

Interactive Meteosat: Educational Platform for Meteorological Applications Entirely Developed with FLOSS Software

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ESA Eduspace

The “Eduspace” website aims to provide students and educators of Europe and worldwide with an e-learning tool giving access and exposure to satellite image data of the Earth and in particular to a wide-spread visibility of



Earth Observation applications for education and training. Eduspace is primarily aimed at secondary school students, but some material is more advanced and better suited towards university undergraduates.

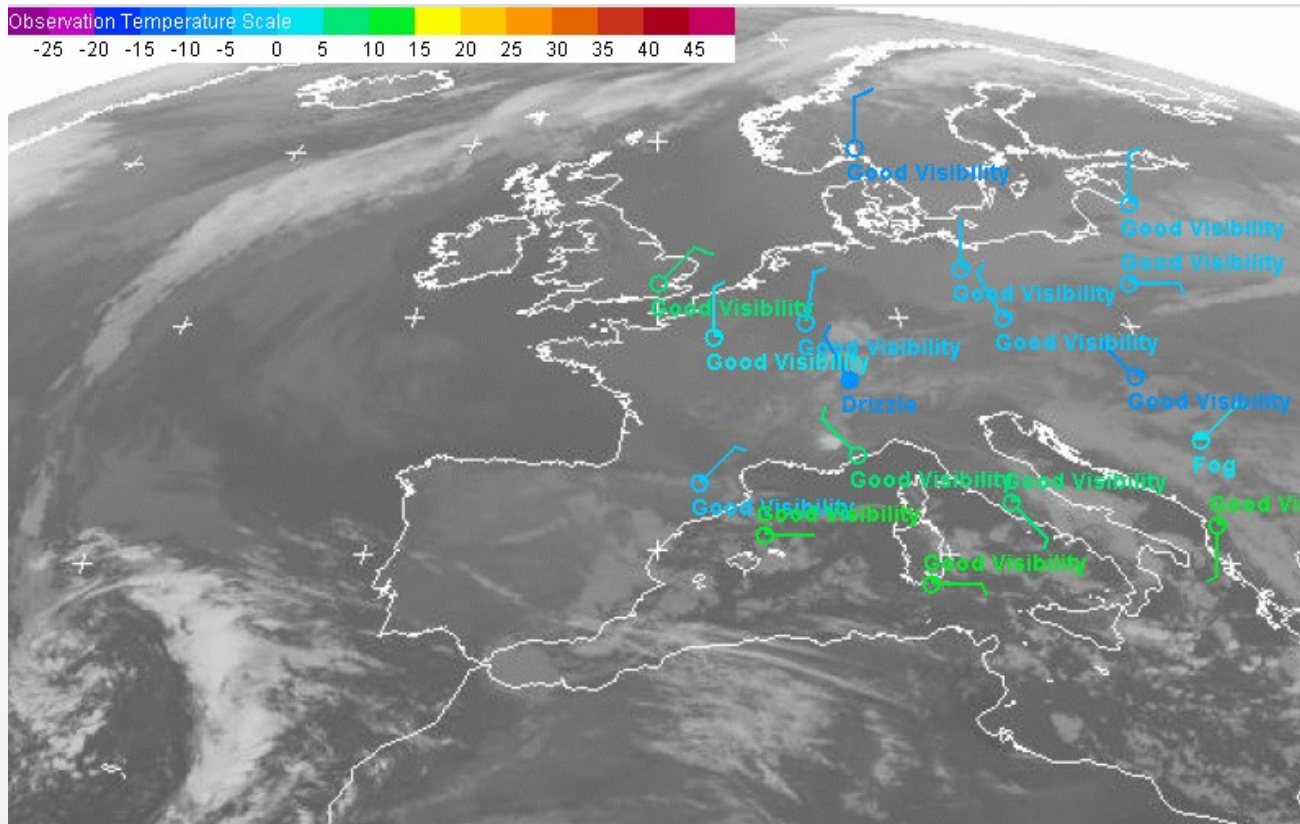
Interactive Meteosat

- Teachers and students do explore and analyse the weather of the day in Europe
- Do their own weather observation which become visible on the corresponding Meteosat image
- Exercise: analyse and produce a forecast!



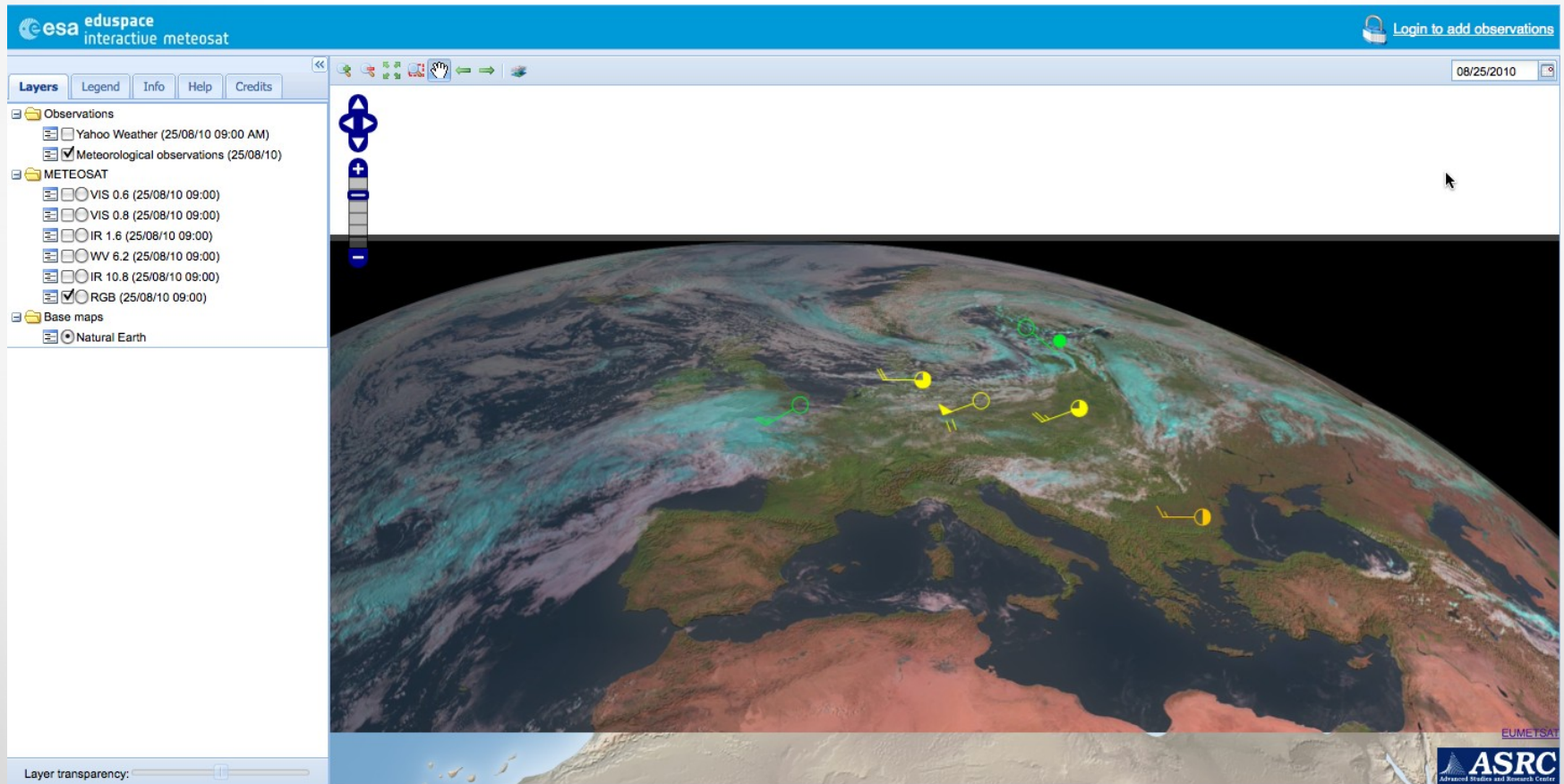
Web tool v.1

- Launched in November 2001
- Java based (closed source)



Meteosat

- Will be officially launched in November 2010
- Developed by ASRC using open source software
- More complex and interactive



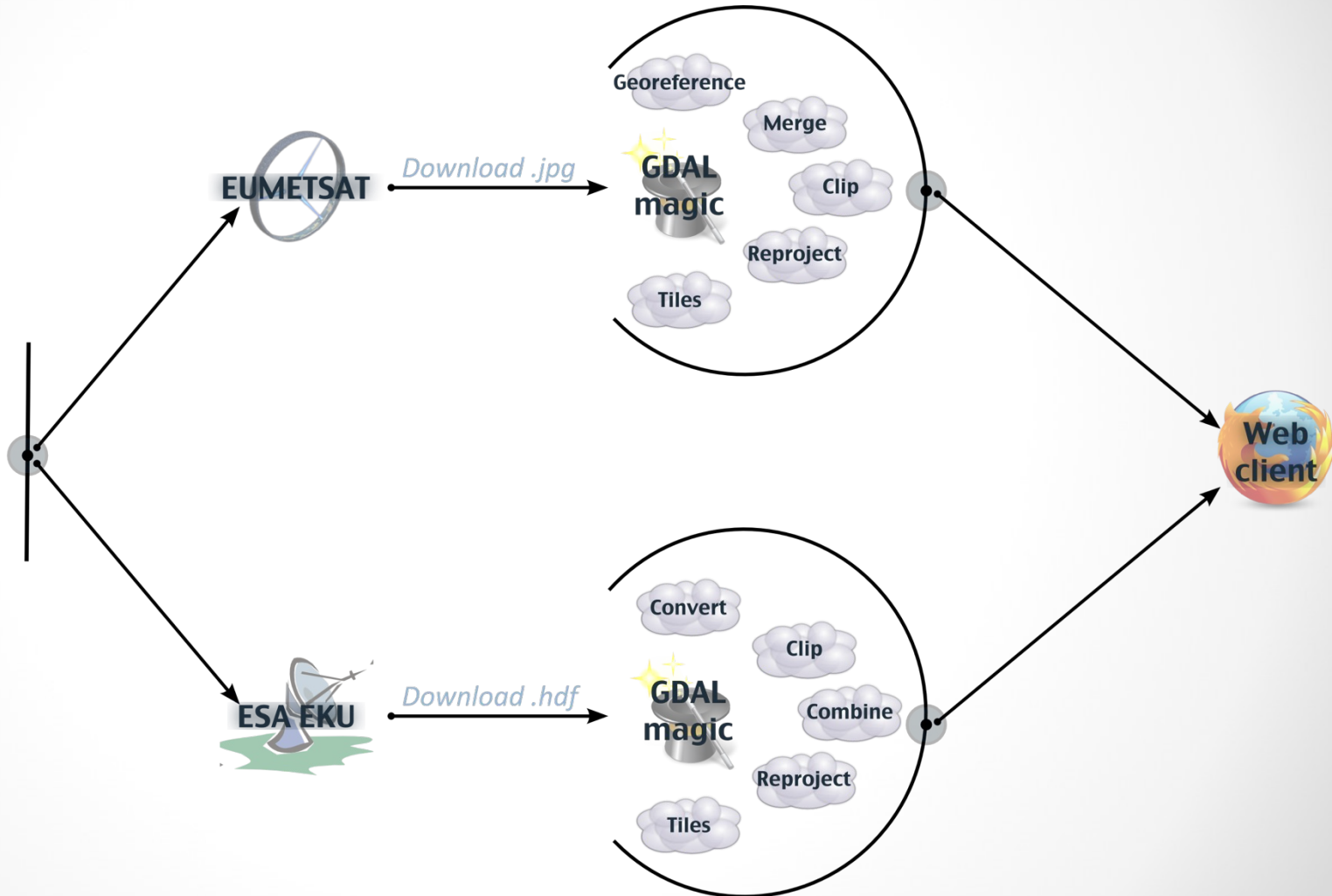
Tasks

- Download and process daily METEOSAT images
- Create a web interface for users to upload meteorological observations
- Integrate the images and the observations into a webmapping application

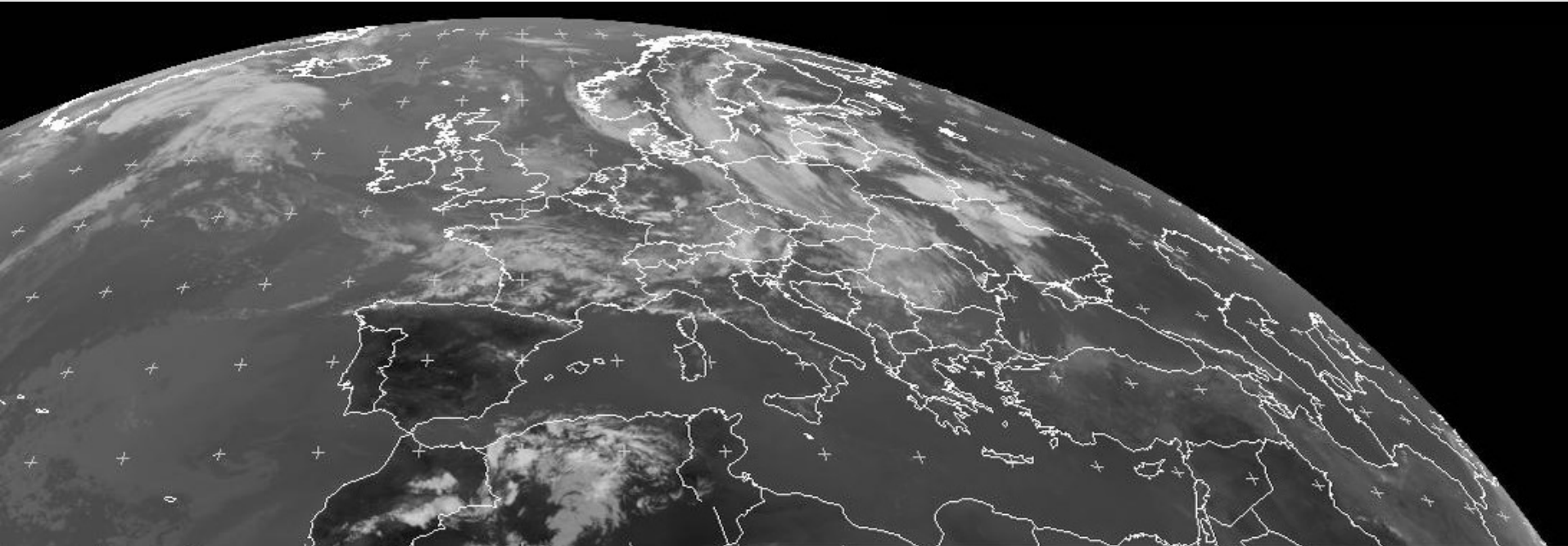
processing

METEOSAT channels

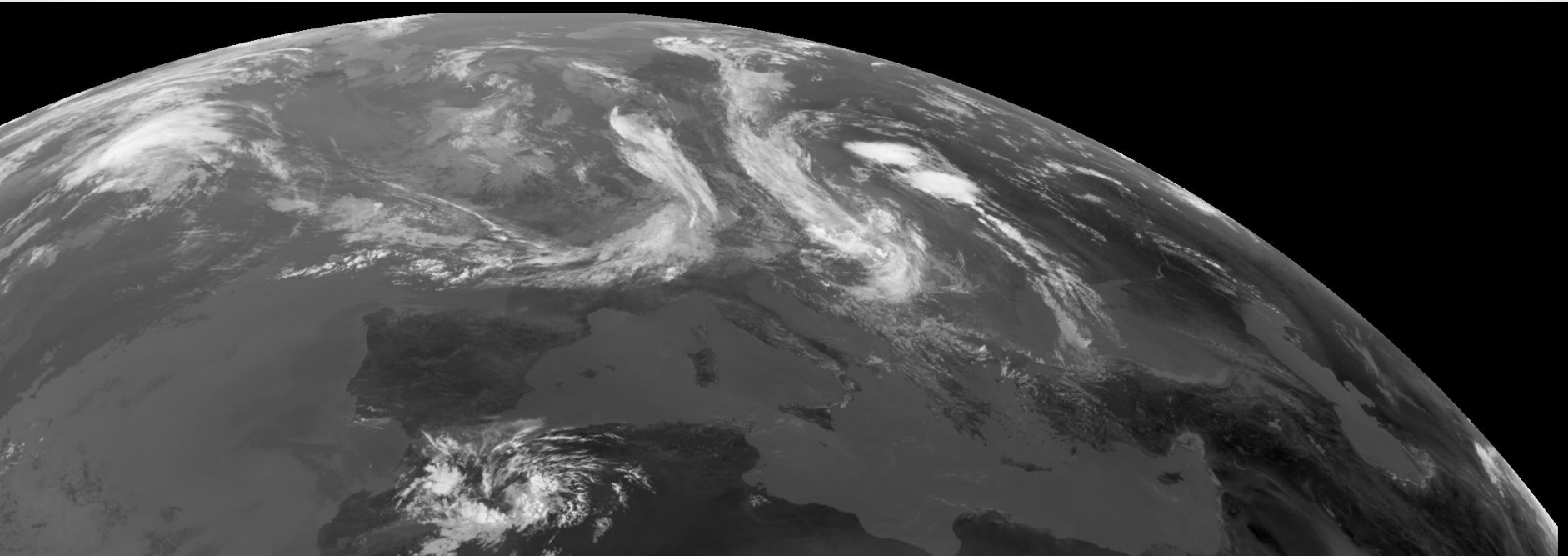
- Visible 0.6 μm ;
- Visible 0.8 μm ;
- Infrared 1.6 μm ;
- Infrared 10.8 μm ;
- Water Vapour 6.2 μm ;
- Natural Color RGB



EUMETSAT image



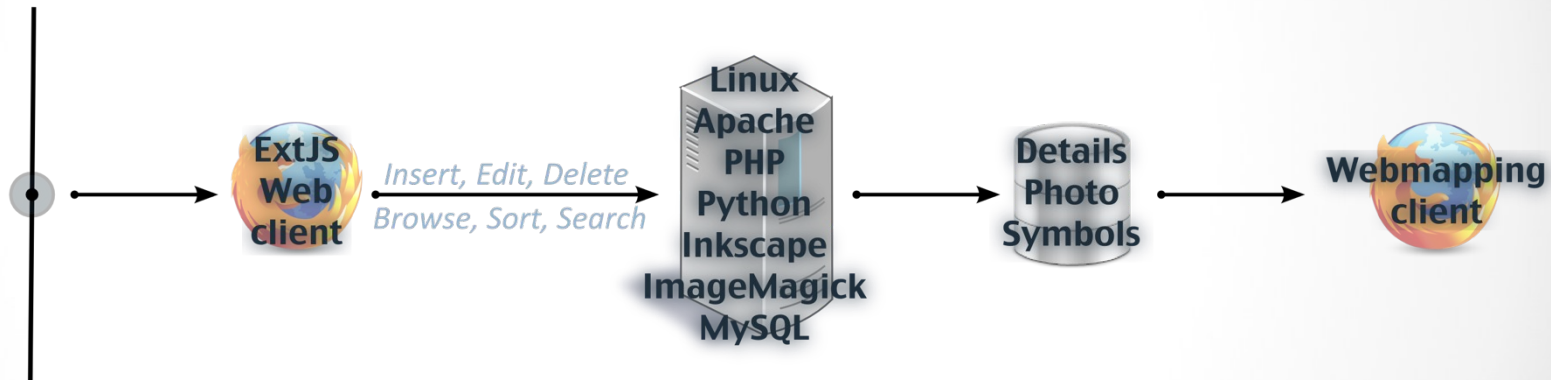
EKU image



Observation upload

Users

- ❖ Date & time;
- ❖ Latitude & longitude;
- ❖ Location;
- ❖ Elevation;
- ❖ Current conditions;
- ❖ Wind direction;
- ❖ Wind speed;
- ❖ Cloud cover;
- ❖ Temperature;
- ❖ Additional obs;
- ❖ Photo.



Observation upload

Meteorological observations

http://www.asrc.ro/imeteosat_beta/obs-home.php

esa eduspace interactive meteosat Administration panel

Add observation Edit observation Remove observation Upload photo Help Credits Logout

Date	Time	Latitude	N/S	Longitude	E/W	School	Location	Elevation	Current conditions	Wind direction	Wind speed	Wind units	Cloud cover	Temperature	Additional observations	Photo	
06-09-2010	09:00 AM	51° 30' 36"	North	-1° 52' 12"	West	Yahoo London	yahoo	100 m	Good visibility	90°	14.5	m/s		+13°	Data from Yahoo Weather		
<input checked="" type="checkbox"/>	06-09-2010	09:00 AM	44° 25' 48"	North	26° 6' 0"	East	Yahoo Bucharest	yahoo	100 m	Mist	130°	4.8	m/s		+17°	Data from Yahoo Weather	
<input type="checkbox"/>	06-09-2010	09:00 AM	52° 14' 24"	North	21° 0' 36"	East	Yahoo Warsaw	yahoo	100 m	Rain	320°	20.9	m/s		+9°	Data from Yahoo Weather	
<input type="checkbox"/>	06-09-2010	09:00 AM	52° 31' 12"	North	13° 22' 48"	East	Yahoo Berlin	yahoo	100 m	Good visibility	360°	1.6	m/s		+8°	Data from Yahoo Weather	
<input type="checkbox"/>	06-09-2010	09:00 AM	60° 10' 12"	North	24° 55' 48"	East	Yahoo Helsinki	yahoo	100 m	Good visibility	350°	1.6	m/s		+11°	Data from Yahoo Weather	
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Observation upload

Meteorological observations

http://www.asrc.ro/imeteosat_beta/obs-home.php

esa eduspace interactive meteosat Administration panel

Logout

Add observation Edit observation Remove observation Upload photo Help Credits

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09/06/2010	9:00 AM	44 25 48	North	26 6 0	East	Yahoo Bucharest	yahoo	100	Mist	130	4.83	m/s	Partly cloudy (1/2)	17	Data from Yahoo Weather	1#3321
06-09-2010	09:00 AM	52° 14' 24"	North	21° 0' 36"	East	Yahoo Warsaw	yahoo	100 m	Good visibility	320°	20.9	m/s		+9°	Data from Yahoo Weather	
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Page 1 of 160 Per Page: 20 Local sort: Off Local filter: Off Remove filters

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Mapping clients

- Geostationary view (+proj=geos +lon_0=0.0 +h=35785831 +x_0=0.0 +y_0=0.0)
- Map view (EPSG:3785 a.k.a. EPSG:900913)
- Google Earth

Geostationary View

The screenshot displays a web browser window titled "Geostationary View" with the URL http://www.asrc.ro/imeteosat_beta/geostationary_view.html. The browser's address bar includes a search engine (Google) and a user profile icon (ABP). The page header features the "esa eduspace interactive meteosat" logo and a "Login to add observations" button.

The main interface is divided into several sections:

- Layers Panel (Left):** Contains a list of data layers with checkboxes and expand/collapse icons.
 - Observations:**
 - Yahoo Weather (today 09:00 AM)
 - Meteorological observations (today)
 - METEOSAT:**
 - VIS 0.6 (06/09/10 09:00)
 - VIS 0.8 (06/09/10 09:00)
 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
 - Base maps:**
 - Natural Earth
- Navigation and Controls (Top Left):** Includes a compass, a vertical zoom slider, and navigation arrows.
- Main View (Center):** A 3D geostationary view of Earth showing cloud cover and satellite footprints. Several green and yellow markers are visible on the map, indicating specific satellite locations or data points.
- Bottom Left:** A "Layer transparency" slider.
- Bottom Right:** Logos for "ASRC Advanced Studies and Research Center" and "WMS".

The browser's status bar at the bottom shows "Done" and various system tray icons including S3, Fox, and WMS.

Map View

Map View

http://www.asrc.ro/imeteosat_beta/map_view.html

Google

esa eduspace interactive meteosat

Login to add observations

pick a date

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (today 09:00 AM)
 - Meteorological observations (today)
- METEOSAT
 - VIS 0.6 (06/09/10 09:00)
 - VIS 0.8 (06/09/10 09:00)
 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - OpenStreetMap
 - Google Map
 - Google Satellite
 - Google Physical

Map showing Europe and the Mediterranean region. Key locations labeled include Iceland, Sverige (Sweden), Suomi (Finland), Norge (Norway), Danmark (Denmark), Polen (Poland), Belgie (Belgium), Deutschland (Germany), France, Italia (Italy), and others. Meteorological observation points are marked with colored circles and lines: a green circle in the Baltic Sea, a red circle in the North Sea, a yellow circle in the Black Sea, and a blue circle in the Mediterranean Sea.

Layer transparency: [Slider]

Done

POWERED BY Google

Map data ©2010 - Terms of Use

ASRC Advanced Studies and Research Center

WMS

Get info

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html


esa eduspace interactive meteosat

Login to add observations


pick a date

Layers Legend Info Help Credits

Weather observation details

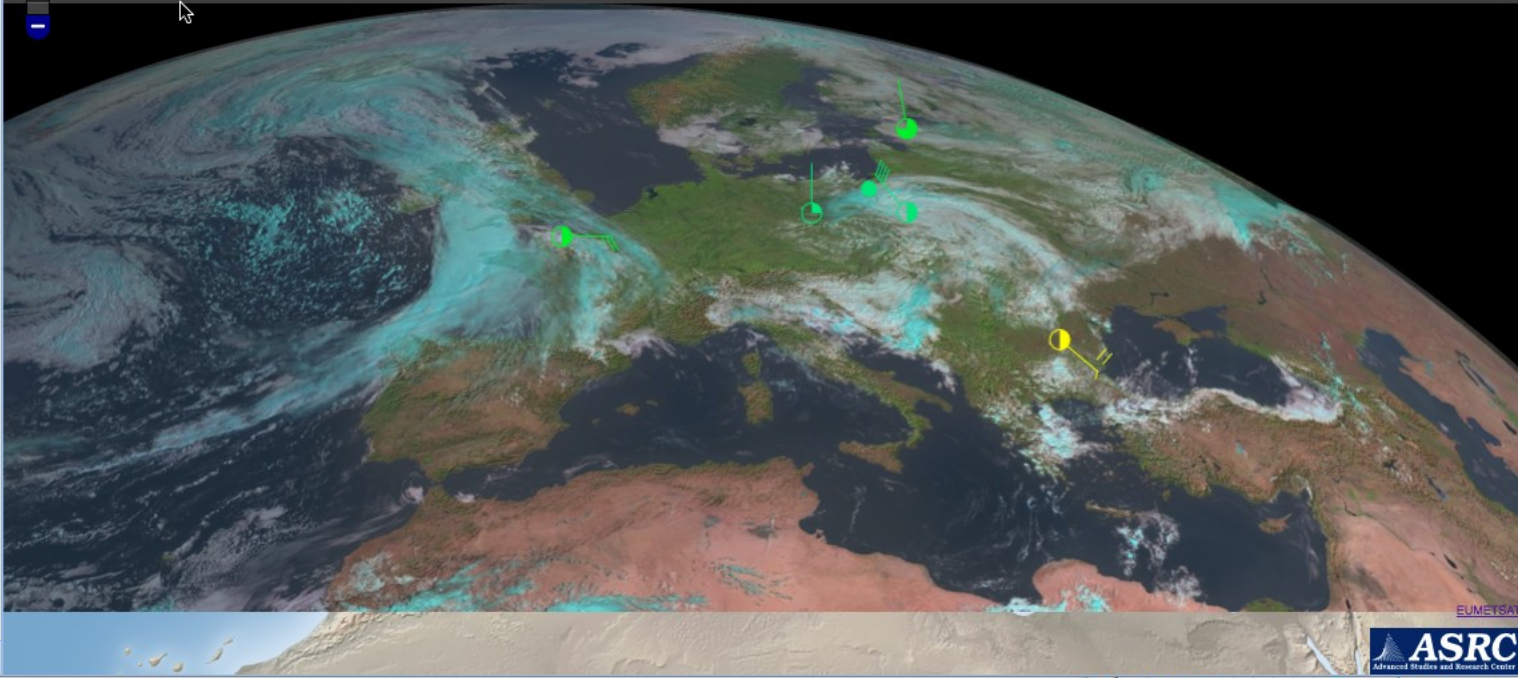


Country: Romania
City: Bucharest
School: Yahoo Bucharest
Latitude: 44° 25' 48" North
Longitude: 26° 6' 0" East
Date: 2010-09-06
Time: 09:00 AM
Elevation: 100 m
Current Conditions: Mist
Wind direction: 130°
Wind speed: 9.3 kts / 4.8 m/s
Cloud cover: Partly cloudy
Temperature: 17° Celsius
Additional observations: Data from Yahoo Weather Service
Photo:



Layer transparency:

Done



ASRC
Advanced Studies and Research Center

EUMETSAT

S3 Fox

WMS

Archive

Map View

http://www.asrc.ro/imeteosat_beta/map_view.html

Google

Map View

esa eduspace interactive meteosat

Login to add observations

Layers Legend Info Help Credits

Observations

- Yahoo Weather (today 09:00 AM)
- Meteorological observations (today)

METEOSAT

- VIS 0.6 (06/09/10 09:00)
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Base maps

- OpenStreetMap
- Google Map
- Google Satellite
- Google Physical

September 2010

S	M	T	W	T	F	S
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2
3	4	5	6	7	8	9

Today

Layer transparency:

Map data ©2010 - Terms of Use

ASRC Advanced Studies and Research Center

WMS

Archive

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

Google

esa eduspace interactive meteosat

Login to add observations

09/02/2010

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (02/09/10 09:00 AM)
 - Meteorological observations (02/09/10)
- METEOSAT
 - VIS 0.6 (02/09/10 09:00)
 - VIS 0.8 (02/09/10 09:00)
 - IR 1.6 (02/09/10 09:00)
 - WV 6.2 (02/09/10 09:00)
 - IR 10.8 (02/09/10 09:00)
 - RGB (02/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency: [slider]

Done

EUMETSAT ASRC Advanced Studies and Research Center WMS

Archive

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

Google

esa eduspace interactive meteosat

Login to add observations

09/04/2010

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (04/09/10 09:00 AM)
 - Meteorological observations (04/09/10)
- METEOSAT
 - VIS 0.6 (04/09/10 09:00)
 - VIS 0.8 (04/09/10 09:00)
 - IR 1.6 (04/09/10 09:00)
 - WV 6.2 (04/09/10 09:00)
 - IR 10.8 (04/09/10 09:00)
 - RGB (04/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency: [slider]

Done

ASRC Advanced Studies and Research Center

EUMETSAT

WMS

S3 Fox

Archive

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

Google

esa eduspace interactive meteosat

Login to add observations

09/05/2010

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (05/09/10 09:00 AM)
 - Meteorological observations (05/09/10)
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Layer transparency: [slider]

Done

ASRC Advanced Studies and Research Center

EUMETSAT

S3 fox

WMS

Archive

Geostationary View

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Google

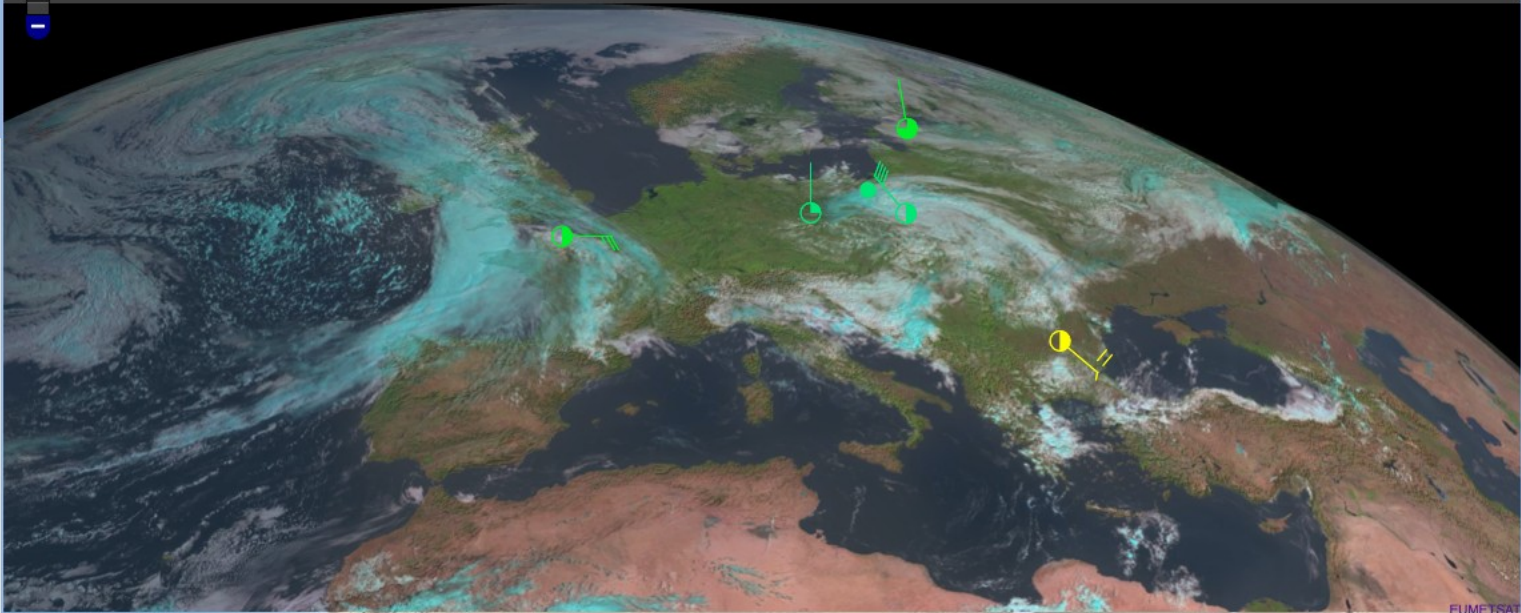
esa eduspace interactive meteosat

Login to add observations

09/06/2010

Layers Legend Info Help Credits

- Observations
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 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - Natural Earth



Layer transparency: [slider]

Done

EUMETSAT

ASRC
Advanced Studies and Research Center

S3 Fox

WMS

Channels: VIS

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

Google

esa eduspace interactive meteosat

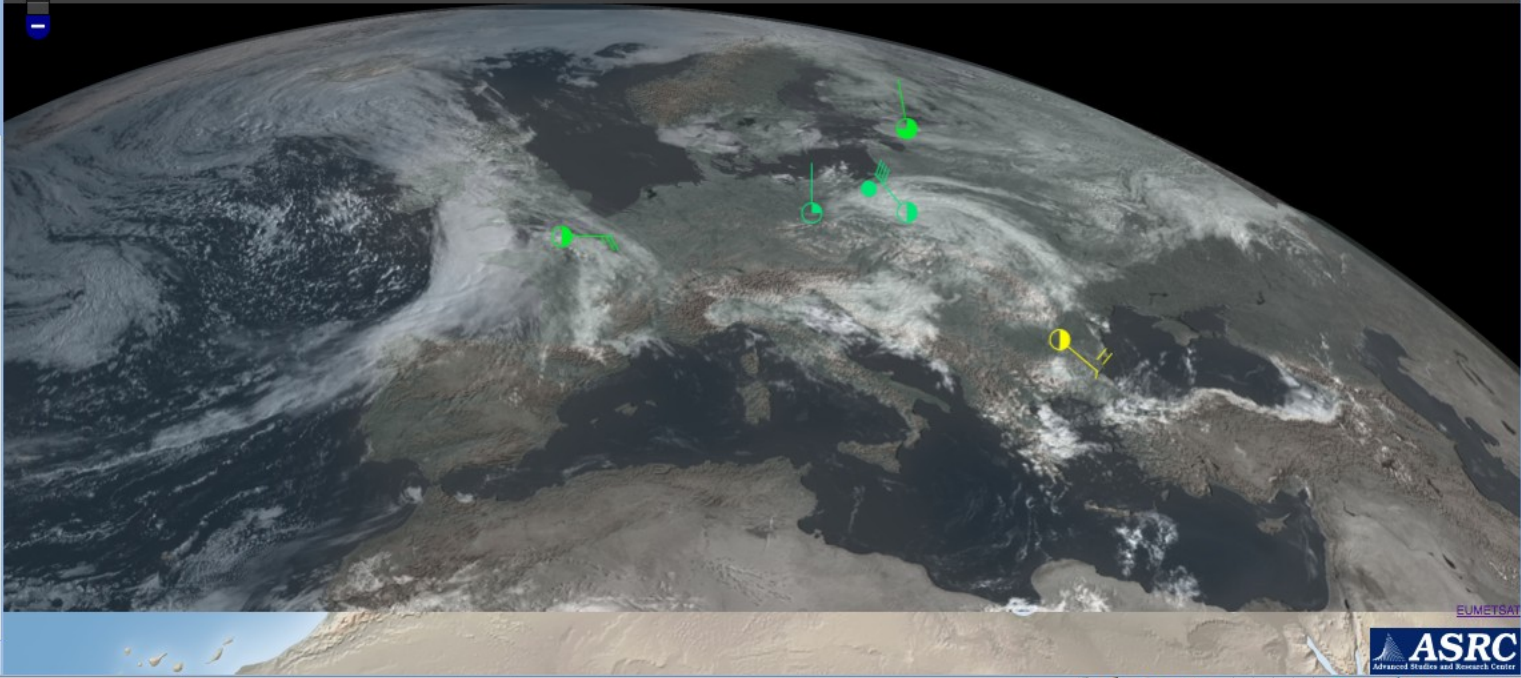
Login to add observations

pick a date

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (today 09:00 AM)
 - Meteorological observations (today)
- METEOSAT
 - VIS 0.6 (06/09/10 09:00)
 - VIS 0.8 (06/09/10 09:00)
 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency:



Done

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WMS

Channels: IR 10.8

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

esa eduspace interactive meteosat

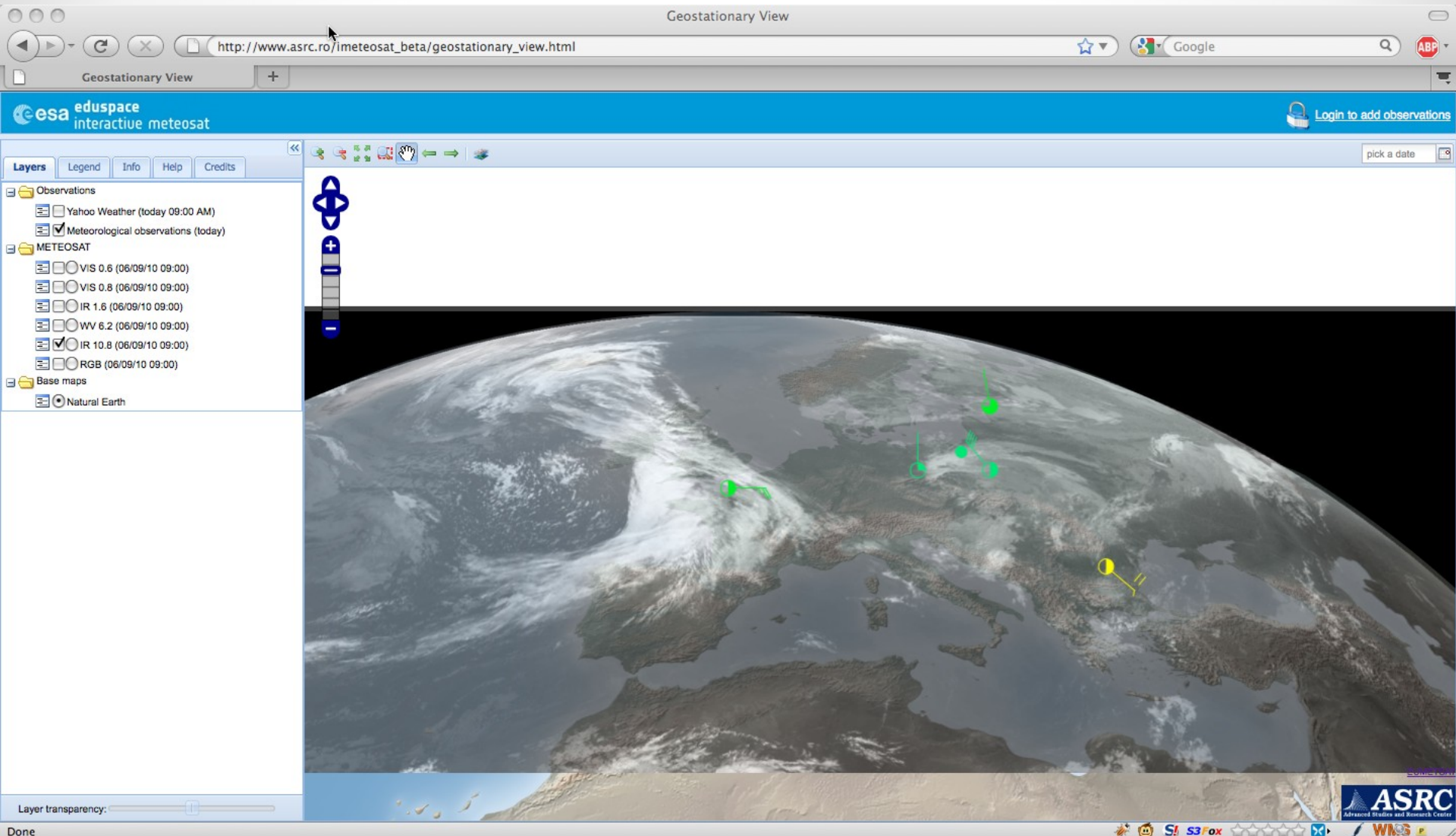
Login to add observations

pick a date

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (today 09:00 AM)
 - Meteorological observations (today)
- METEOSAT
 - VIS 0.6 (06/09/10 09:00)
 - VIS 0.8 (06/09/10 09:00)
 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency: Done



Channels: IR 1.6

Geostationary View

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Google

esa eduspace interactive meteosat

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 - RGB (06/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency: [slider]

Done

ASRC Advanced Studies and Research Center

WMS

Channels: IR 1.6

Geostationary View

http://www.asrc.ro/imeteosat_beta/geostationary_view.html

Google

esa eduspace interactive meteosat

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 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - Natural Earth

Layer transparency:

Done

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Additional obs. sources

Map View

http://www.asrc.ro/imeteosat_beta/map_view.html

Google

Map View

esa eduspace interactive meteosat

Login to add observations

pick a date

Layers Legend Info Help Credits

- Observations
 - Yahoo Weather (today 09:00 AM)
 - Meteorological observations (today)
- METEOSAT
 - VIS 0.6 (06/09/10 09:00)
 - VIS 0.8 (06/09/10 09:00)
 - IR 1.6 (06/09/10 09:00)
 - WV 6.2 (06/09/10 09:00)
 - IR 10.8 (06/09/10 09:00)
 - RGB (06/09/10 09:00)
- Base maps
 - OpenStreetMap
 - Google Map
 - Google Satellite
 - Google Physical

Layer transparency:

Done

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Conclusions

- Linux, Apache, PHP, Python, Wget, Textpattern, MySQL, GDAL, PROJ4, ImageMagick, Inkscape, OpenLayers, ExtJS, GeoExt, Proj4JS.
- Verdict: **Easy, fun, efective.**

Future work

- Integrate GLOBE temperature data
- Add Google Earth support
- Translate the application in all Eduspace official languages
- Eduspace portal

The end

Thanks for your attention.
Questions?

www.asrc.ro/imeteosat_beta/