

# Report of the working group on meteorological visualisation applications

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## Output formats as they relate to meteorological plots

Moderator: Stephan Siemen

- **On-screen graphics formats were discussed.**
  - Care must be taken with lossy formats such as JPEG and MPEG.
  - Apart from GIF and PNG, TIFF is also used for publication-quality plots. A georeferenced raster format, GeoTIFF, is becoming better supported.
- **Graphics formats for printing and documents were discussed.**
  - PostScript and PDF still dominate, but PDF is popular on Windows platforms because of lack of default PostScript support there.
  - Newspapers prefer Encapsulated PostScript (EPS) files which are also popular in the research community. It can be a good idea to produce files directly for the printing house so that the newspaper cannot inadvertently degrade the image quality.

## Output formats as they relate to meteorological plots

- **Graphics formats for printing and documents (continued...)**

- **The Windows Metafile (WMF) format has been used in order to support Chinese characters. This is being superseded by Microsoft's new EMF format.**
- **It was noted that some firms are now requiring data in OpenDocument format as this is not tied to one software vendor.**

- **Interactive graphics formats were discussed.**

- **SVG has been considered for, and even used in, some visualisation packages. However, its limitations and lack of support and development have made it less attractive.**

## Output formats as they relate to meteorological plots

### ● Interactive graphics formats (continued...)

- Flash was suggested, as it is well supported and installed on most web browsers. However, Flash is not necessarily suitable for high-quality images.
- Google Maps shows what can be done on the web without using a desktop package or seeing actual files. This application illustrates the power of available web technologies such as AJAX, loading a large raster image piece by piece as needed; vector graphics can be overlaid. This approach works well with all browsers. Panning, zooming and toggling of layers, for example, are possible. It is also possible to retrieve the geographical coordinates of a point selected by the user and load relevant data on demand.
- These features were noted as the main interests of interactive plots.

## Formats suitable for interfacing with GIS

Moderator: Stephan Siemen

### ● **Geographical Information Systems (GIS) were discussed.**

- **GIS systems store various kinds of georeferenced data and are used primarily by end users, not meteorologists.**
- **Most GIS software cannot import data in the standard meteorological data formats. Data can be converted to a GIS format, but reprojecting gridded data onto a rectangular grid can degrade the quality.**
- **Better solution is to import GIS data into meteorological visualisation software. Information that might be imported includes locations and names of cities, roads, railways and also population figures.**
- **The Shapefile format is popular and well-supported, but is proprietary (ESRI). GML and CSML are examples of XML-based formats which may come to dominate.**

## Formats suitable for interfacing with GIS

- **Geographical Information Systems (continued...)**
  - **One problem with GIS data is a lack of standardisation with no central repository, making local changes (e.g. country borders) slow to propagate.**

## Use of XML to describe a visualisation task

Moderator: Sylvie Lamy-Thepaut

### ● Use of XML to describe a **visualisation** task

- XML is text-based and easy to read/write by humans and computers.
- One advantage of XML formats is that validation tools exist and can be used as long as a proper schema is defined.
- XML-based files can become very large; defining a separate schema for each dataset can help reduce the file size.
- Attribute-based XML can be easier for humans to read, but harder to validate as it is less structured.

## Use of XML to describe a visualisation task

### ● Use of XML to describe a **visualisation** task (continued...)

- Different organisations have used different XML-based formats.
- GML was tentatively advocated as a way of encoding metadata.
- GML can encode geospatial vector data, but raster data is generally described with a reference to an external file.
- WMO is investigating standards for describing meteorological data in XML – could this lead to widely-adopted standards? This issue will be examined by appropriate WMO expert teams.