible to create new FA files for this domain (but still experimental and not user friendly).
- Fields can be written either in grid point or spectral format.

What do you need?

- R (obviously) + some standard packages (maps...)
- FA-LFI library (PALADIN or other)
- PROJ4 projection library
- F90 compiler (I use g95, also tested with ifort and pgf)
- Rfa and geogrid source code at ˜mrpe716/Rfa or from Alex Deckmyn.

How to get help

- Some basic information in ALADIN Newsletter 31.
- More detailed documentation for installation and basic use is available from ~mrpe716/Rfa
- Most routines have online documentation: e.g. type `?FAdec`. This can also be compiled into a pdf document.
- Mail alex.deckmyn@oma.be

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- Feedback and suggestions are welcome!