birdhouse:
a collection of web processing services for climate data

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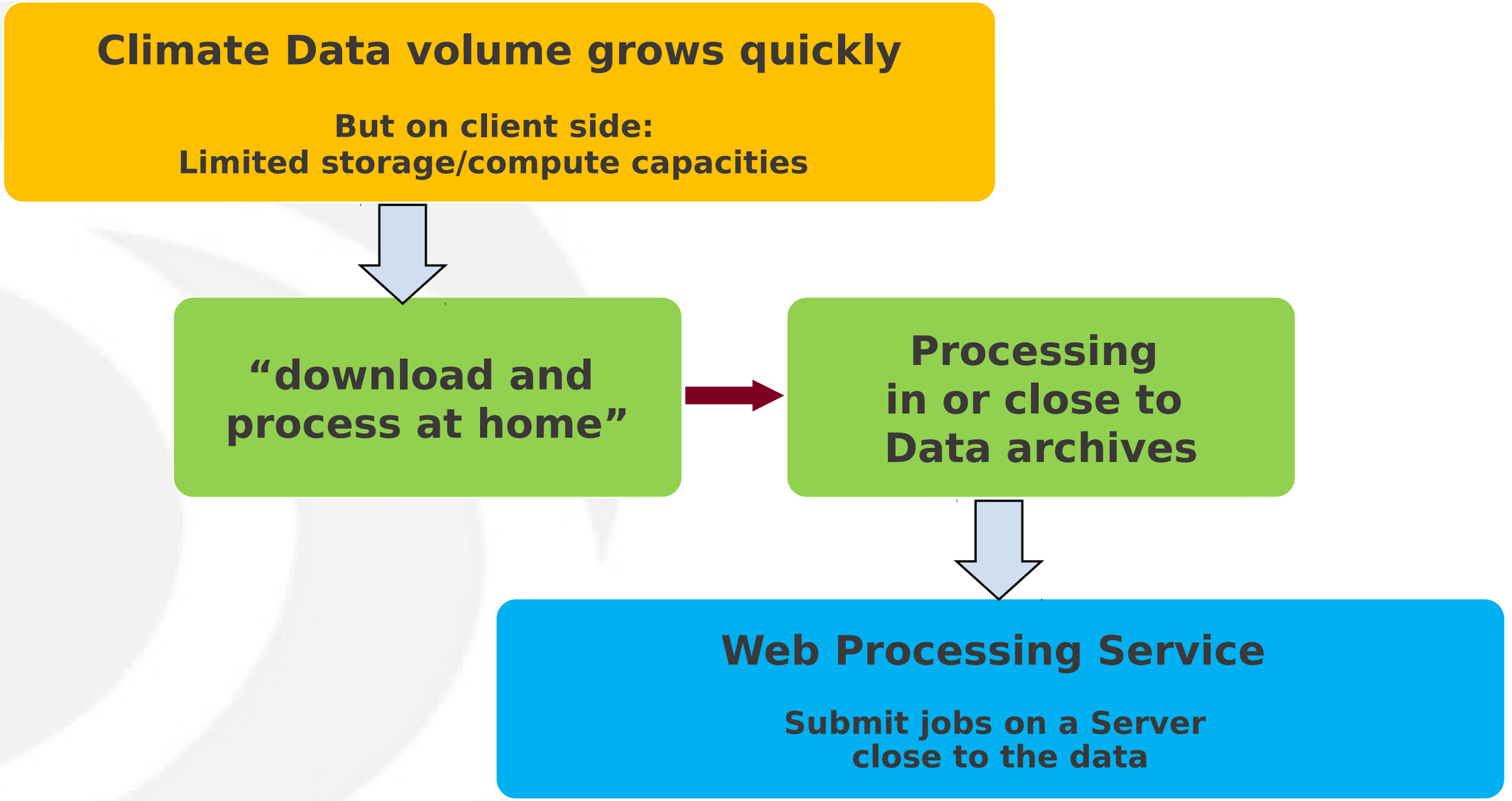
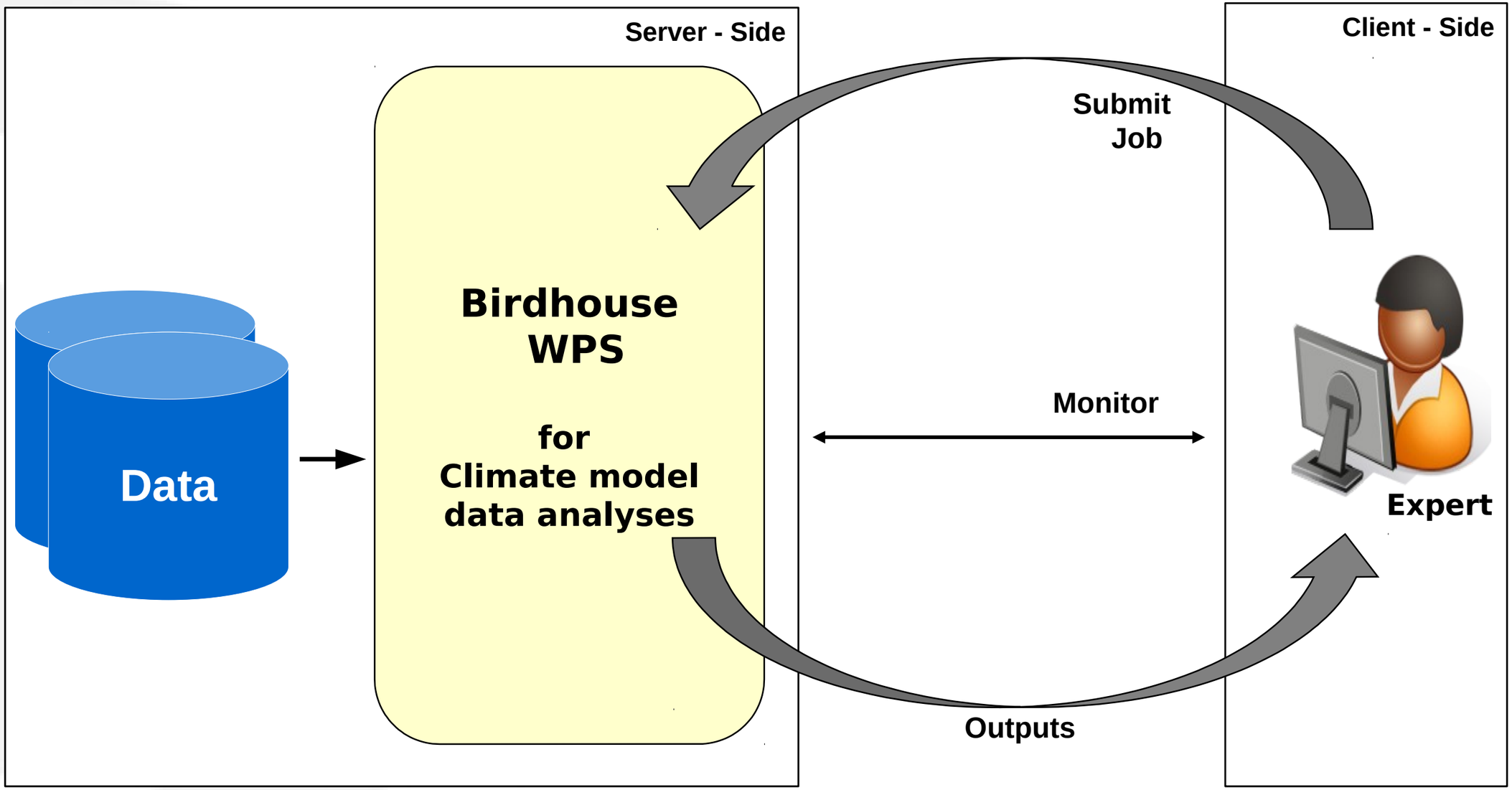
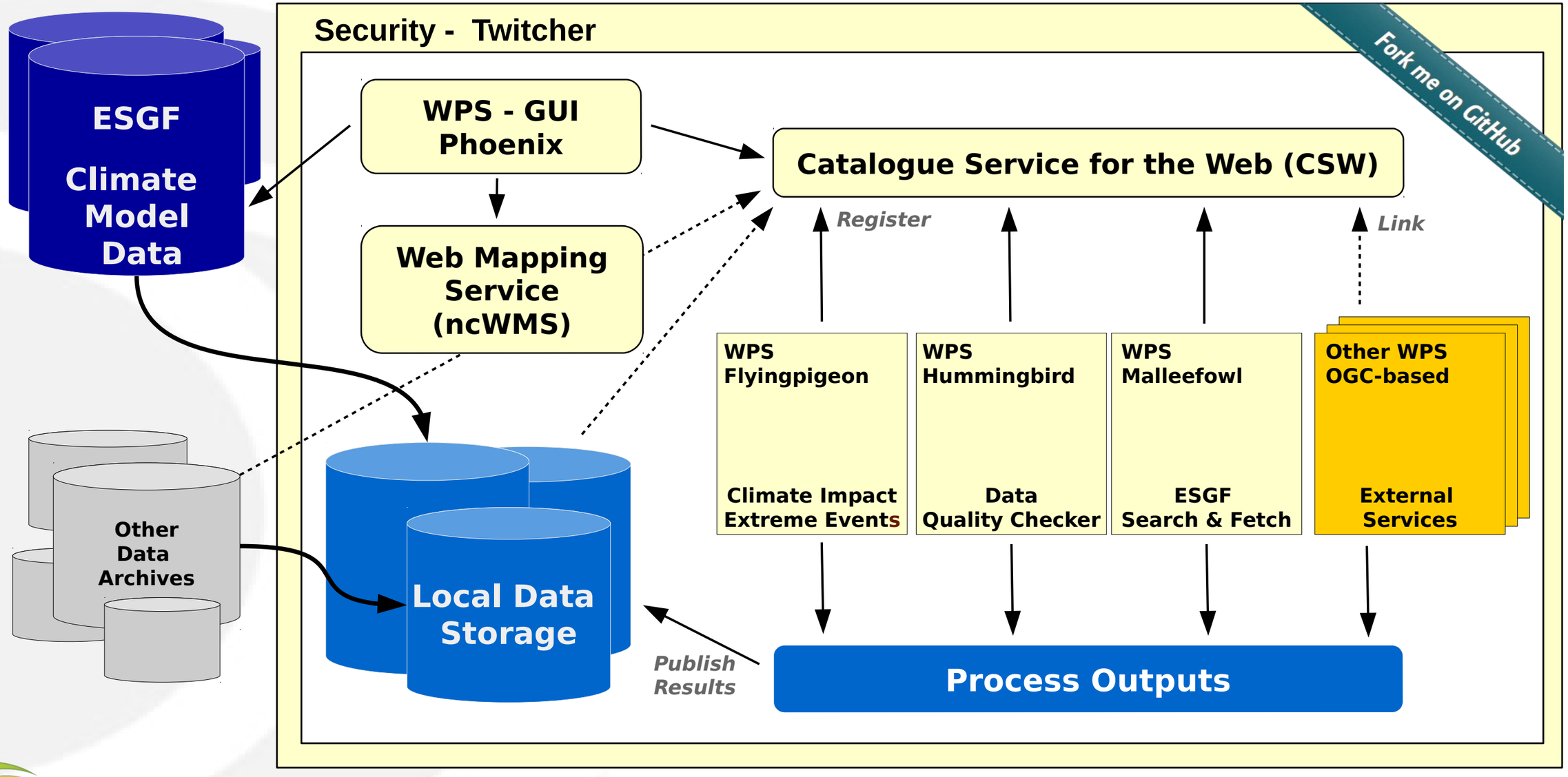
DKRZ cnrs


Climate Data volume grows quickly
But on client side:
Limited storage/compute capacities
“download and process at home”
Processing in or close to Data archives
Web Processing Service
Submit jobs on a Server close to the data


Server - Side
Client - Side
Submit
Job
Birdhouse
WPS
for
Climate model
data analyses
Data
Monitor
Expert
Outputs

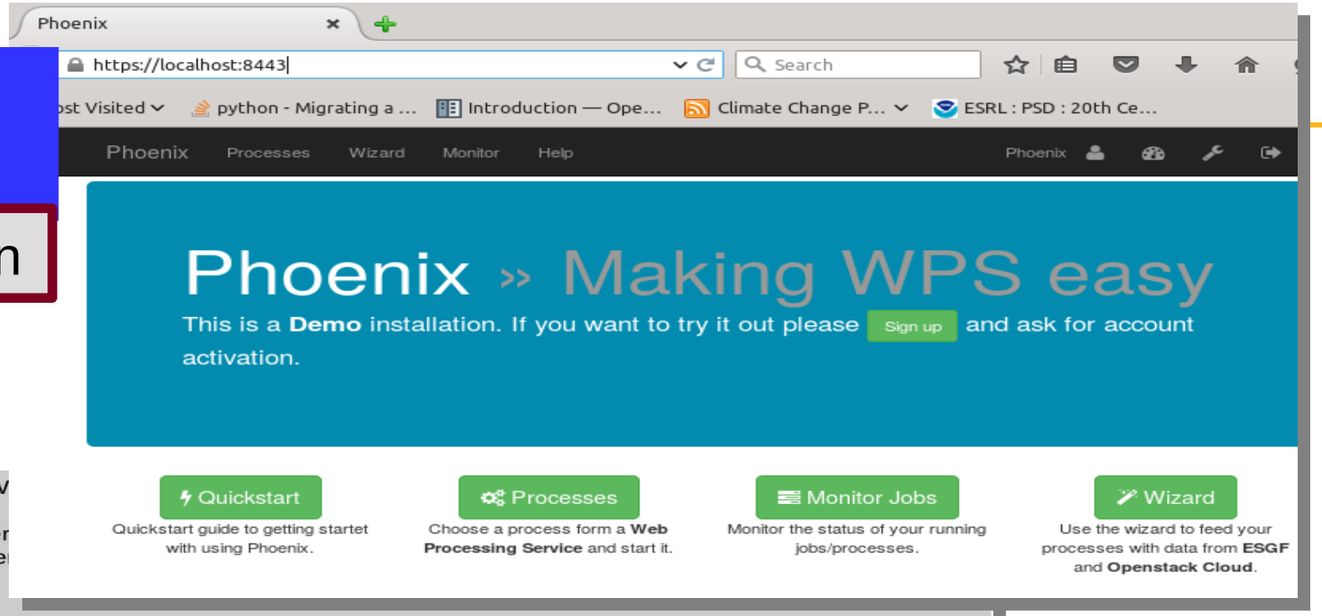
Birdhouse - Ecosystem



Client Side

Web Browser GUI

Basic autentication



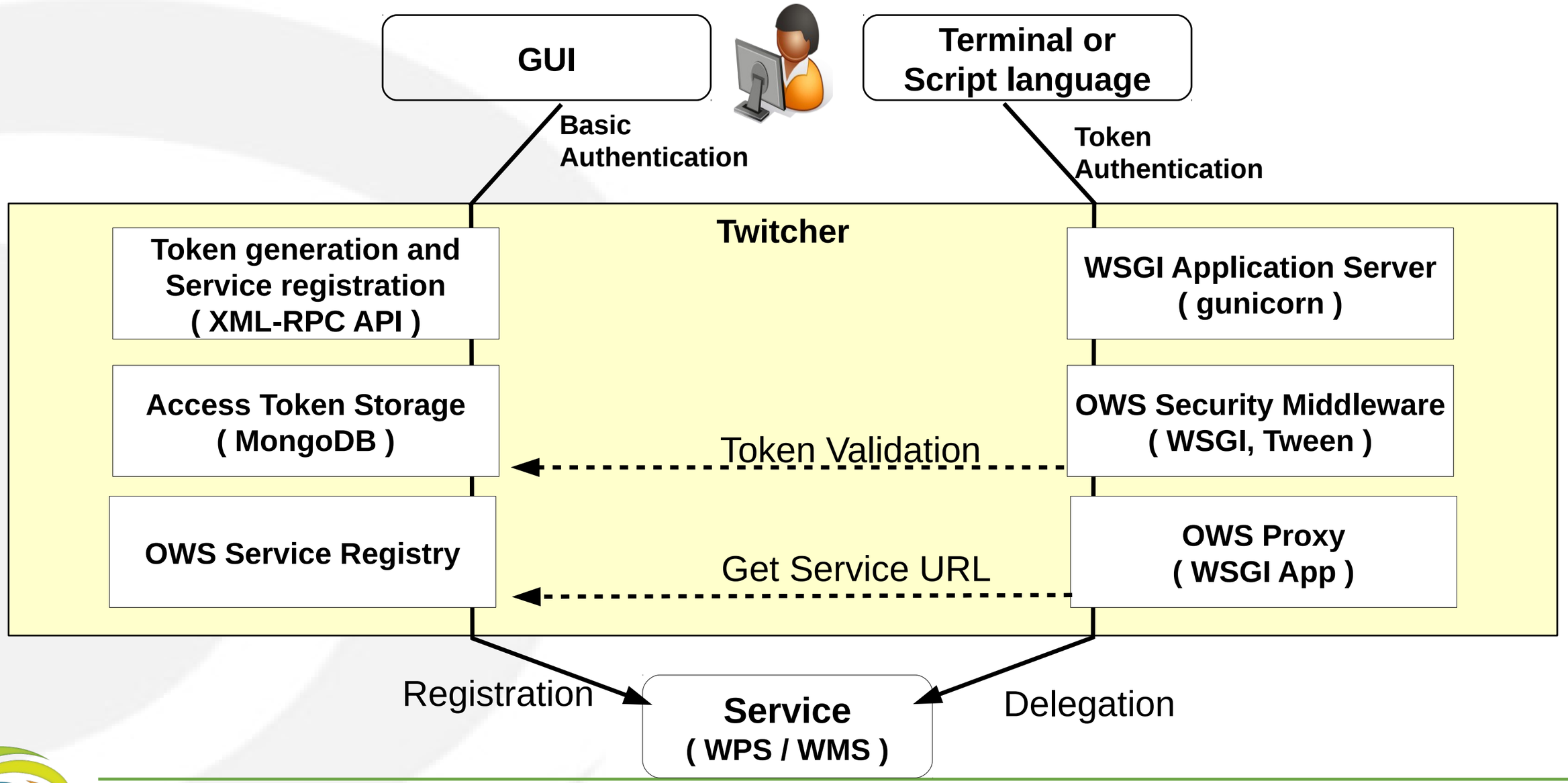
Script langage Terminal Call

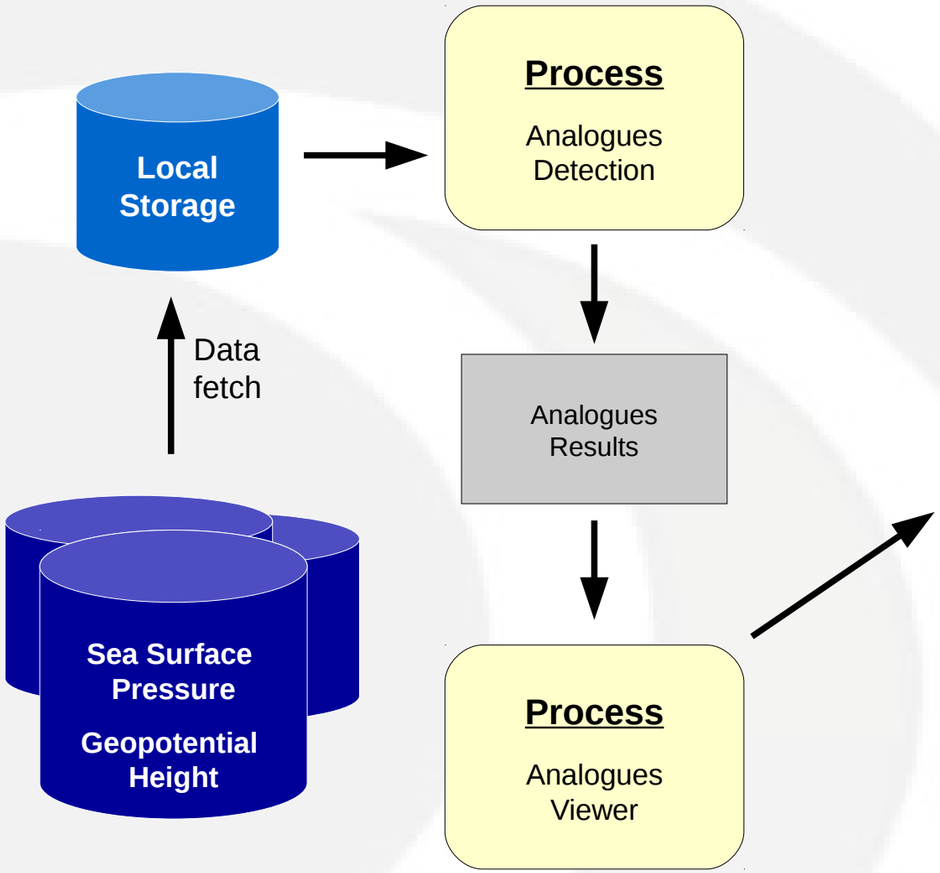
Token autentication

```
[nhempel@lsce3199 ~]$ export WPS_SERVICE=htt

[nhempel@lsce3199 ~]$ birdy -h

usage: birdy [<options>] <command> [<args>]

Flyingpigeon: Processes for climate data, indices and extrem events

optional arguments:
  -h, --help            show this help message and exit
  --debug               enable debug mode

command:
  List of available commands (wps processes)

  {visualisation,sdm,segetalflora,indices_single,subset_countries,eobs_to
                  Run "birdy <command> -h" to get additional help.

    visualisation       Visualisation of netcdf files:                    Just testing a nice script to visualise some variables
    sdm                 Species distribution model:                       Species distribution model
    segetalflora        Segetal Flora:                                    Species biodiversity of segetal flora.  Imput files: variable:tas , domain: EUR-
                                                                          11 or EUR-44
    indices_single      Calculation of climate indice (single variable):  This  process calculates climate indices based on one single variable.
    subset_countries    Subset netCDF files:                              This process returns only the given polygon from input netCDF files.
    eobs_to_cordex      EOBS to CORDEX:                                   downloads EOBS data in adaped CORDE format
    ensembleRobustness  Calculation of the robustness of an ensemle:      Calculates the robustness as the ratio of noise to
                                                                           signal in an ensemle of timeseries
    analogs             Days with analog pressure pattern:                Search for day with analog pressure pattern
    fetch               Download Resources:                               This process downloads resources (limited to 50GB) to the local file system
                                                                          and returns a textfile with appropriate pathe
```

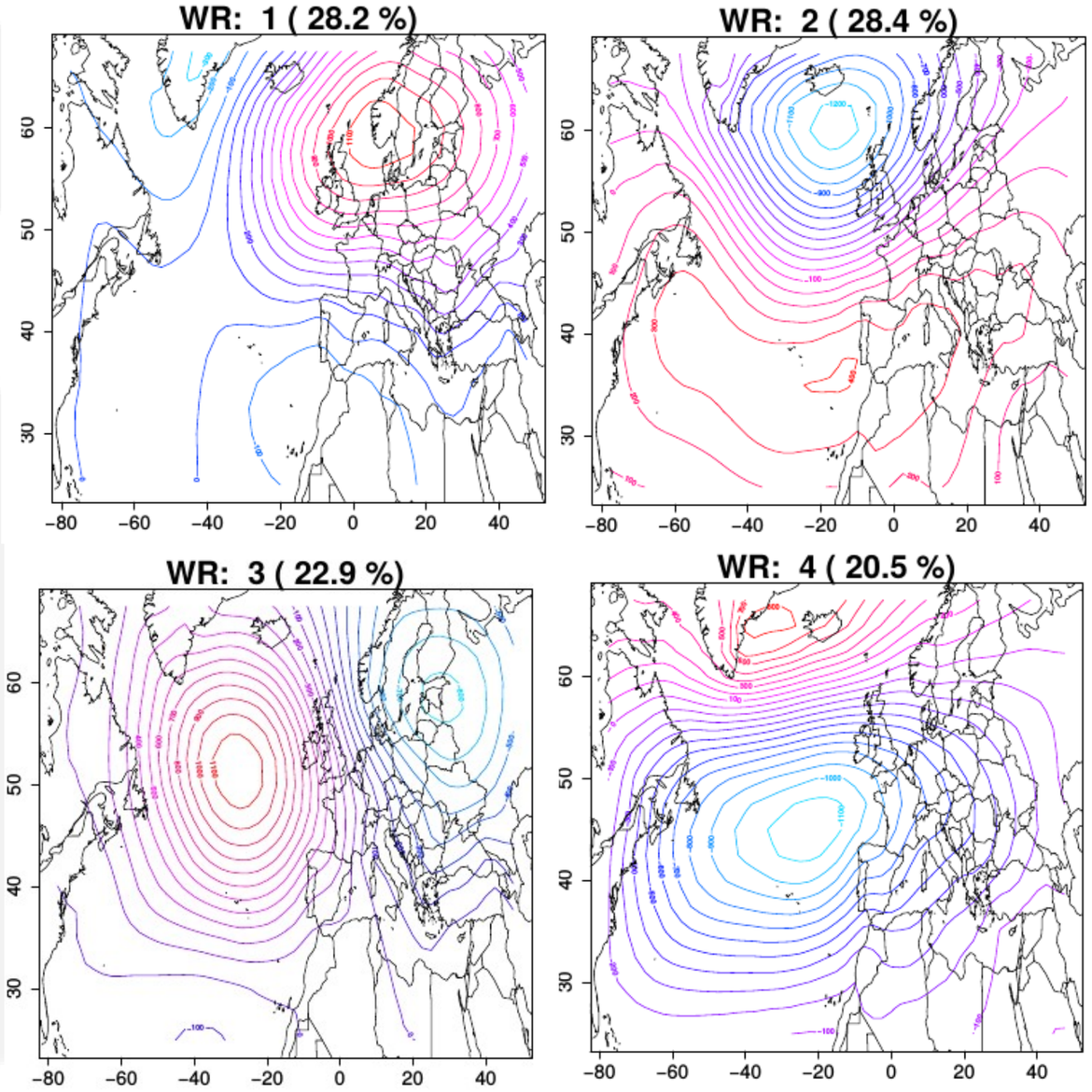
```
from owslib.wps import W

wps = WebProcessingSer
                      ve

execute = wps.execute(
    identifier="niceprocess",
    inputs=[
    ("parameter_1", "argument"),
    ("parameter_2", "42"),
#     ("parameter_3", "0.987"), # use the default value
    ("file_identifier", "https://thredds/fileServer1/test/file1.nc"),
    ("file_identifier", "https://thredds/fileServer1/test/file2.nc"),
    ("file_identifier", "https://thredds/fileServer2/test/file3.nc")],
    output=[("output", True)])

# time for a coffee

for o in execute.processOutputs:
    print o.reference

https://mouflon.dkrz.de:8090/wpsoutputs/flyingpigeon/output_graphic-697dee76-d722-93ae-9789bf75cf44.png
https://mouflon.dkrz.de:8090/wpsoutputs/flyingpigeon/output_netCDF-697dee76-d722-93ae-9789bf75cf44.nc
https://mouflon.dkrz.de:8090/wpsoutputs/flyingpigeon/output_text-697dee76-d722-93ae-9789bf75cf44.txt
```

Security


GUI
Terminal or
Script language
Basic
Authentication
Token
Authentication
Twitcher
Token generation and
Service registration
(XML-RPC API)
WSGI Application Server
(gunicorn)
Access Token Storage
(MongoDB)
OWS Security Middleware
(WSGI, Tween)
Token Validation
OWS Service Registry
OWS Proxy
(WSGI App)
Get Service URL
Registration
Service
(WPS / WMS)
Delegation

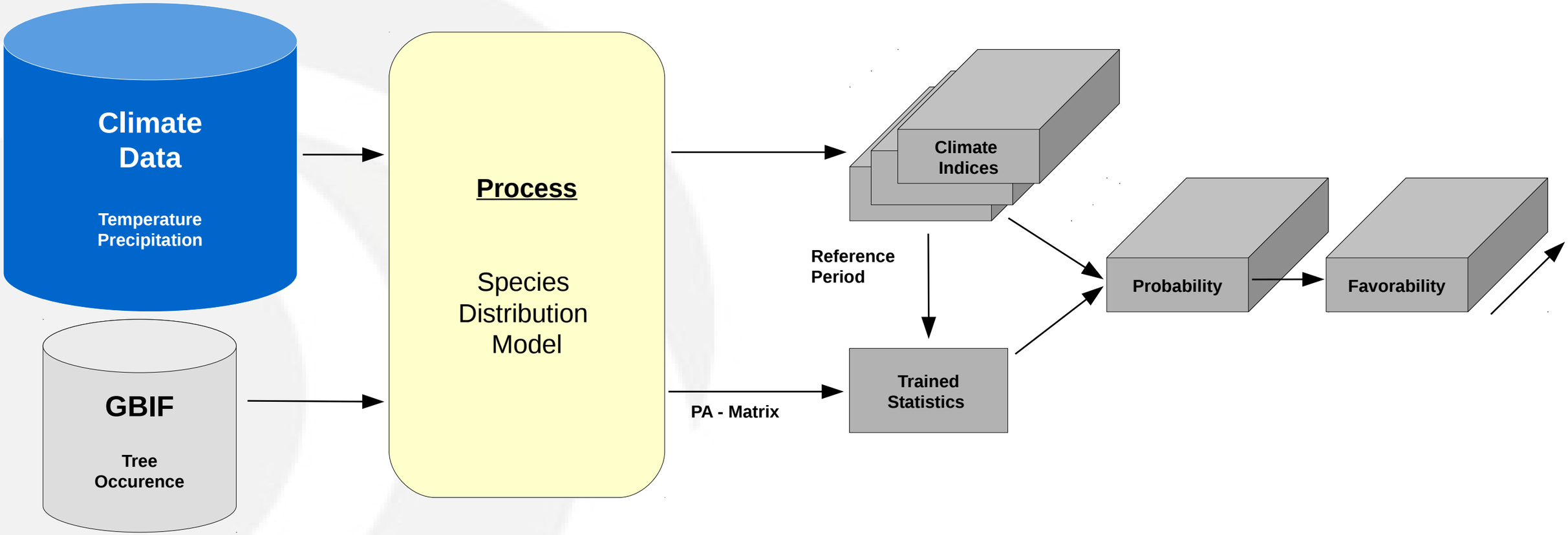

Local Storage
Process
Analogues Detection
Data fetch
Analogues Results
Sea Surface Pressure
Geopotential Height
Process
Analogues Viewer


Analogues Viewer
Help
Contact
313 selected out of 218,560 records | Reset All
Period of Interest (manual selection, format dd/mm/yyyy)
Start Date: 01/12/2009
End Date: 28/02/2010
Period of Interest (chart selection)
reset
[01/12/2009 -> 28/02/2010]
Season
DJF
Archive decade
1948-1955
1956-1965
1966-1975
1976-1985
1986-1995
1996-2005
2006-2015
Correlation
reset
Count
Correlation
Distance
Count
Distance

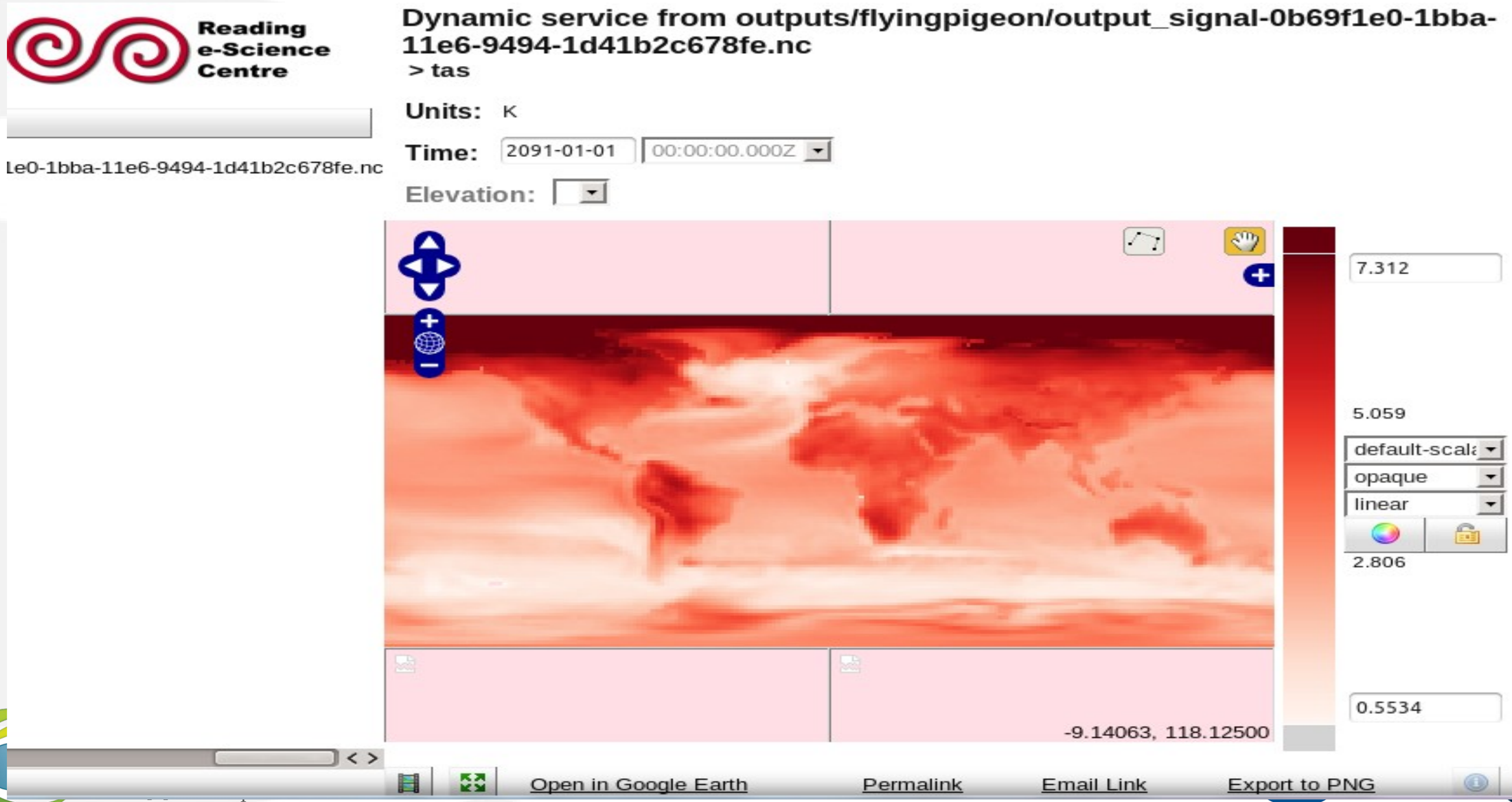


Trained Weather regimes Projected on other Dataset

Year	WR 1	WR 2	WR 3	WR 4
...				
2084	35.16	28.57	30.77	5.49
2085	33.33	24.44	36.67	5.56
2086	21.11	28.89	40.00	10.00
2087	37.78	11.11	10.00	41.11
2088	18.68	19.78	37.36	24.17
2089	34.44	44.44	17.78	3.33
...				


Climate
Data
Temperature
Precipitation
GBIF
Tree
Occurence
Process
Species
Distribution
Model
Climate
Indices
Reference
Period
Probability
Favorability
Trained
Statistics
PA - Matrix

Web Mapping Server



- https://github.com/bird-house
- http://birdhouse.readthedocs.org/en/latest/

- https://gitter.im/bird-house/birdhouse
- https://lists.dkrz.de/mailman/listinfo/wps
- https://lists.dkrz.de/mailman/listinfo/wps-dev

- DEMO GUI: https://mouflon.dkrz.de

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Thanks to :

Carmen Alvarez-Castro, Patrick Brockmann, Carsten Ehbrecht, Wolfgang Falk, Nils Hempelmann, Heinz-Dieter Hollweg, Jörg Hoffmann, Nikolay Kadygrov, Stephan Kindermann, Florian Klemme, Nikolay Koldunov, Ben Koziol, Cathy Nangini, Sabine Radanovics, Seckmag, Robert Vautard, Pascal Yiou , …. , et. al.