

HARP:

Developments in the Hirlam - Aladin verification project

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Outline

- General ideas and needs for HARP
- HARP EPS verification tools
- HARP spatial verification
- TODO's

General HARP issues

Hirlam and Aladin work together on EPS- and spatial verification tools.

→ Build a verification toolbox available to the members

- Based on R (a lot of verification packages are available)
- Common I/O of data and results
- Start from what is currently needed

Local adaptations of input is necessary

General HARP issues

Use of R as a common programming language

- Recent version of R (R3.0. ...)
- Some R-packages available at CRAN repository
 - verification
 - SpatialVx
 - RSQLite
 - h5r
 - ggplot2
 - shiny
 - ...

General HARP issues

Some stuff that is not available on CRAN

- A number of external and modified R-packages – provided (not only) for HARP
 - geogrid
 - mapnew
 - Rgrib2
 - Rfa
 - Repts
- ECMWF grib_api (not straight forward to install and make it work with R – but there is documentation)

General HARP issues

And the actual HARP scripts

- R-scripts for the actual verification tasks
- Utilities (shell, python)
 - Interpolate fields / station data
 - Read and write to database (files, SQLite)
 - Extract data from different sources (grib, hdf5, vfld, vobs, inca, ...)
- Examples, instructions and documentation (under construction)

HARP EPS tools

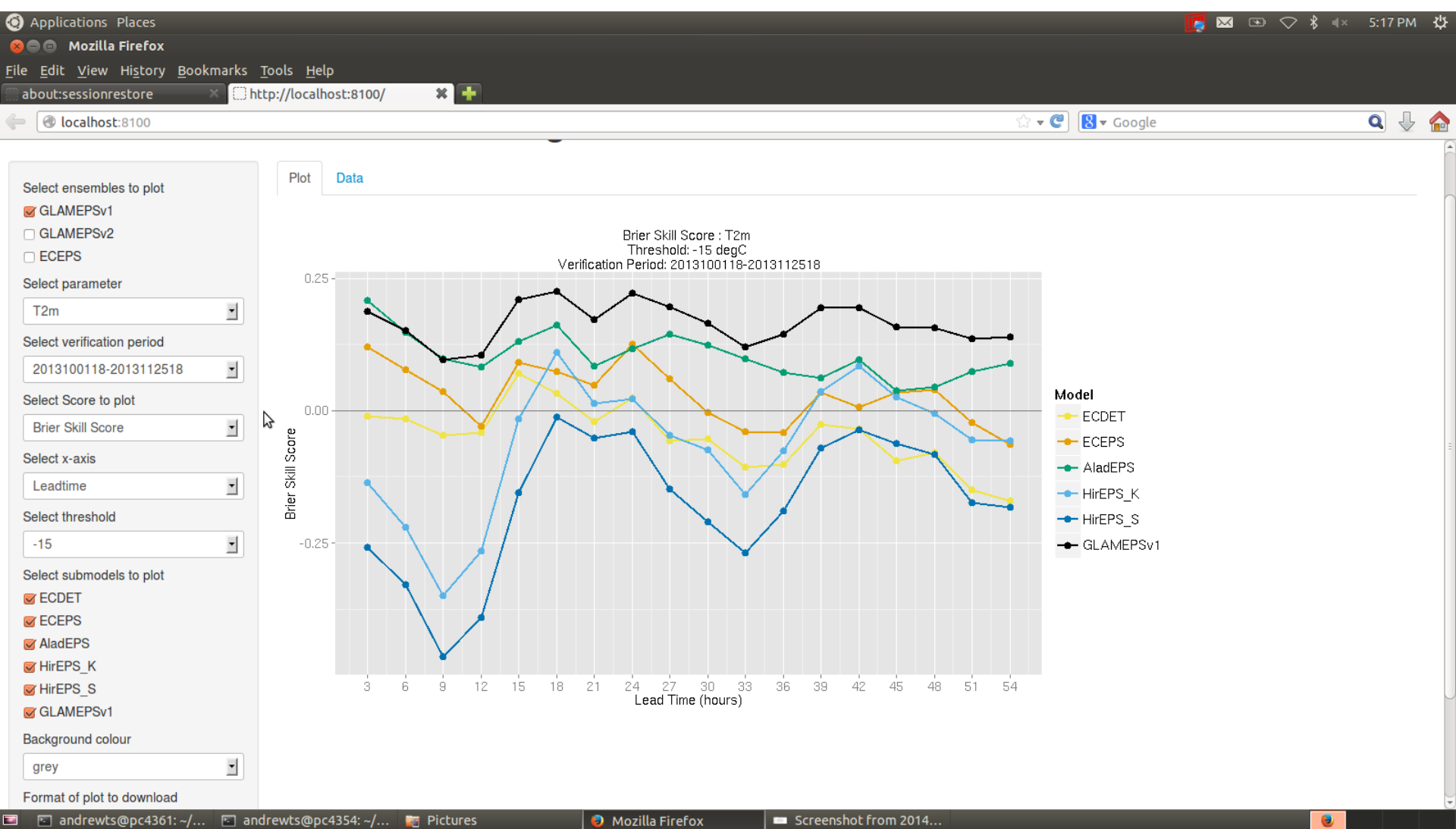
Developed in the context of GLAMEPS at ECGB

- Model data from each sub-ensemble (extraction, interpolation, creating SQLite tables)
- Observation data from archive (MARS extraction and creation of SQLite files via vobs)
- Run EPS verification
 - Output is written to SQLite files
 - Graphics produced using shiny(R)

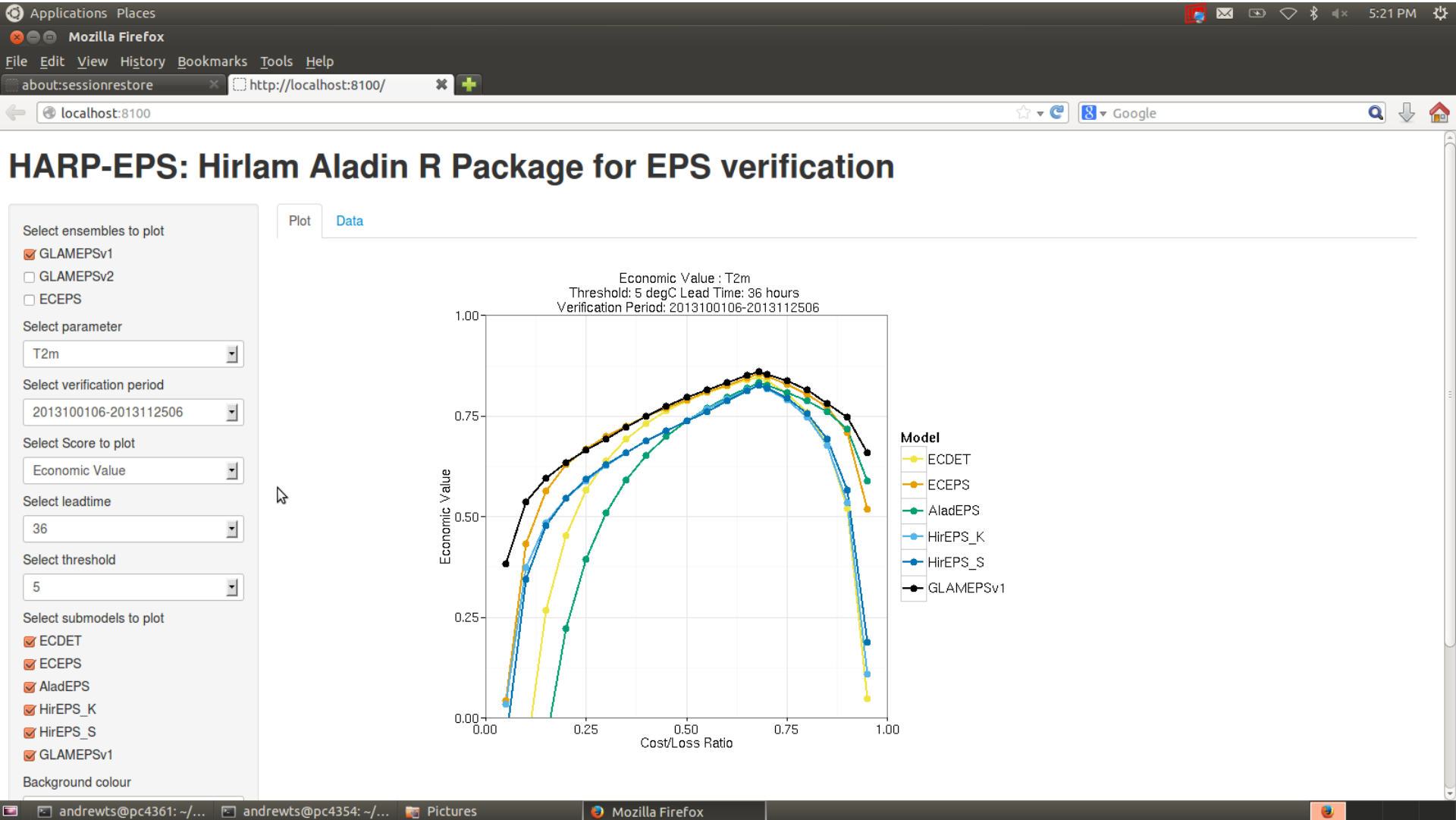
HARP EPS tools

- R-tool to show results - SHINY
 - R-package for web presentation
 - Graphics on demand from (SQLite) database files
 - Append tables with new results
 - Run locally or as inter-/intranet application

HARP EPS tools



HARP EPS tools



HARP EPS tools

Select ensembles to plot

- GLAMEPSv1
- GLAMEPSv2
- ECEPS

Select parameter

T2m

Select verification period

2013100106-2013112506

Select Score to plot

Economic Value

Select leadtime

36

Select threshold

5

Select submodels to plot

- ECDET
- ECEPS
- AladEPS
- HirEPS_K
- HirEPS_S
- GLAMEPSv1

Background colour

Plot Data

expt	mname	x	y
GLAMEPSv1	ECDET	0.0500	-1.2184
GLAMEPSv1	ECDET	0.1000	-0.1036
GLAMEPSv1	ECDET	0.1500	0.2680
GLAMEPSv1	ECDET	0.2000	0.4538
GLAMEPSv1	ECDET	0.2500	0.5652
GLAMEPSv1	ECDET	0.3000	0.6396
GLAMEPSv1	ECDET	0.3500	0.6926
GLAMEPSv1	ECDET	0.4000	0.7325
GLAMEPSv1	ECDET	0.4500	0.7634
GLAMEPSv1	ECDET	0.5000	0.7882
GLAMEPSv1	ECDET	0.5500	0.8085
GLAMEPSv1	ECDET	0.6000	0.8254
GLAMEPSv1	ECDET	0.6500	0.8396
GLAMEPSv1	ECDET	0.6795	0.8471
GLAMEPSv1	ECDET	0.7000	0.8370
GLAMEPSv1	ECDET	0.7500	0.8055
GLAMEPSv1	ECDET	0.8000	0.7581
GLAMEPSv1	ECDET	0.8500	0.6793
GLAMEPSv1	ECDET	0.9000	0.5216
GLAMEPSv1	ECDET	0.9500	0.0484

HARP spatial verification

Input files are field data that cannot be presented in SQLite database files:

- Utilities needed for observations (hdf5, inca) extraction and interpolation to model grid
- Methods for FSS and SAL locally locally implemented operationally
 - Configure verification task (config-files)
 - Reading forecast GRIB files, interpolate to a common grid
 - Extract observations and interpolate to verification grid
 - Run verification
 - Output to SQLite file or
 - Graphics

HARP spatial verification

SELECT * FROM stats

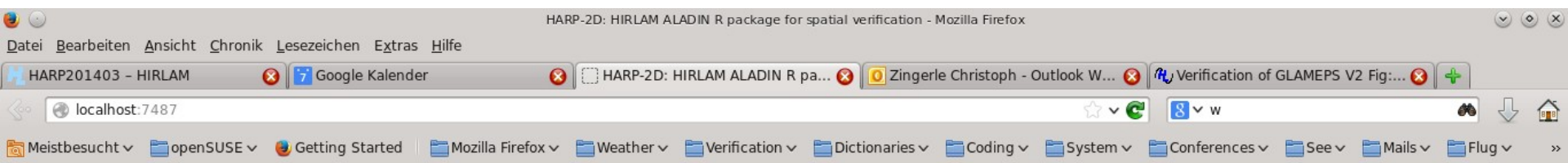
SQL ausführen

Aktionen ▾

Letzter Fehler: not an error

date	leadtime	threshold	nbpts	baserate	bias	mse	ets	hk	fss	
1359687600	3	0.1	1	0	0.35375555555...	68106604.91330...	-0.023911938248...	0	0.270578438280	^
1359687600	3	0.3	1	0	0.35375555555...	68106604.91330...	-0.014775234334...	0	0.212940651494	
1359687600	3	1	1	0	0.35375555555...	68106604.91330...	-0.000036047075...	0	0.054626028760	
1359687600	3	3	1	0	0.35375555555...	68106604.91330...	0.000042915672...	0	0.011700053182	
1359687600	3	0.1	3	0	0.35375555555...	68106604.91330...	-0.022594020707...	0	0.302009742117	
1359687600	3	0.3	3	0	0.35375555555...	68106604.91330...	-0.015235583898...	0	0.240330675946	
1359687600	3	1	3	0	0.35375555555...	68106604.91330...	0.000415387331...	0	0.062704143351	
1359687600	3	3	3	0	0.35375555555...	68106604.91330...	0.000552570178...	0	0.011337717059	
1359687600	3	0.1	15	0	0.35375555555...	68106604.91330...	0.016668765676...	0	0.384897665169	
1359687600	3	0.3	15	0	0.35375555555...	68106604.91330...	0.019608897972...	0	0.319181716818	
1359687600	3	1	15	0	0.35375555555...	68106604.91330...	0.029103585754...	0	0.111844038780	
1359687600	3	3	15	0	0.35375555555...	68106604.91330...	0.009354066884...	0	0.011379605227	
1359687600	3	0.1	49	0	0.35375555555...	68106604.91330...	0.068793494005...	0	0.500830525043	
1359687600	3	0.3	49	0	0.35375555555...	68106604.91330...	0.074501185120...	0	0.452073514141	
1359687600	3	1	49	0	0.35375555555...	68106604.91330...	0.078996886154...	0	0.226470424844	
1359687600	3	3	49	0	0.35375555555...	68106604.91330...	0.042014584666...	0	0.014063126024	
1359687600	3	0.1	225	0	0.35375555555...	68106604.91330...	0.111040061223...	0	0.766232840350	
1359687600	3	0.3	225	0	0.35375555555...	68106604.91330...	0.097623249380...	0	0.772002174414	
1359687600	3	1	225	0	0.35375555555...	68106604.91330...	0.091339020558...	0	0.701200059533	
1359687600	3	3	225	0	0.35375555555...	68106604.91330...	0.110636712777...	0	0.116465620451	
1359698400	6	0.1	1	0	0.51533333333...	68107318.64632...	-0.137276808472...	0	0.605442549847	
1359698400	6	0.3	1	0	0.51533333333...	68107318.64632...	-0.122692190793...	0	0.611260053619	
1359698400	6	1	1	0	0.51533333333...	68107318.64632...	-0.037991482582...	0	0.374994345682	
1359698400	6	3	1	0	0.51533333333...	68107318.64632...	0.000187509404...	0	0.017862549197	
1359698400	6	0.1	3	0	0.51533333333...	68107318.64632...	-0.116006077444...	0	0.648591387783	
1359698400	6	0.3	3	0	0.51533333333...	68107318.64632...	-0.108707937711...	0	0.661047043609	

HARP spatial verification



HARP-2D: HIRLAM ALADIN R package for spatial verification

Select verification method

Fraction Skill Score (FSS)

Select a score to plot

fss

Select leadtime

12

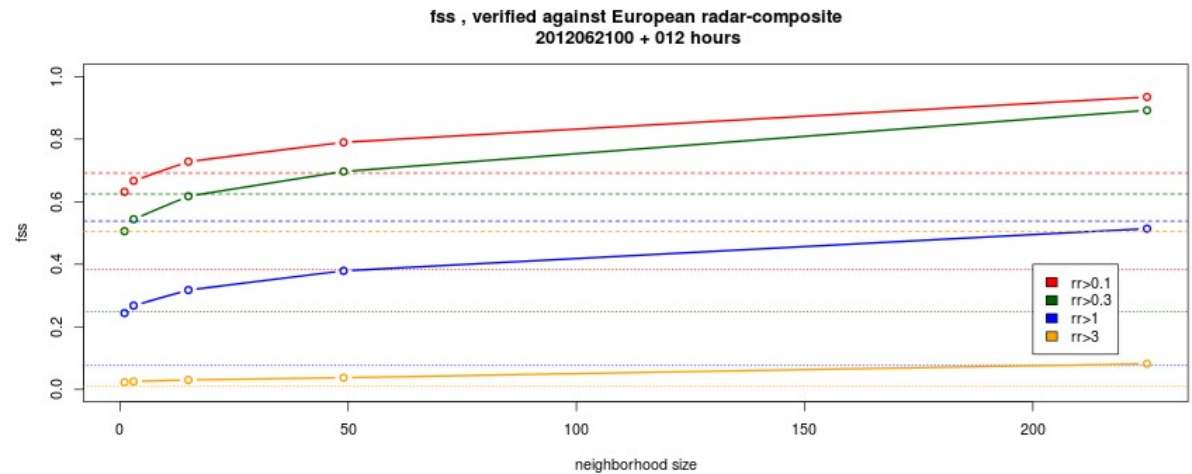
Select threshold

0.1

0.3

1

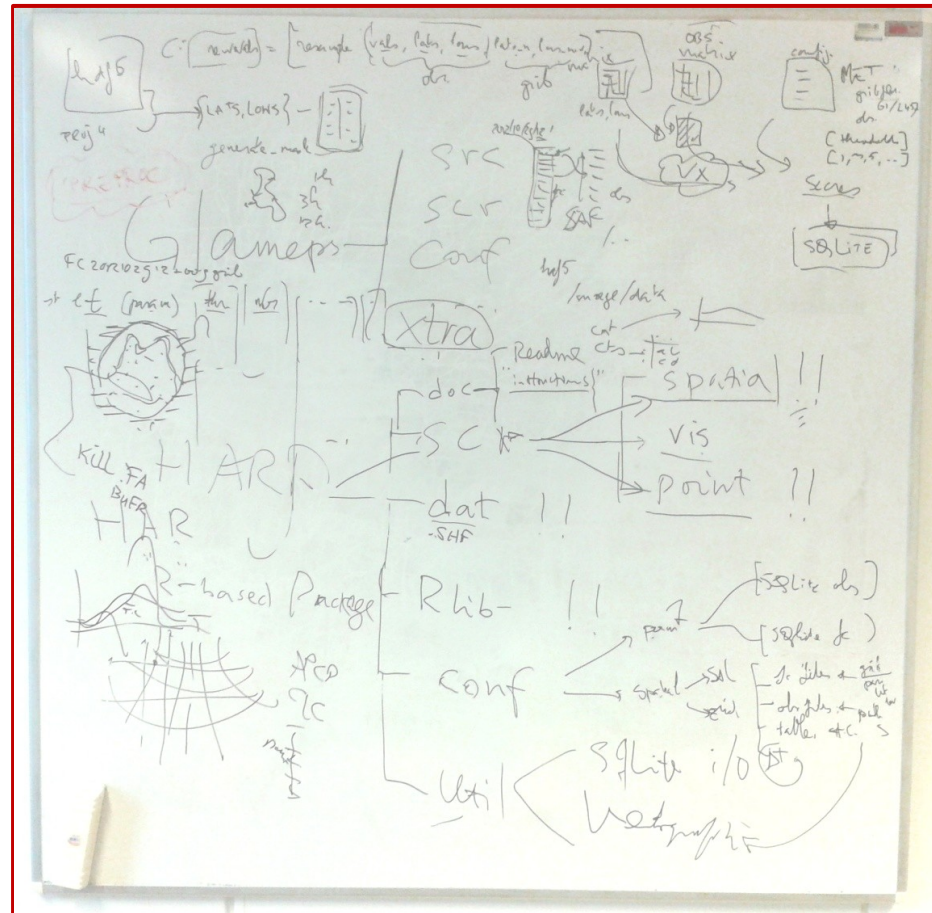
3



Hirlam – Aladin R-Package

Which is not just an R-package

- Provide tools for several verification issues (e.g. work with spatial and point data, ensemble, ...)
- Utilities to read data
- Configuring a verification routine with local data
- Working examples
- Open to extensions, new scores, data sources, ...



TODO's

- Need cleanup (increase consistency between eps and spatial tools, conventions)
- Completion of code (visualization, shiny, methods,...)
- Update of installation instruction, documentation and examples
- Portable to other systems (to be tested)
- Script to run from command line

→ **Encourage people to make use of HARP**

THANK YOU!

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