



OGC Meteorology and Oceanography Domain Working Group progress report

3rd Workshop on the use of GIS/OGC standards in
meteorology

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MODWG Background

- Nov 2008 : 1st GIS-OGC standards in met conference output : need to create a Met Ocean DWG within OGC
- Mar 2009 : MDWG creation within OGC
 - A public email list : <https://lists.opengeospatial.org/mailman/listinfo/meteo.dwg>
 - A twiki : http://external.opengis.org/twiki_public/bin/view/MeteoDWG/WebHome
- Nov 2009 : WMO-OGC MoU signed
- Jun 2009 : Extension Met DWG to Met-Ocean DWG

Works



- Jun 2009-Sept 2009 : Survey to highlight issues around WMS use
- Sept 2009 : 10 issues :
 1. Time handling (12 times)
 2. Bounding Box, Anti-Meridian, poles & Southern Hemisphere, Projections (6 times)
 3. Vertical coordinates (5 times)
 4. Metadata, search and filtering (4 times)
 5. Performance (4 times)
 6. Asynchronous and dynamic delivery (3 times)
 7. Styling (3 times)
 8. Security (2 times)
 9. Integration with other systems, such as WCS, GRIB, OpenDap (2 times)
 10. Cross section description (1 time)

MetOcean DWG working proposal

WMS

1. Time handling
2. Bounding Box, Anti-Meridian, poles and Southern Hemisphere, Projections
3. Vertical coordinates
4. Metadata, search and filtering
5. Asynchronous and dynamic delivery
6. Styling
7. Integration with other systems, such as WCS, GRIB, OpenDap
8. Cross section description (wait WMS 1.4?) *

*Performance a priority in all works, security not specific to Met Ocean communities

WCS, WFS

Models

What ?

How ?

To be defined

Andrew Woolf's
presentation +
Working group

MetOcean DWG works in 2010

WMS

Time handling => DIM Proposals
Metadata, search and filtering
=> got stucked on 3 proposals
Decided to set an I.E.

Styling => Actions towards SLD/SE SWG

Cross section description => Actions towards WMS SWG

Bounding Box, Anti-Meridian, poles and Southern Hemisphere, Projections => Nothing by now

Vertical coordinates => Nothing by now. Is it a real problem?

Asynchronous and dynamic delivery => Support the creation of a PubSub SWG

Integration with other systems, such as WCS, GRIB, OpenDap => observe CF-NetCDF pioneering work

Models

Modelling working group

Works connected to IPET-MDI
and

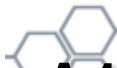
INSPIRE Expert TEAM

INSPIRE methodology

Use Cases

WCS, WFS

Layers granularity issue-3 Proposals



- **A1. Single layer for all runs :**

WMS Layer represents particular parameter (e.g. Temperature, Pressure, ...) while RUNs, OFFSETs (and TIMEs) are listed in GetCapabilities as WMS dimensions

- **A2. Separate runs into layers or services :**

Model RUN is represented as *separate layer* OR as a dedicated *service endpoint*.

Available forecast validity TIMEs are listed in GetCapabilities.

- **A3. Separate runs into layer hierarchy/**

- Using WMS layer tree to “group” same parameters:

- Parent layer provides Best Run selection with TIME dimension
- Child layers represent different RUNs listing corresponding available forecast TIMEs

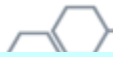
The I.E. definition



- Call for participants
 - http://external.opengeospatial.org/twiki_public/bin/view/MetOceanDWG/MetocWMS_1stIE_Volunteerings
- 1st I.E focussed on time issues
 - Run,
 - Offset
 - Accumulation period
 - Defaults
- Use cases : 2 families :
 - Defined by on duty forecasters for met professional users
 - Defined by non meteorologists for decision makers
- Available on the twiki at http://external.opengeospatial.org/twiki_public/bin/view/MetOceanDWG/MDWG_WMS_1stIE_UseCases
- Initial plans to make it before the summer but some delays ...

1st family of Use cases : Met Ocean

Professional users

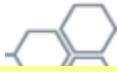


A forecaster at a NWS and an analyst at ECMWF are observing and analysing a weather feature and trying to predict its future developments. They want to compare its development between different model runs and look at ensemble outputs. The aim is to see how forecasters can easily use maps of other NWP forecasts to improve their ability to access a meteorological situation. Ideally I would add that the ECMWF and NWS analysts should be easily be able to exchange the maps they are looking at!

- **This UC should test** time dimensions, security : is here a limited factor since we have "trusted" channels?
- **Encourage a broader community**
- **Challenges for the IE:**
 - How to define "different model runs"
 - How to generate "ensemble outputs"
 - How to serve the models via WMS

2nd family of Use cases : Decision makers

Obtaining forecasts



Several government agencies are observing a disaster zone (like Haiti). They have to plan relief from air, sea and by road. They have maps of roads, storage facilities, hospitals, etc and would like to overlay these with forecasts to make decisions to co-ordinate the relief (like the average/accumulated rainfall). The aim is to see how well NWS can provide forecasts reliable&fast to be used in standard OGC clients.

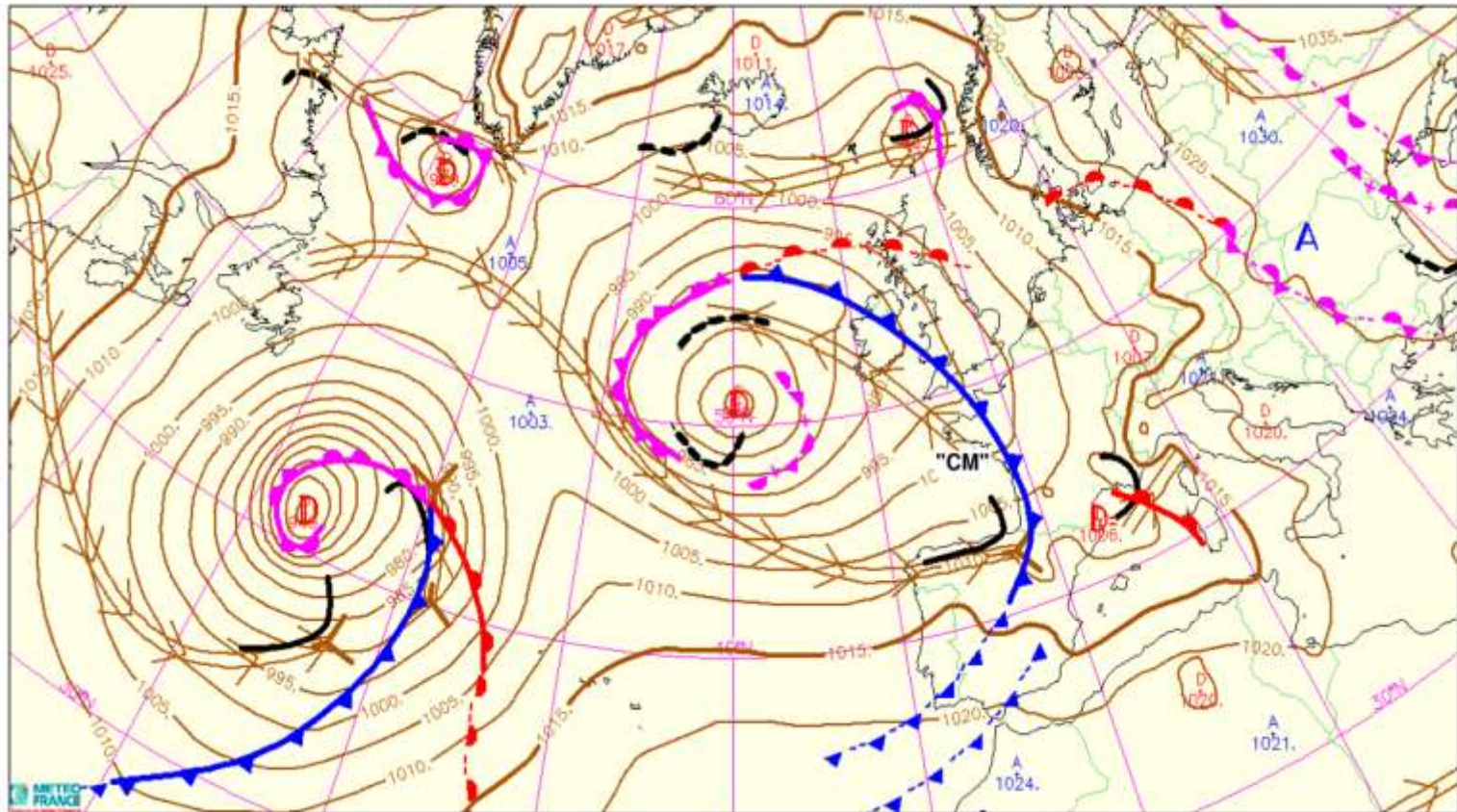
This UC should test: our servers only, security being a big issue, meteorological specific clients would only be consider if very thin - more likely they would be standard OGC clients (such as ESRI)

- This use case can be used to make a business case of using OGC standards
- ...
- **Challenges for the IE:**
 - How to define different "forecasts"
 - Define good default values

1st Use case detailed scenario :

Forecaster task : build a ANASYG/PRESYG

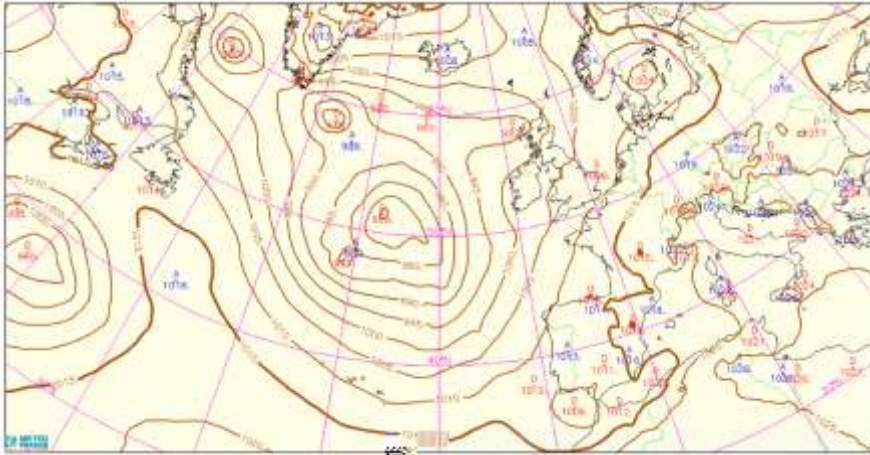
PRESYG, Réseau: 04/02/2010 00:00 Ech: 24 Pour le ven 05/02/2010 00:00



Step 1 :Checking the good calibration of the model = good localisation of the significant meteorological patterns

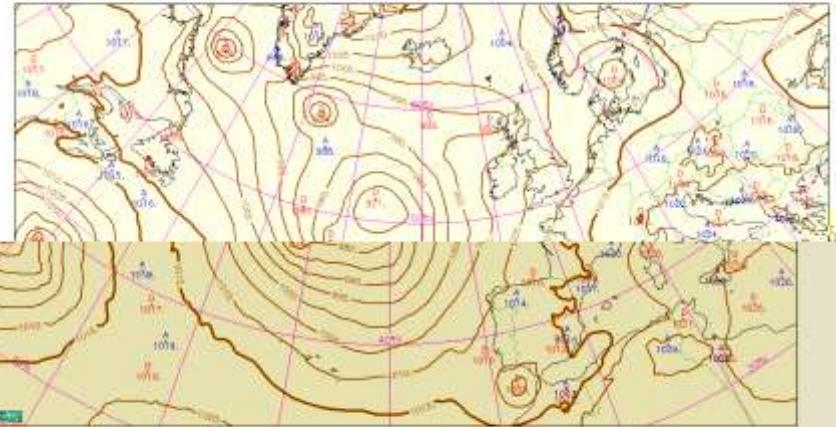


Pour jeu 04 00UTC Pmer SOL Ech00H ARP0.5 04-02-10 00UTC



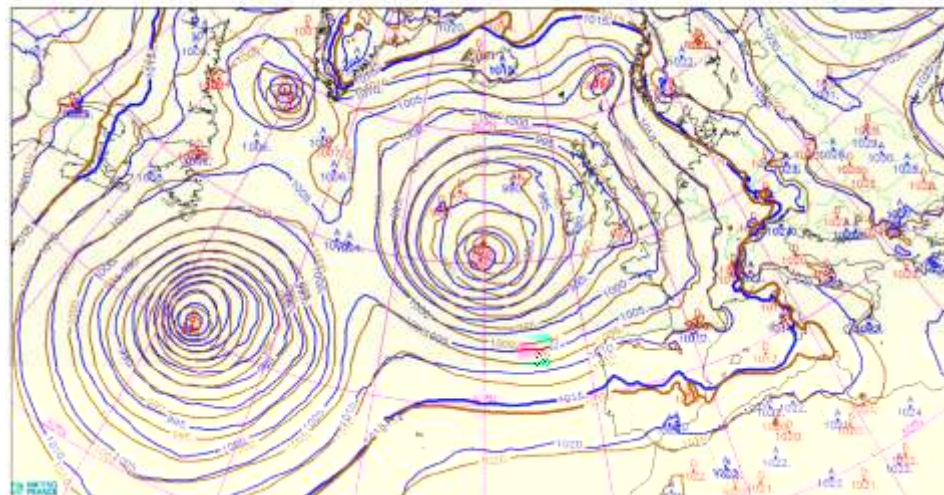
French ARPEGE Numerical Model Mean sea Level Pressure
Analysis (offset 00h) Run of 00H Valid for Thursday 4th February 2010

Pour jeu 04 00UTC Pmer SOL Ech00H CEP0.5 04-02-10 00UTC



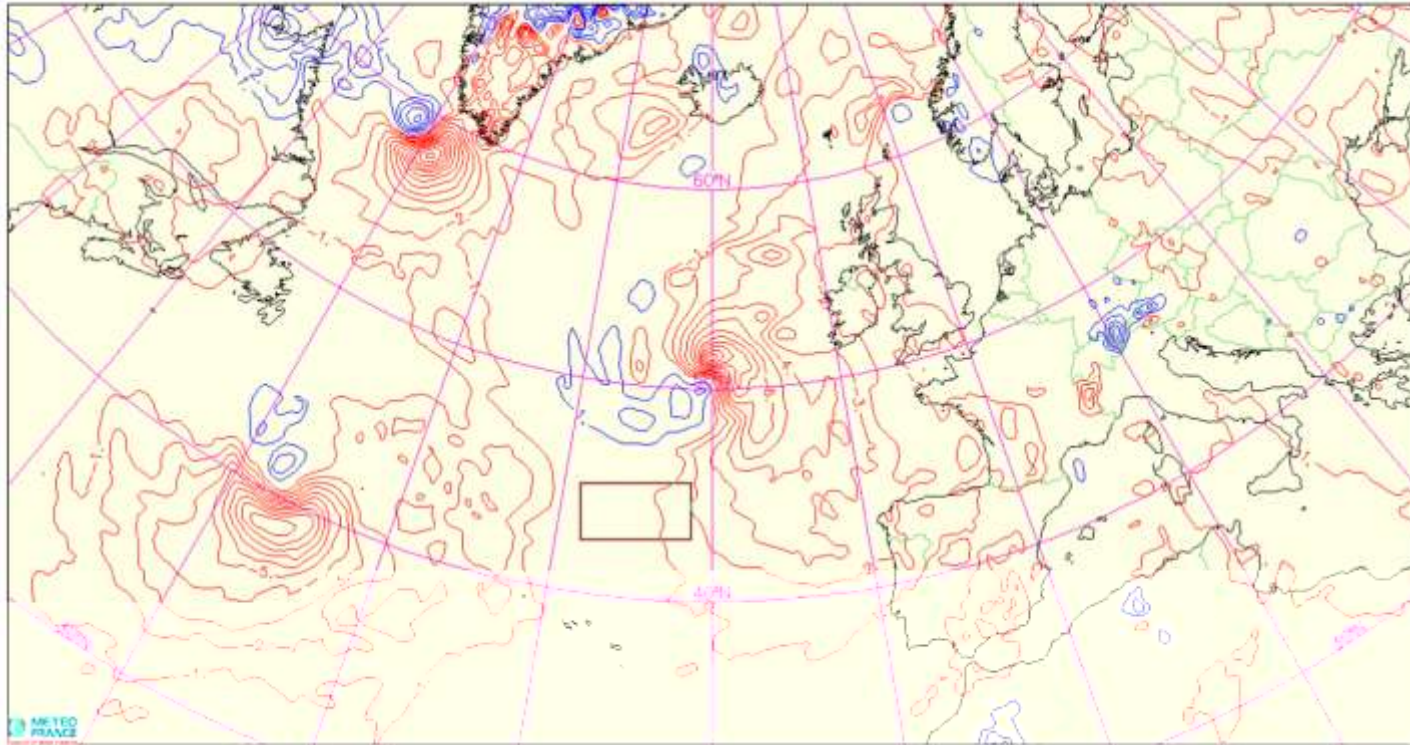
ECMWF Numerical Model Mean sea Level Pressure
Analysis (offset 00h) Run of 00H Valid for Thursday 4th February 2010

Pour ven 05 00UTC Pmer SOL Ech24H ARP0.5 04-02-10 00UTC



...Could be extended later to WCS I.E.

Pour ven 05 00UTC Pmer SOL Ech24H ARP0.5 04/02/10 00UTC



Difference between ARPEGE and ECMWF Numerical Model Mean sea Level Pressure fields
Analysis (offset 00h) Run of 00H Valid for Thursday 4th February 2010

- Step 2: Check of model calibration at surface level
= comparison of forecasted and observed precipitations

Comparison of the observed water wave and accumulated precipitations available at the first time step of the model (ground level)

Remark : The Total precipitations field is not available at FORECAST_OFFSET= 0H so it has to be made at the first FORECAST_OFFSET(here = 1H). If the step of the model is > 1hour, all combination has to be made on the same duration (i.e. if step = 3hours, water wave has to be over 3hours)

- Step 3: Check of modele calibration in altitude = comparison of watervapor satellite image and the altitude of the 2PVU from the numerical model

▪

- Cecile visualizes the Water vapor from Meteosat at 12 UTC. She overlays the field of geopotential on the 2.0 level expressed in PVU (Potential Vorticity Unit) at 12 UTC. She then checks if the dark areas of the image fit to the area of strong gradient.

- Step 4: Check of modele calibration in altitude =comparison of the infrared satellite image and the Humidity field at 850 hPa from the numerical model

- Cecile visualizes the infrared from Meteosat at 12 UTC. She overlays the field of Humidity at 850 hPa at 12 UTC. She then checks if the white areas of the image fit to the area where the humidity is over 90% (thicker isoline from the Humidity field)

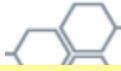


Challenges for the I.E.

- How to represent Mean Sea Level Pressure (SLD does not do isolines, so would need to be extended, but that work is ongoing)
- How to browse the time dimensions
- How to request "Mean sea level pressure"
- How to define an accumulation duration
- How to combine observations and forecast
- How to select a vertical level in pressure

can be later extended to let forecaster workstation requesting related data through WCS and exchange meteorological objects (in GML/CSML) between workstations ...

2nd detailed use case scenario : decision makers



No detailed scenario by now

Should be defined by a non meteorologist.

Tested via a client not designed to handle specifically
Met Ocean Data

EGOWS preparatory testings



- EGOWS (European Group on Meteorological Workstations) is a working Group that gathers once a year developers and users of meteorological systems mainly for forecasters or production. Created in 1989, this group was originally European but it welcomes regularly participants from outside Europe (Canada, Australia or China...).
- During the last workshop (01-04 June 2010) at ECMWF a session of 2 or 3 hours was dedicated to connect various clients and servers for an interoperability test on the 03 of June afternoon. No specific use case was provided.
- These are the conclusion of this trials :

Participants



- ECMWF
- DWD
- IBL
- Met.no
- University of Reading
- KNMI



Available systems

Servers :

- ECMWF 1.1.1
- IBL 1.1.0, 1.1.1, 1.3.0
- Met.no1.1.1
- ncWMS(Reading University)
1.1.1, 1.3.0
- BADC 1.1.1, 1.3.0
- KNMI Adaguc1.1.1
- NOAA 1.1.1
- Nexrad 1.1.1

Clients :

- Metview all
- Visual Weather (+ web client
–flex based) all
- Ninjo(+ web) 1.1.1
- BADC web 1.3.0
- KNMI web client 1.1.1

Issues to look out for



- Versions different between Servers and Clients:
- Different projections offered/used :
- Ratio of image should not be changed by server:
- Forming correct URLs....:
- How to handle no Time given for models:
- Interpretation of the getCapabilities:
- Time: getCapabilities versus client time:
- Update Notification of the getCapabilities documents:
- Automatic generation of user interfaces on the client side:
- Animation on clients:

Conclusions Of EGOWS testings

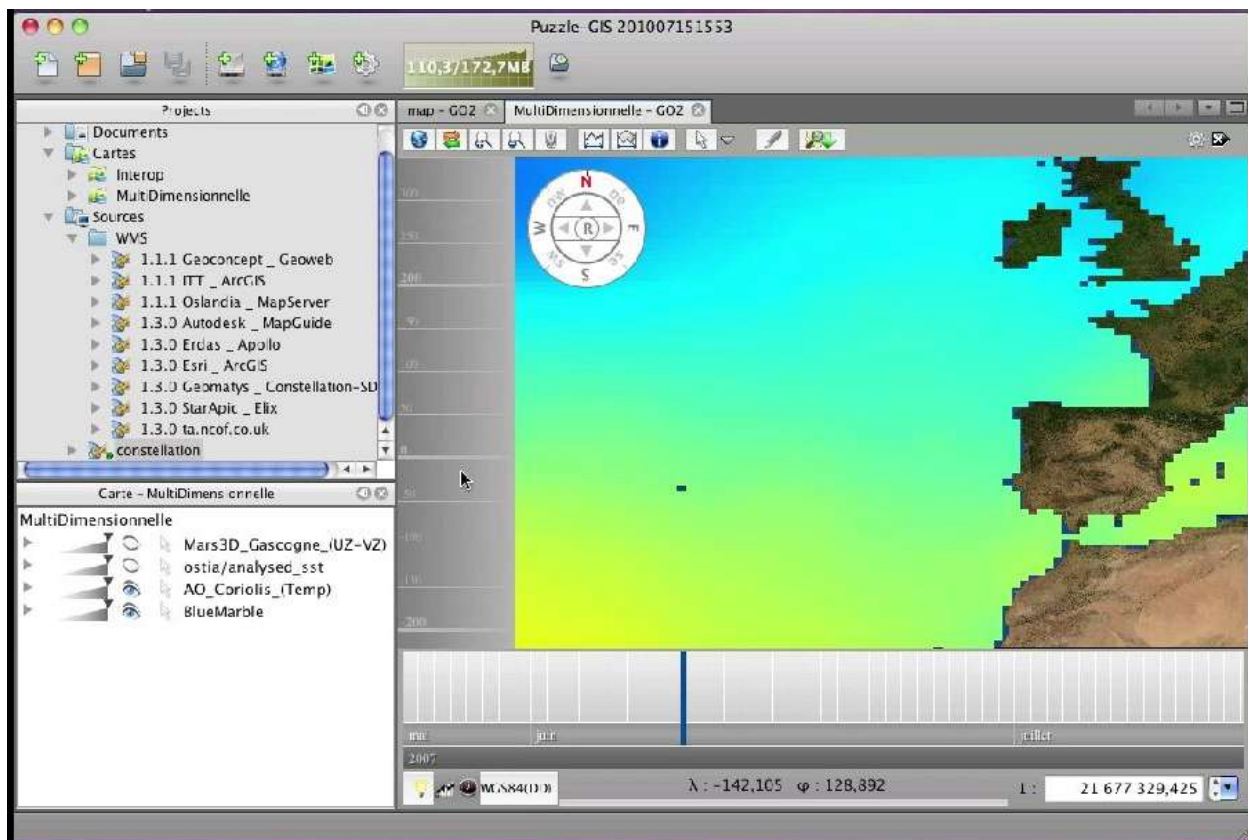


- Many combination worked, spontaneously
- Need more testing with 'general purpose' GIS clients
- Recording of results:
- Post Snapshots and text on MetOcean? Wiki
http://external.opengeospatial.org/twiki_public/bin/view/MetOceanDWG/MetocWMS_IE_Implementations
- Twiki link to Egows tests conclusions :
http://external.opengeospatial.org/twiki_public/bin/view/MetOceanDWG/MetocWMS_EGOWS_WMS_IE_Retex_June2009:

Geomatys testings for Interop testing of the French OGC Forum



- Puzzle-GIS based on Geotoolkit.org
- <http://baobab.geomatys.com/files/interop.mov>
- Ostia/analysed_sst NCWMS service provided by NERC



WMS metadata issue : How to serve extra Metadata about WMS Layers and maps?



1. Use a non-standard WMS operation (e.g. GetMapInfo), described in the ExtendedCapabilities? section of the WMS Capabilities document.
2. Use image types that can support metadata headers, e.g. GeoTIFF?
3. Allow GetMap to return metadata (as XML) instead of an image.
4. Use multipart return types, e.g. return a zip or KMZ file containing both the image and the metadata
5. Use HTTP headers in the response to return the information
6. Use a new Layer to store the metadata for a particular Layer

BUT

Headers could be lost by proxy servers

Caches can also affect the HTTP header information elsewhere in the WMS spec

Should be discussed
with WMS SWG
members

SLD/SE : One Twiki page for each specific visualisation case

Example :

http://external.opengeospatial.org/twiki_public/bin/view/MetOceanDWG/GriddedDataWindBarbVisualization

- **Wind Barb Visualization of Gridded Data with Continuous Value Range**
- **Visualization Goal**
- **External Regulations or Conventions**
- **Support in the SE**
- **Example Data**
- **SLD/SE visualization examples**

Still to be documented by Met Ocean services

Interoperability Experiments



- Interoperability experiments can be set up and lead to contributions into the discussions, identification of new issues, or retex around performances
- Volunteers:
http://external.opengis.org/twiki_public/bin/view/MeteoDWG/MetocWMS_IE_Volunteerings
- Environment Canada, Servei Meteorològic de Catalunya (SMC), DWD, Met Office, FMI, Météo-France, NOAA NGDC, Australian Bureau of Meteorology, University of Reading UK, Plymouth Marine Laboratory UK, MeteoGalicia, Magellium

A « reasonable » aim for the WMS and I.E. WG?



What should be into the WMS Met Ocean Applications Best Profile

- Improve the I.E. Use Cases and testings to be done to validate the proposals of content for the best Profile
- Involve more people, more servers, more clients into the I.E.
- Define a roadmap or a procedure

MODWG DRIVER

What is a broader concern

- Identify our specificities around these issues
- Define the activities needed to push our specificities into the OGC SWG
- Organise a reporting and contribute to I.E.s

MODWG ACTIVE