Royal Netherlands
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Using web services for visualisation

EGOWS 2014
Oslo

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2013 EUMETSAT Meteorological Satellite Conference

Outline

ADAGUC software – Overview

What determines success (quality) of web service?

- Focus on performance

Application examples

Conclusions

ADAGUC software - Overview

Open source software for visualisation of meteorological products

Server:

-OGC WMS server (1.1.1 and 1.3.0) with WCS 1.0.0 server

-Server can access

- CF-NetCDF data for grids, point data, swath data from satellites
- RGB images in NetCDF
- HDF5 datasets (KNMI HDF5 for sat/radar)
- Server can also access remote OpenDAP datasets (e.g. climate datasets)

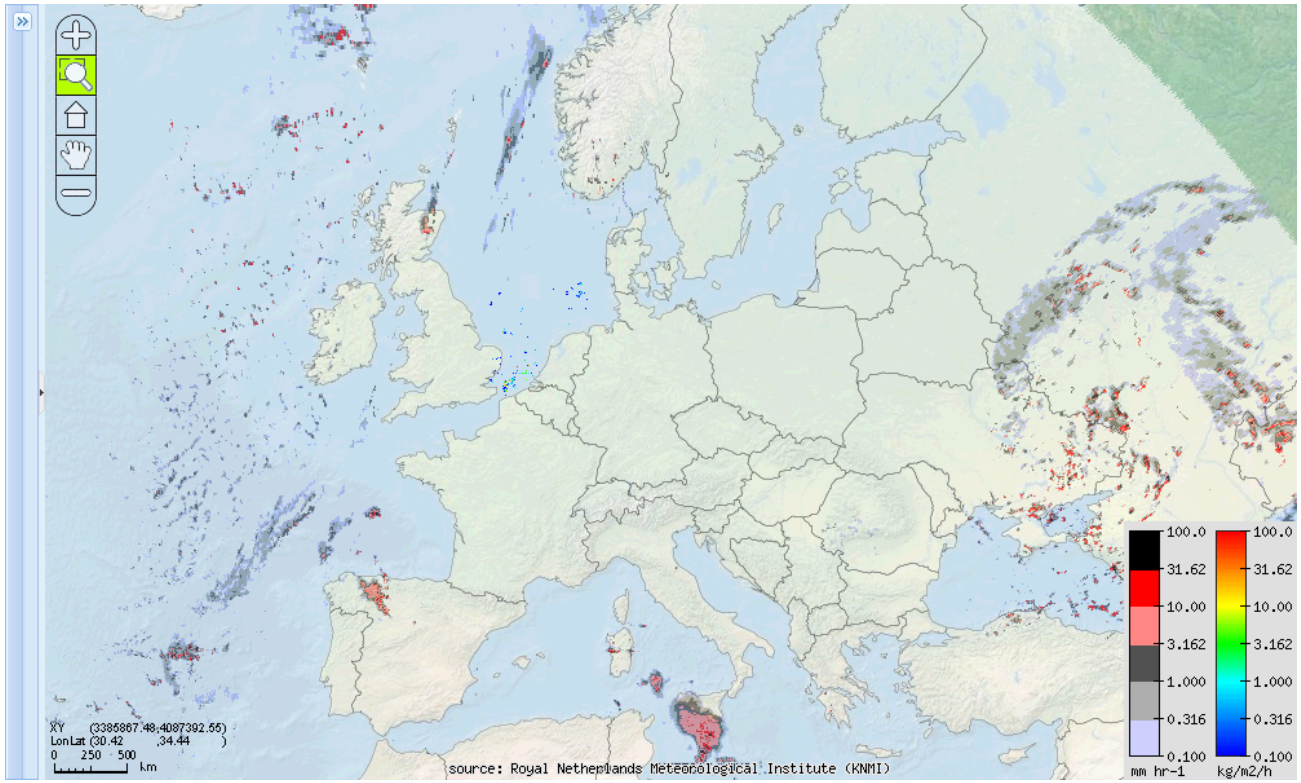
Client:

-Generic web portal for (any) WMS services

-Embeddable viewer for re-use in web applications

Web Map Service - WMS

Generates visualizations of geospatial data in the form of 2D images, suitable for transfer over the internet (JPG/PNG/GIF)



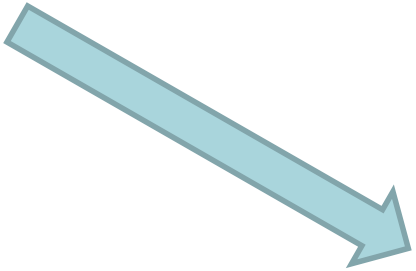
MSG-CPP - Precipitation

ADAGUC WMS: Detail

- NetCDF CF datafiles: grids/RGB images/point data
- Multidimensional (time, elevation, ensemble members, etc): 4D, 5D, 6D
- Implements MetOcean BP reference_time and elevation
- Preconfigurable styling (based on *standard_name* attribute)
- Autoconfigurable for example for visualisation of WPS output
- Extensions:
  - GetReferenceTimes request
  - GetFeatureInfo/GetPointValue
    - » Can also return data in JSON/JSONP
    - » Multiple dimension values (e.g. elevation=* returns data for all elevations)

ADAGUC WMS: GetFeatureInfo extensions

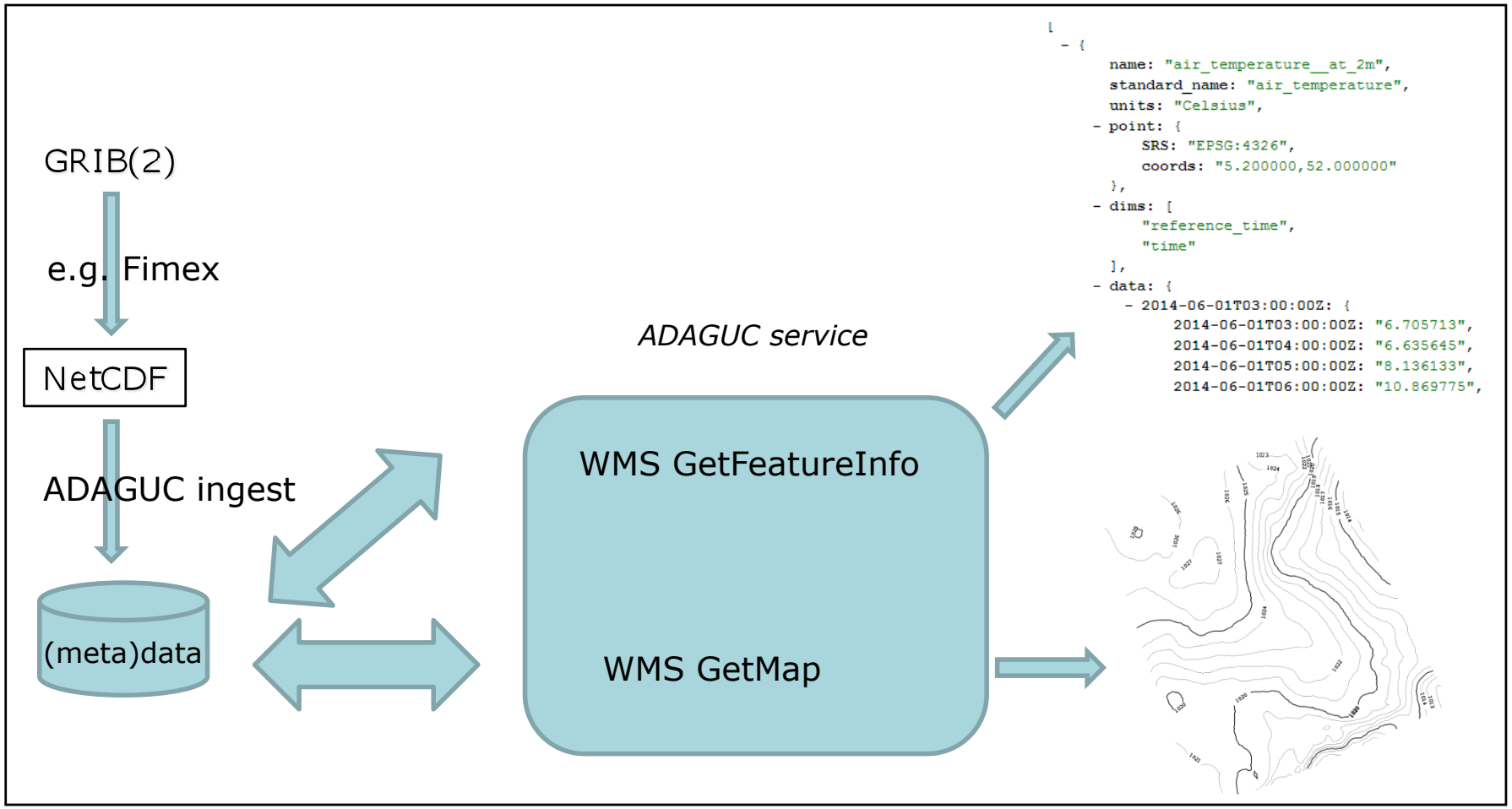
- get value for one point in JSON:
  http://[...]&REQUEST=GETPOINTVALUE
  &QUERY_LAYERS=air_temperature__at_2m
  &[...]&TIME=2014-06-01T00:00:00Z
  &INFO_FORMAT=application/json




```
[
- {
    name: "air_temperature__at_2m",
    standard_name: "air_temperature",
    units: "Celsius",
  - point: {
        SRS: "EPSG:4326",
        coords: "5.200000,52.000000"
    },
  - dims: [
        "reference_time",
        "time"
    ],
  - data: {
      - 2014-06-01T03:00:00Z: {
            2014-06-01T03:00:00Z: "6.705713"
        }
    }
}
]
```

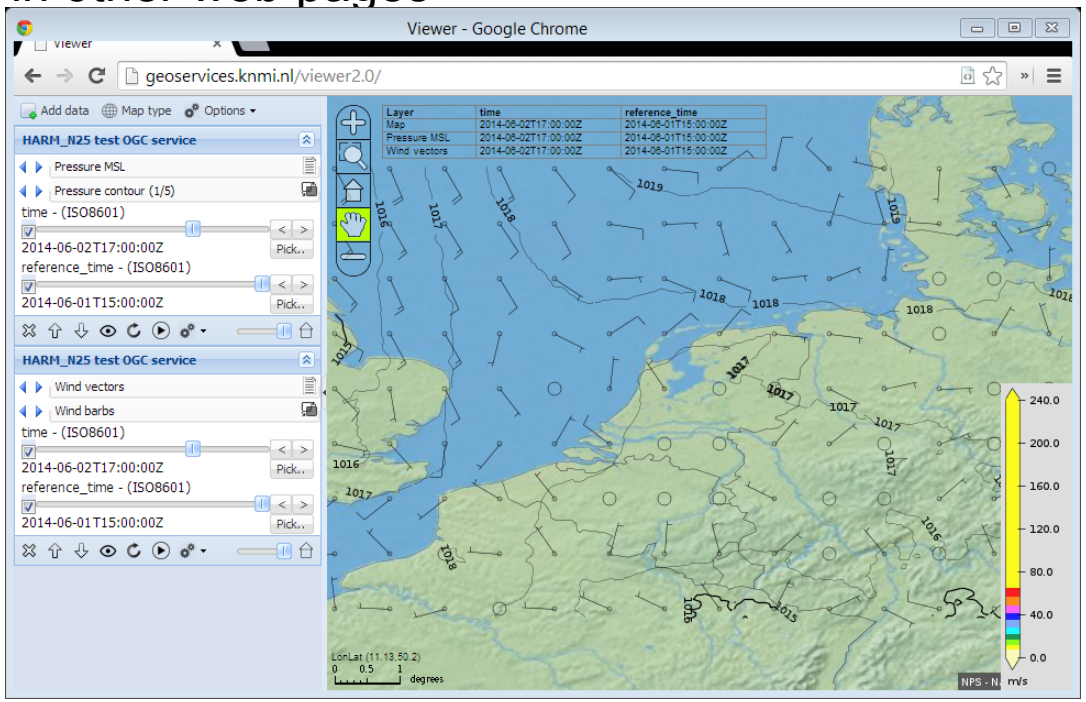

- get time series a certain location in JSON:
  *http://....TIME=2014-06-01T00:00:00Z/**2014-06-03T00:00:00Z***
  &INFO_FORMAT=application/json
- get time series for all ensemble members in JSON:
  http://....TIME=2014-06-01T00:00:00Z/2014-06-03T00:00:00Z
  &DIM_member=*
  &INFO_FORMAT=application/json

How ADAGUC WMS works



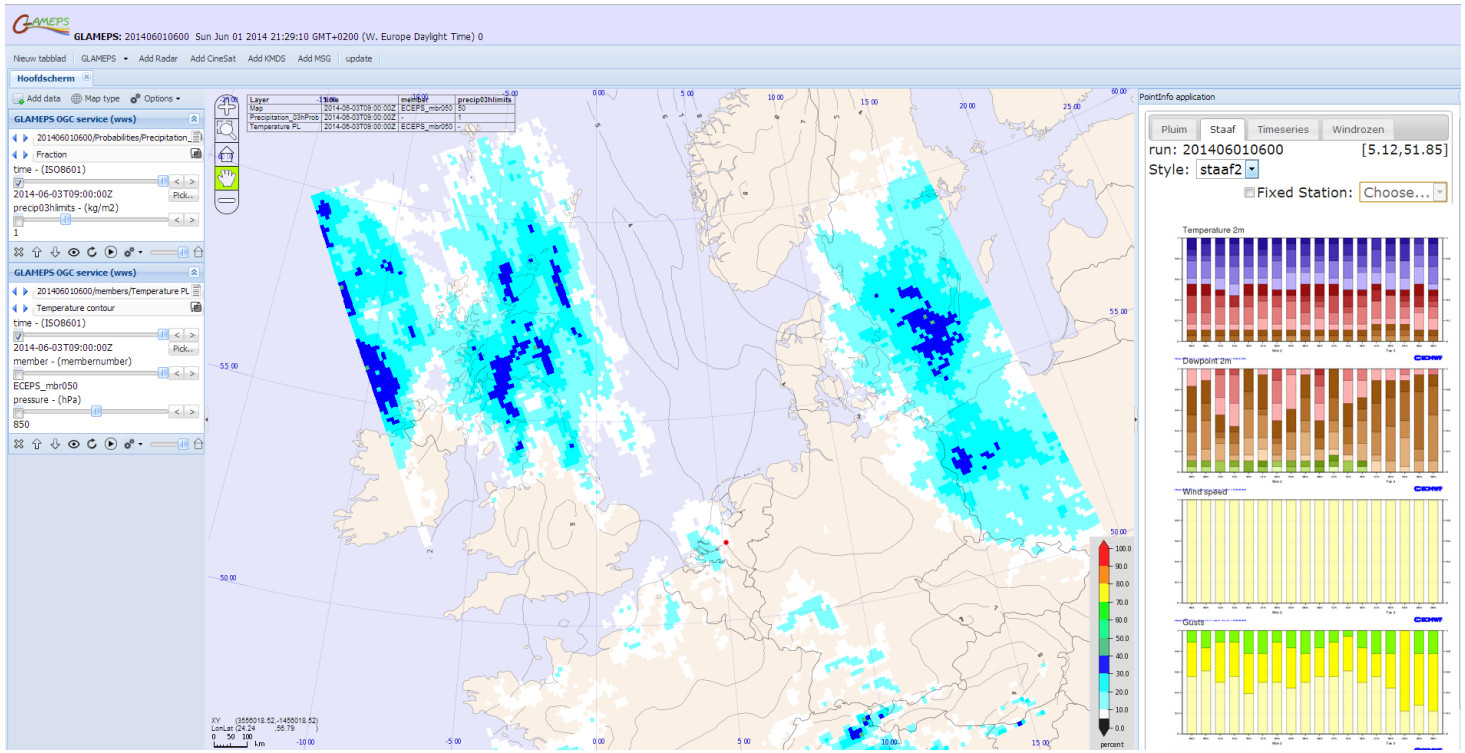
ADAGUC viewer: Detail

- Javascript browser application
- Uses ExtJS, Jquery for GUI elements
- Bespoke mapping subcomponents
- Viewer component is embeddable in other web pages



What determines success (quality) of web service?

- Usability
- Flexibility
- Configurability
- Scalability
- Performance



Success factors – Usability/Flexibility/Configurability

Usability:

- Service and/or viewer should be re-usable in different apps
- Standards compliance
- Too strong dependance on extensions can affect usability

Flexibility:

- Service should easily adapt to other data sources (CF Conventions)

Configurability:

- Service should be easy to configure (many options).

Scalability

Scalability is possibility to apply service on a large scale

Depends on:

- Caching
- Access type: tiles from a restricted single projection set (“Google Maps”) or free rectangles

Performance

- Used algorithms
- Hardware: Real machines vs. virtual machines
- NetCDF data can use compression: trade off between I/O and CPU
  NetCDF compression can use chunking: compression of subsets of a dataset

- Which sort of chunking is optimal depends on use case.

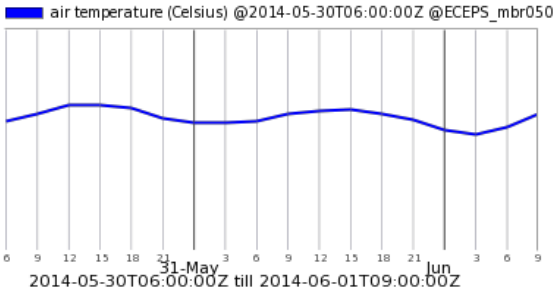
Performance: use cases

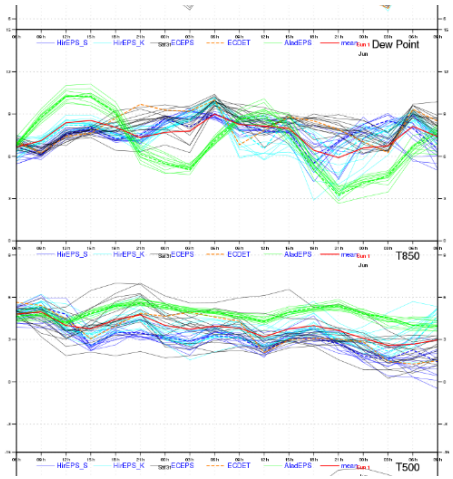
Coordinates - (lon=5.20; lat=52.00)

air_temperature__at_2m (air_temperature__at_2m)

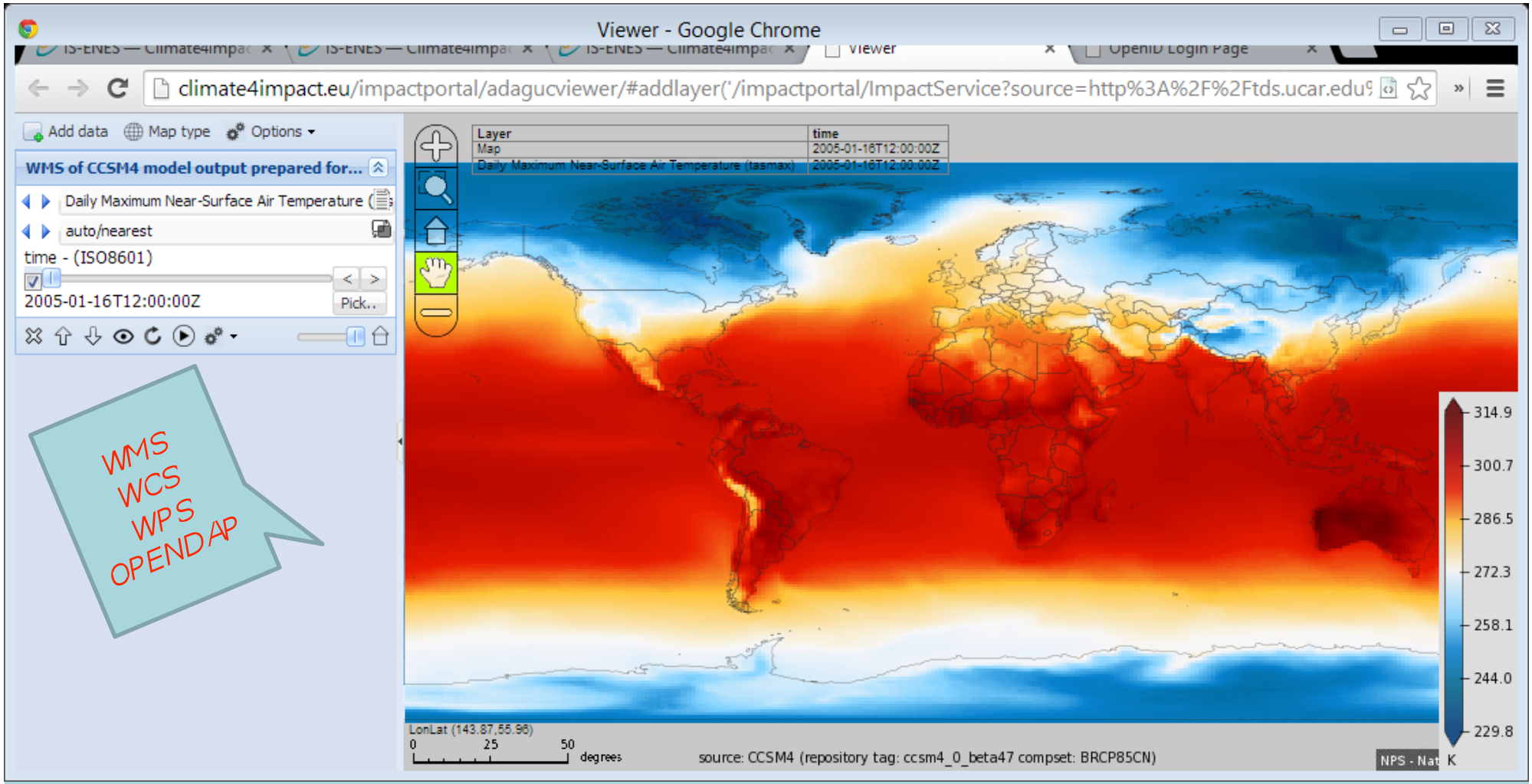
2014-06-01T03:00:00Z

air_temperature__at_2m **6.705713** Celsius

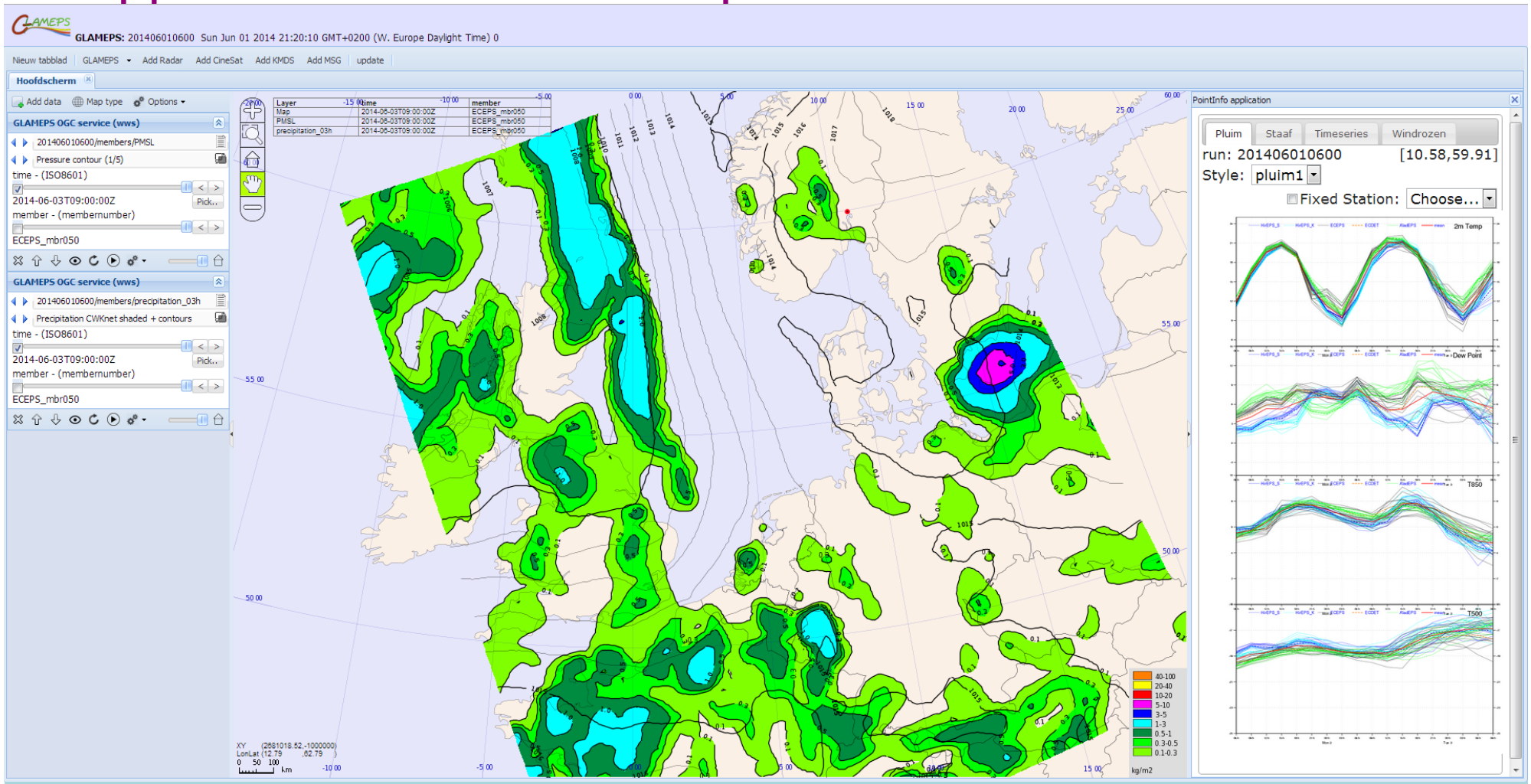




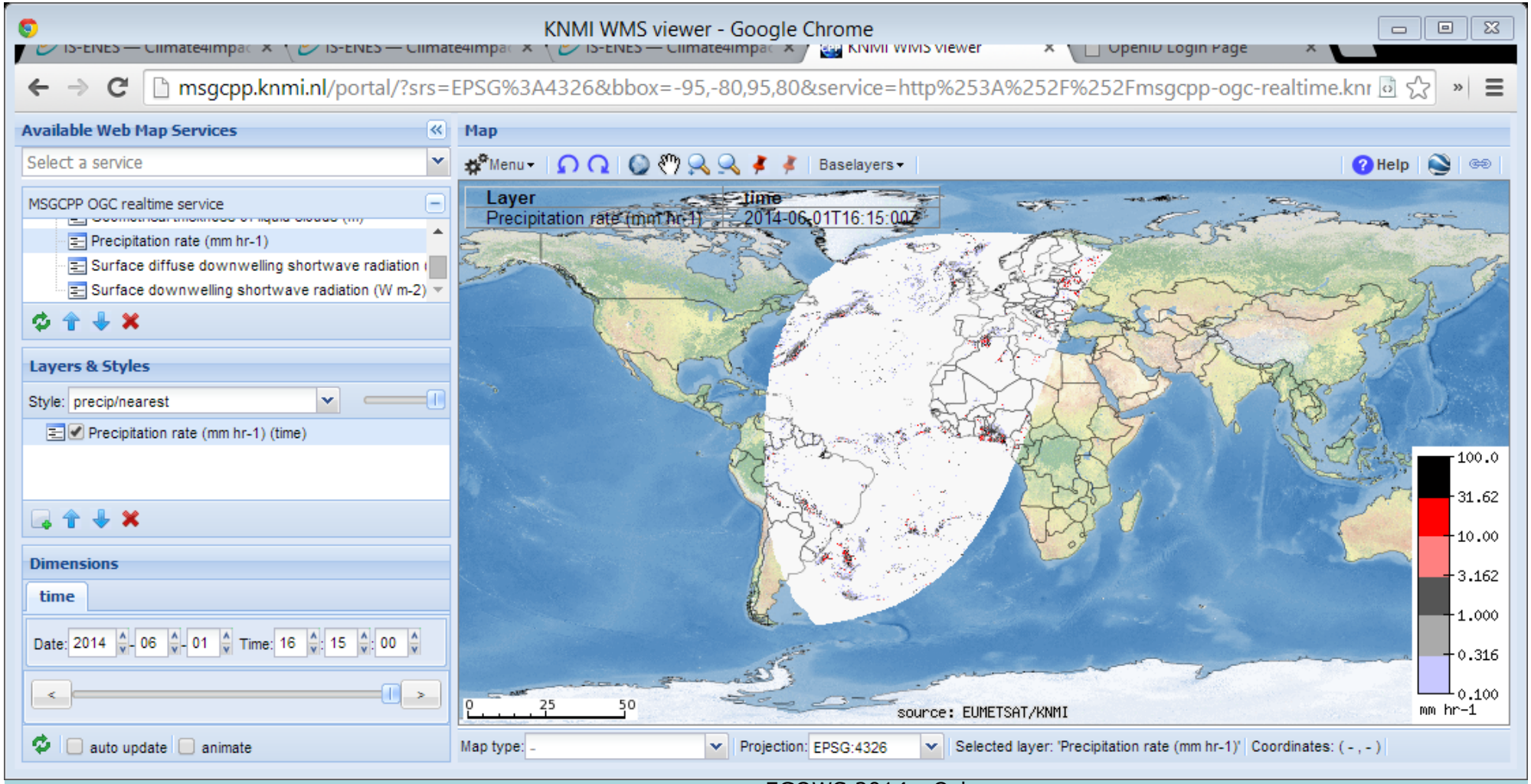
Applications – climate4impact.eu



Applications – GLAMEPS portal



Applications – MSGCPP



Conclusions

ADAGUC is a success for us: we're using and re-using it.

It could replace our Meteorological Workstation, if enough resources are provided.

It can be used for batch production of maps etc.

It can be used for building web applications for different purposes.

By applying ADAGUC we hope to build it out further.

Links

http://adaguc.knmi.nl

http://msgcpp.knmi.nl

http://climate4impact.eu