Introduction to Metview

Computer User Training Course 2016

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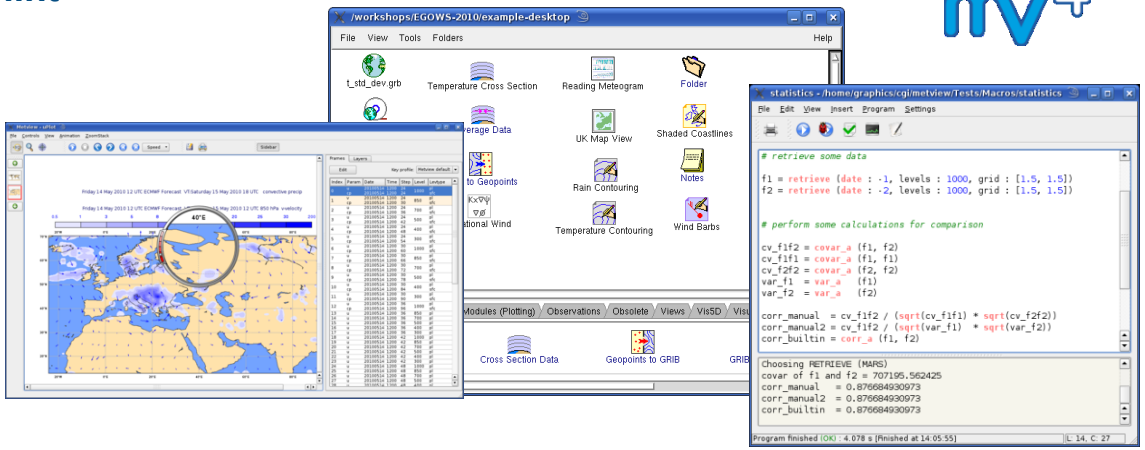
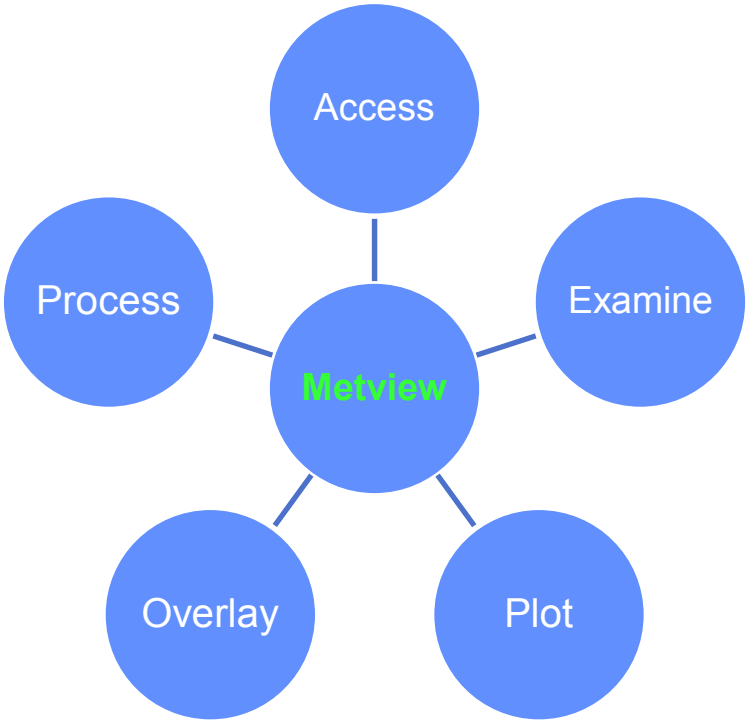
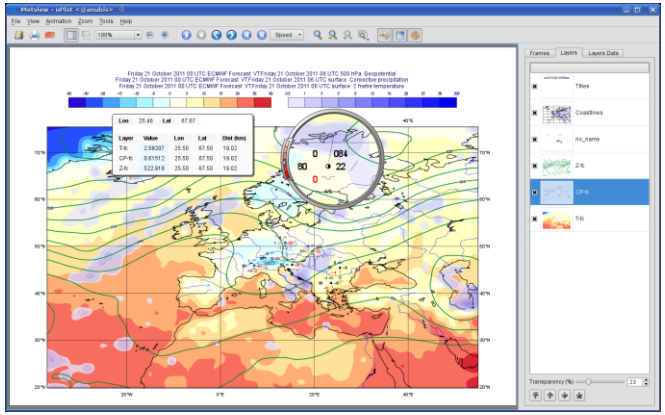
Development Section

metview@ecmwf.int



What is Metview?





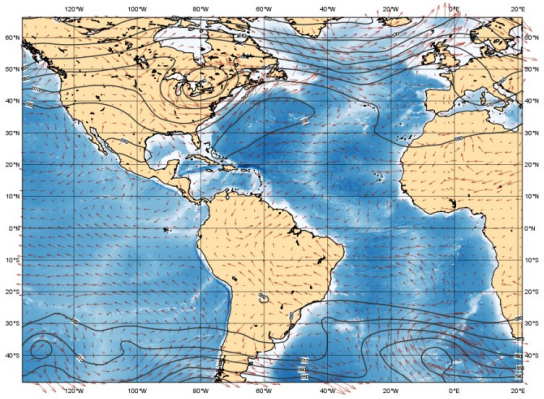
- **Working environment for operational and research meteorologists**
- **Allows analysts and researchers to easily build products interactively and run them in batch mode**

What is Metview?

Built on core ECMWF technologies:

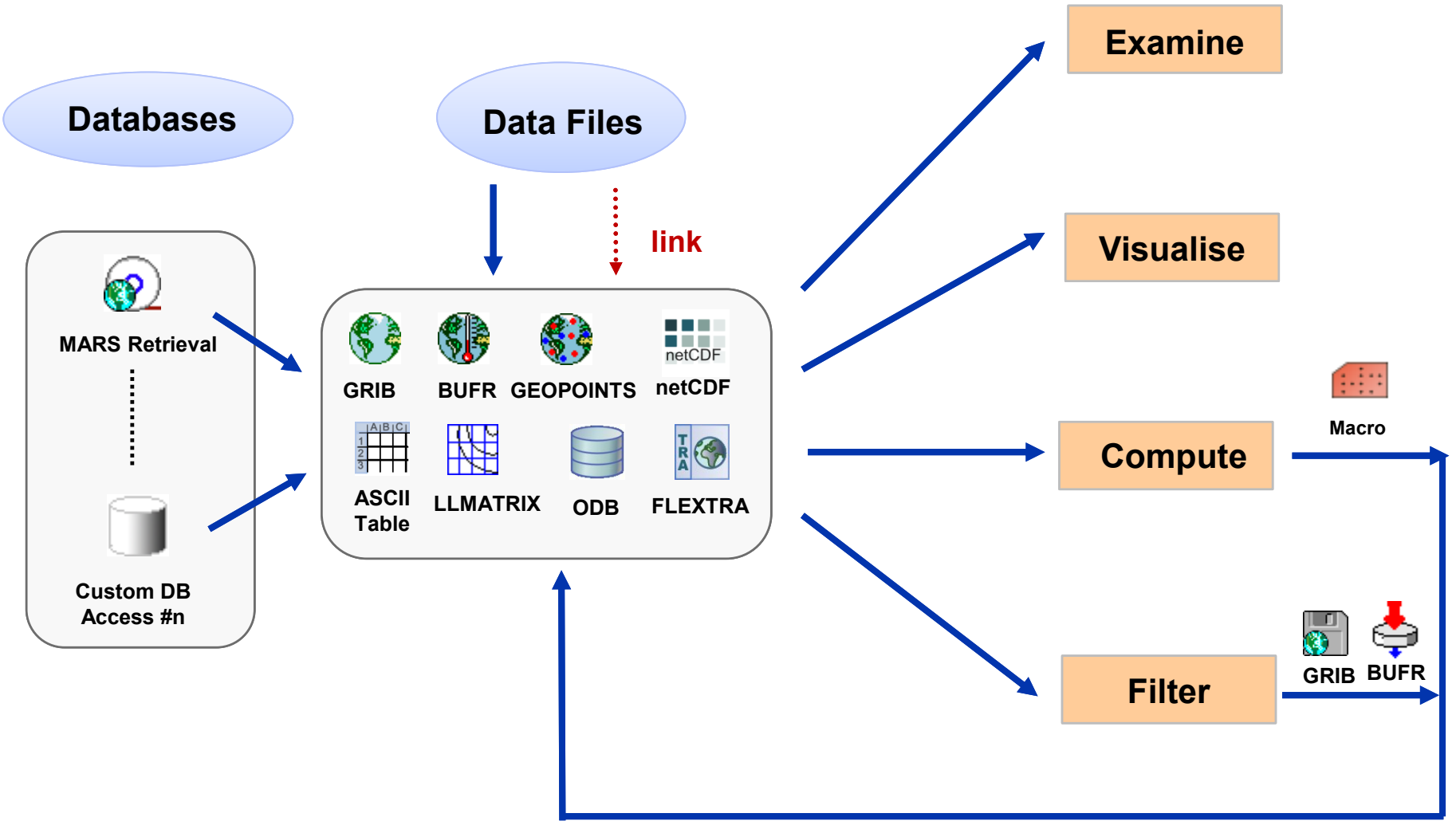
MARS, GRIB_API, Magics, ODB, Emoslib

(* ecCodes, MIR)



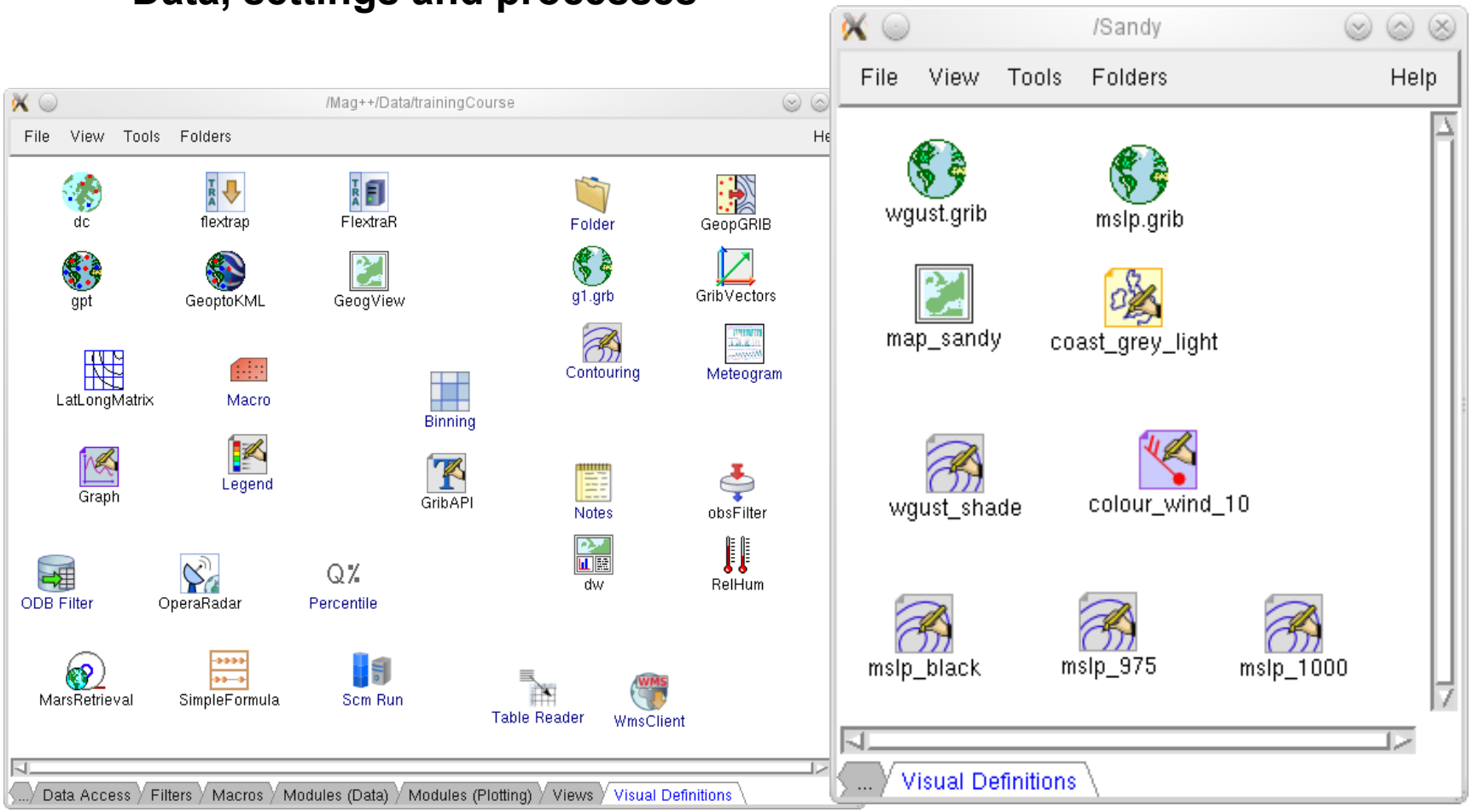
- **Can be easily installed and runs self-contained standalone**
  - **From laptops to supercomputers**
  - **No special data servers required (but can be easily connected to MARS or local databases)**
- **Open Source under Apache Licence 2.0**
- **Metview is a co-operation project with INPE (Brazil)**

Data handling in Metview



Icon-based interface

- **Everything is represented by an icon**
  - **Data, settings and processes**

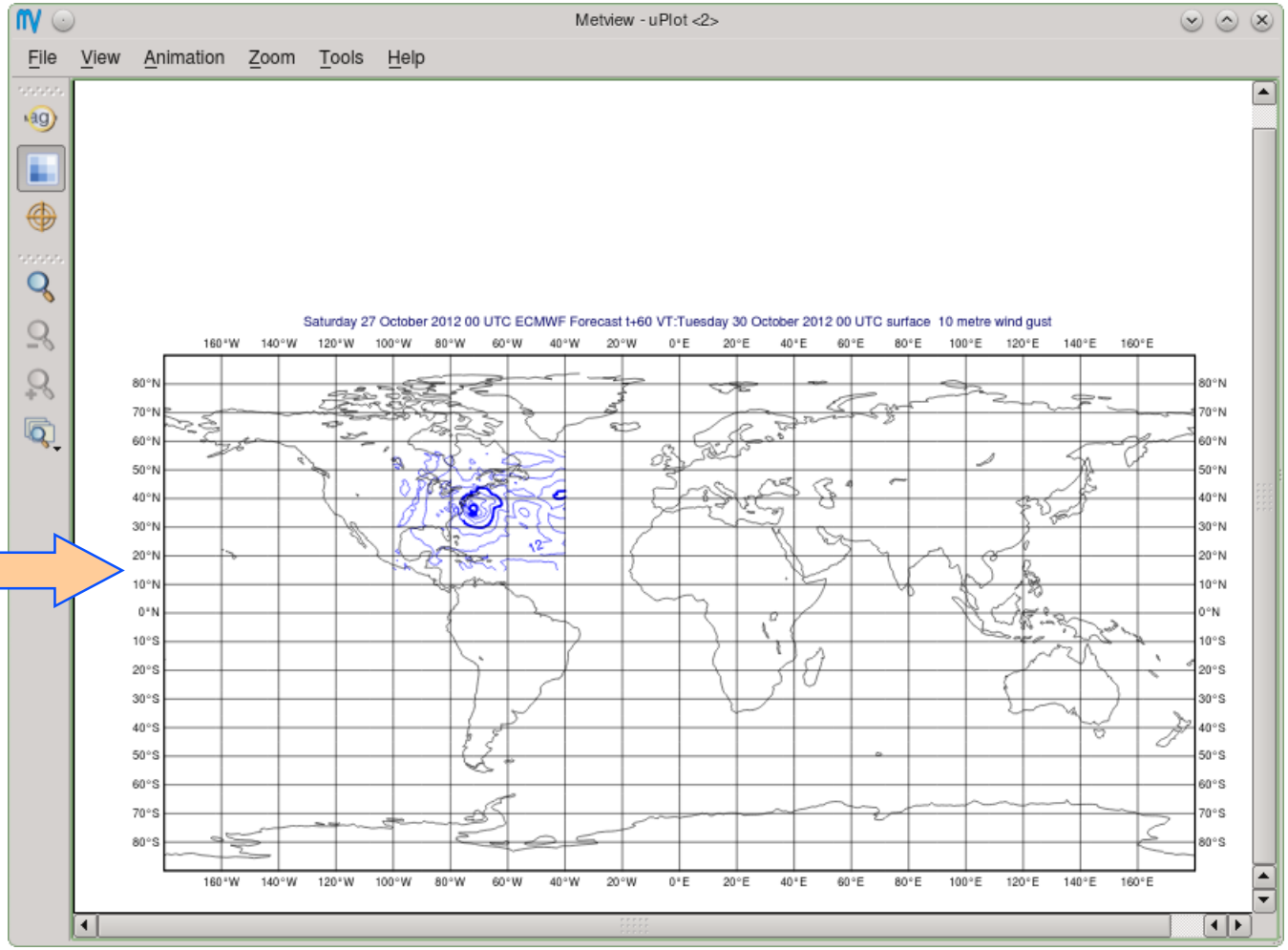


Visualisation

GRIB file

wgust.grib

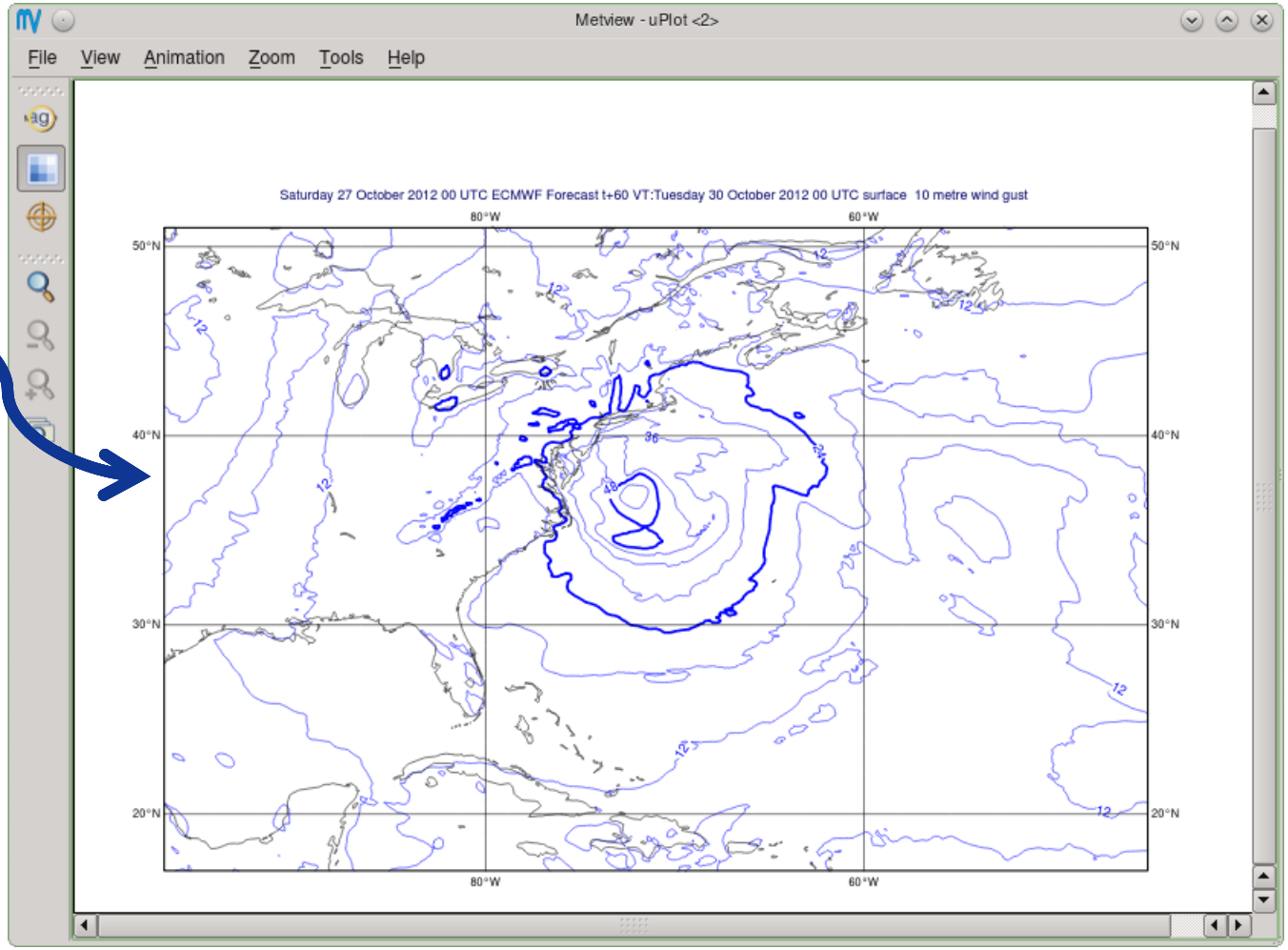
- execute
- **visualise**
- examine
- save
- analyse
- edit
- duplicate
- delete
- empty
- output



Drag and Drop

Map view

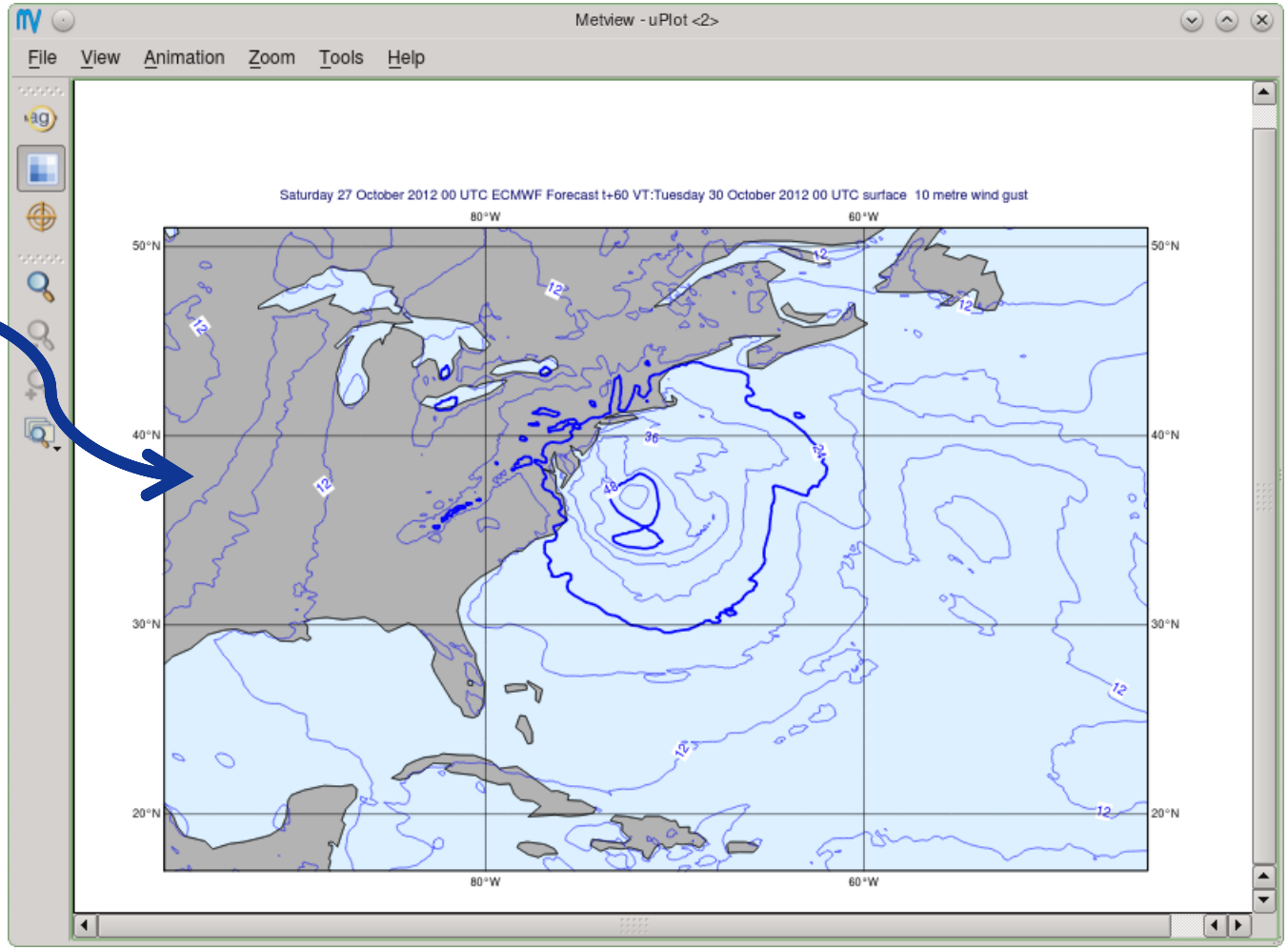
map_sandy



Drag and Drop

Coastlines

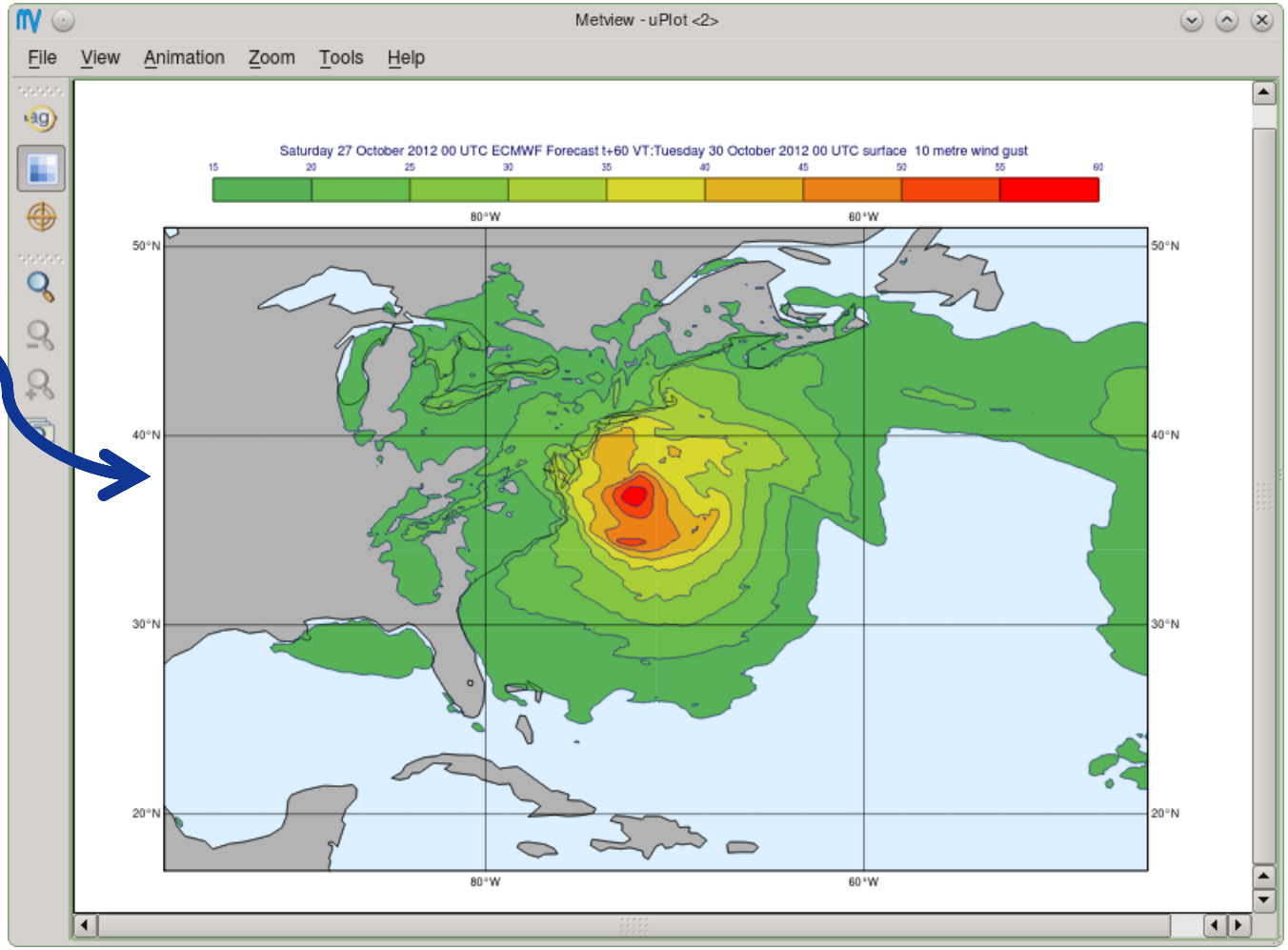
coast_grey_light



Drag and Drop

Contour shading

wgust_shade

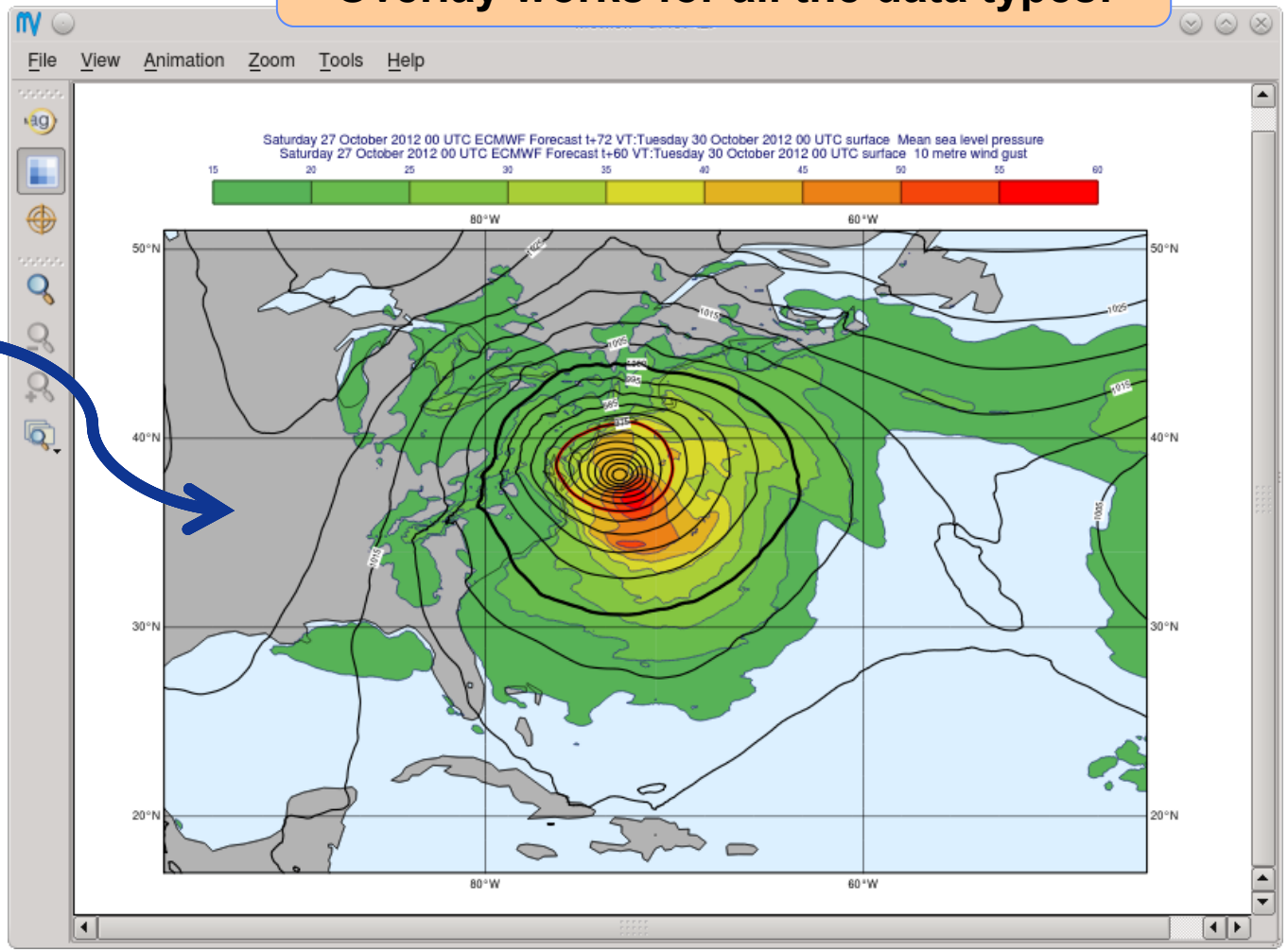


Drag and Drop - Overlay

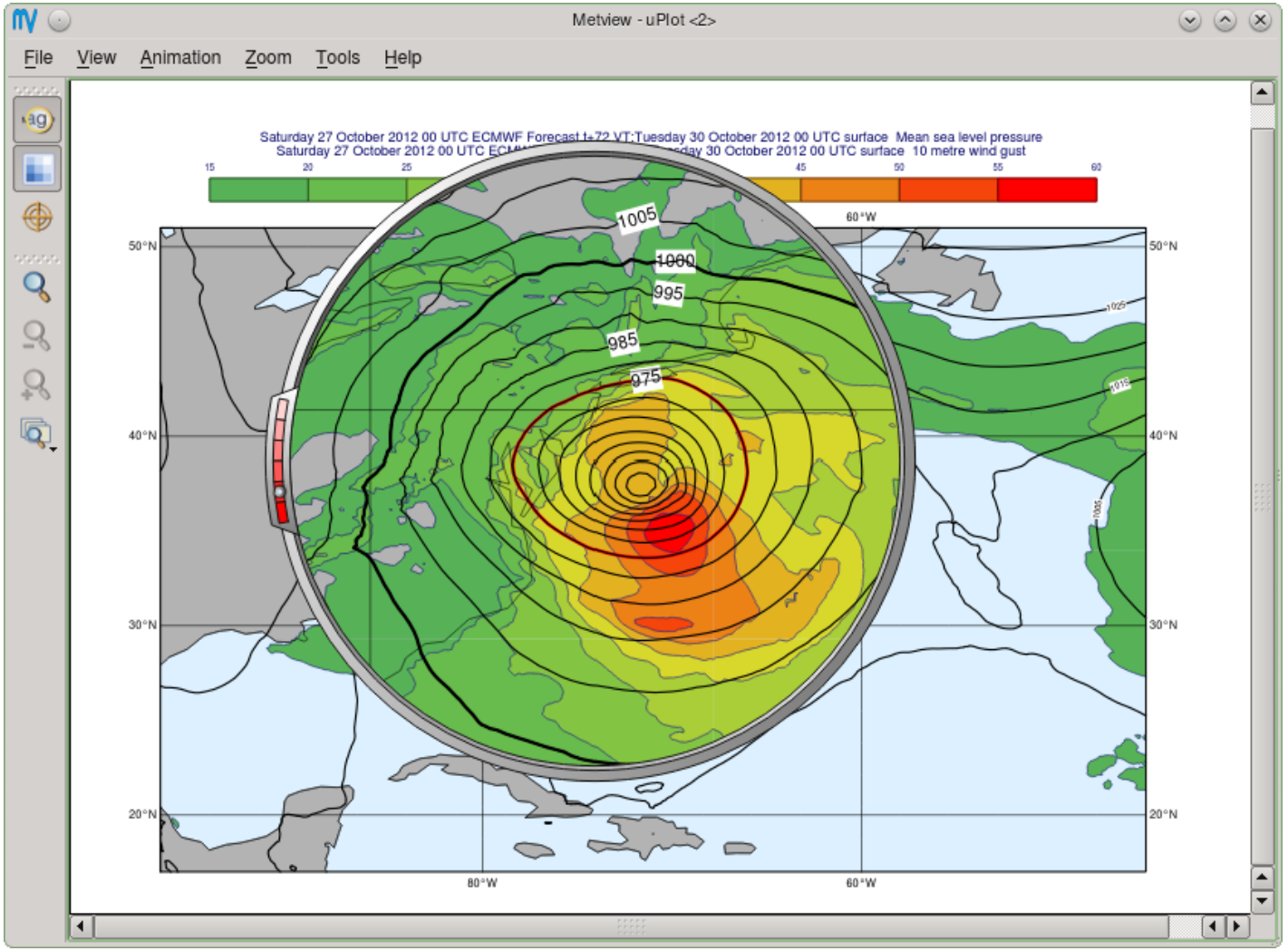
Overlay works for all the data types!

MSLP (GRIB)

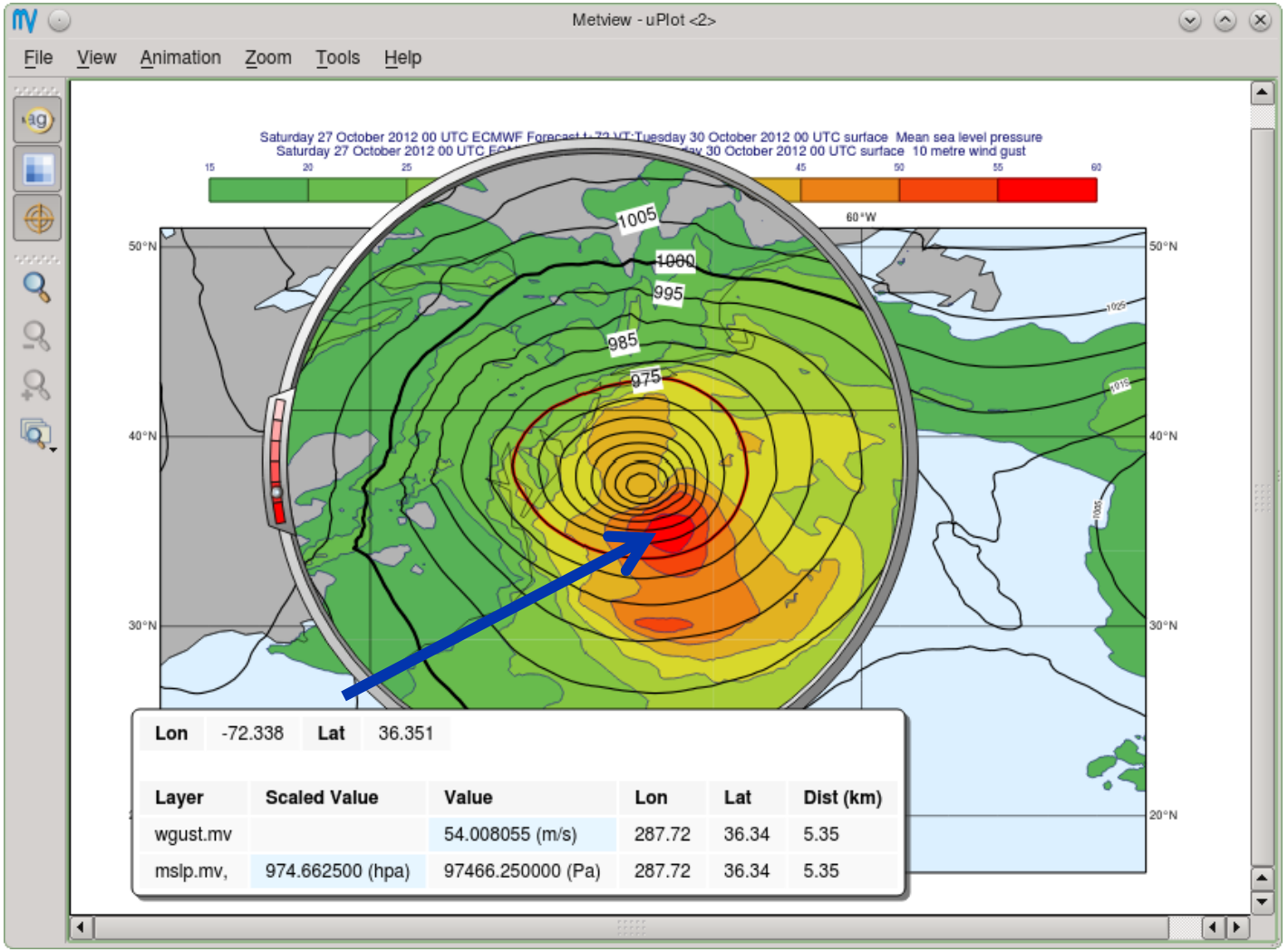
Contouring



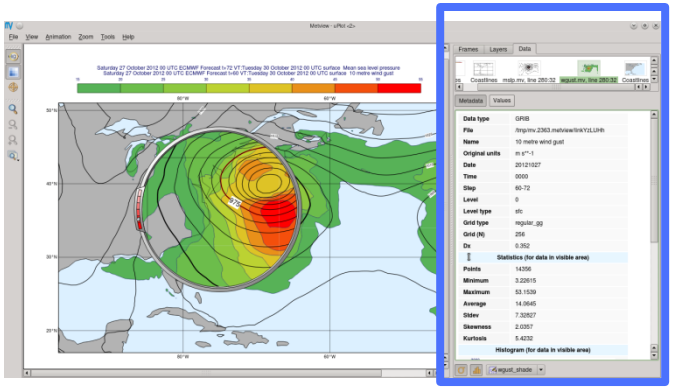
Display Window - Magnifier



Display Window - Cursor Data



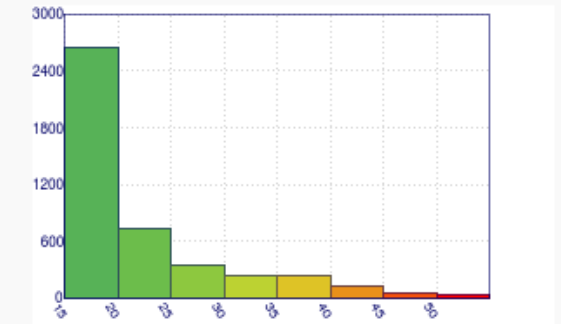
Display Window - Layer Metadata



Sidebar with various tabs

Data type	GRIB
File	/tmp/mv.2363.metview/linkYzLUHh
Name	10 metre wind gust
Original units	m s**-1
Date	20121027
Time	0000
Step	60-72
Level	0
Level type	sfc
Grid type	regular_gg
Grid (N)	256
Dx	0.352
Statistics (for data	
Points	14356
Minimum	3.22615
Maximum	53.1539
Average	14.0645
Stdev	7.32827
Skewness	2.0357
Kurtosis	5.4232
Histogram (for data in visible area)	

Histogram (for data in visible area)



Bar	From	To	Count
	15	20	2638
	20	25	739
	25	30	355
	30	35	240
	35	40	245
	40	45	123
	45	50	62
	50	55	34

wgust_shade

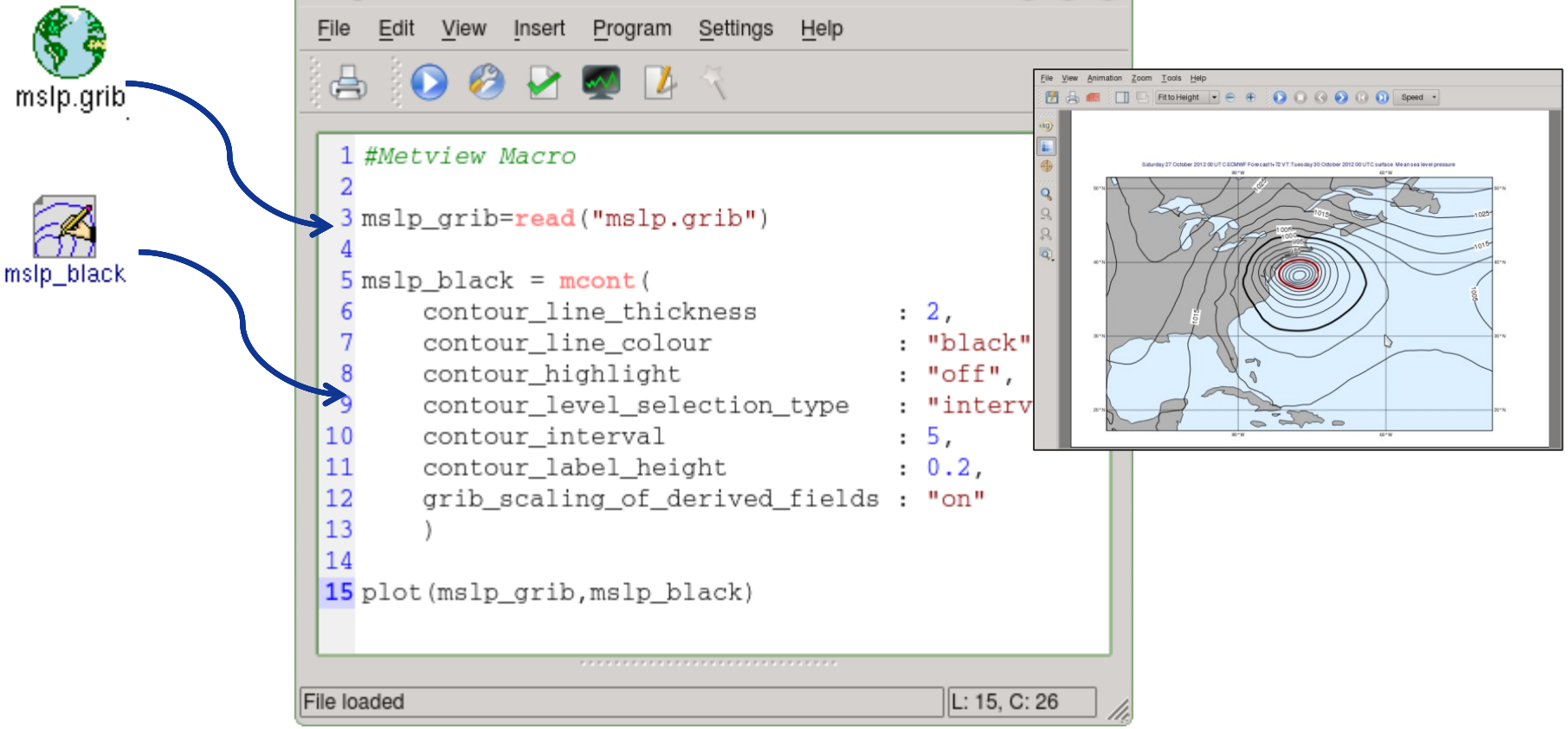
Macro language

- **Powerful high-level meteorologically oriented script language**
- **All Metview tasks can be written or saved as macros, and run in batch or interactive modes**
- **Interfaces with Fortran/C/C++ code**
- **Outputs:**
  - **derived data**
  - **interactive plotting window**
  - **graphics formats (e.g. PS, PNG, SVG, KML, PDF)**
- **Metview provides different ways to automatically generate Macro code**

```
# Read a grib file
temp = read ( "/home/graphics/temp.grb" )

# Re-scaling field
if  threshold > 0  then
     temp = temp – 100
     a = integrate ( temp )
end if

# Compute the gradient
q = gradientb ( temp )

# Save field
write ( "/home/graphics/gradient.grb" , q )

# Plot field
plot ( [ps,svg], q )
```

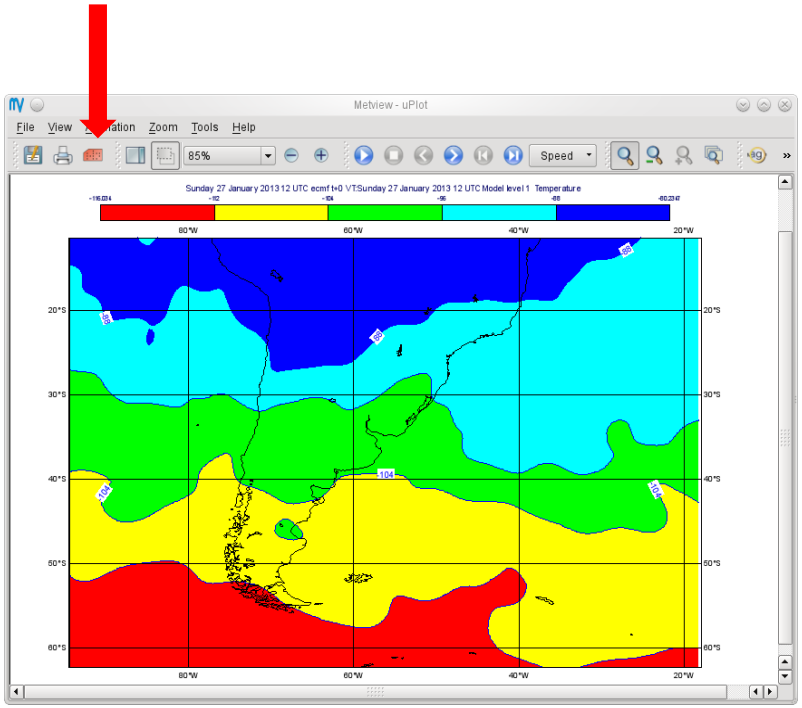
Strong synergy between Icons & Macros

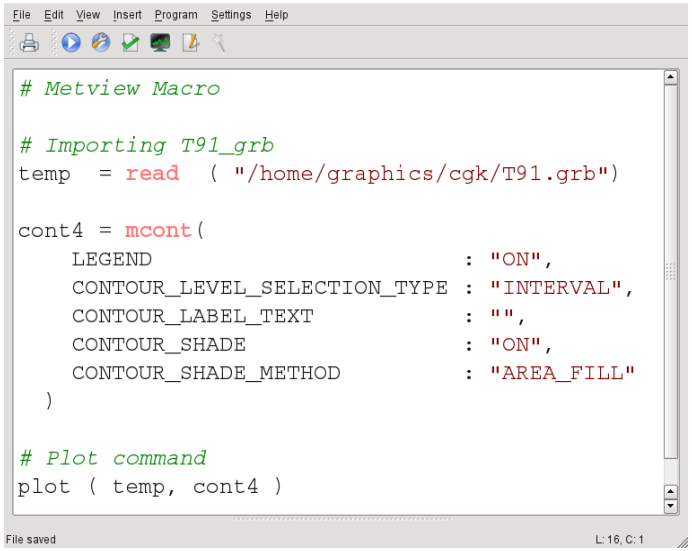
- **Every icon can be translated into a Macro command**



Strong synergy between Icons & Macros

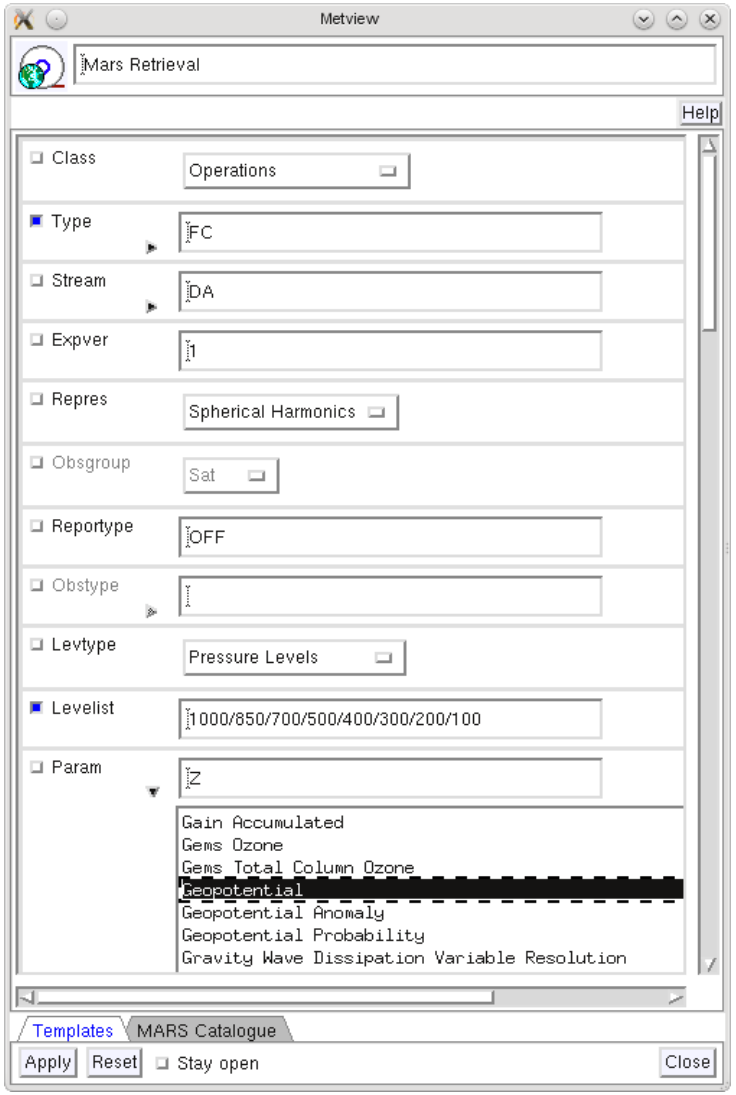
- **Plots can be translated into a Macro program**





Metview and MARS

- **Metview incorporates a MARS client module**
  - **Built from same source code**
  - **All processing options are available**
  - **Direct access to local MARS archive, or through the Web API for external access**
- **All MARS parameters can be accessed**
- **Metview caches retrieved data**
- **Metview can examine, visualise and process any data formats in MARS**

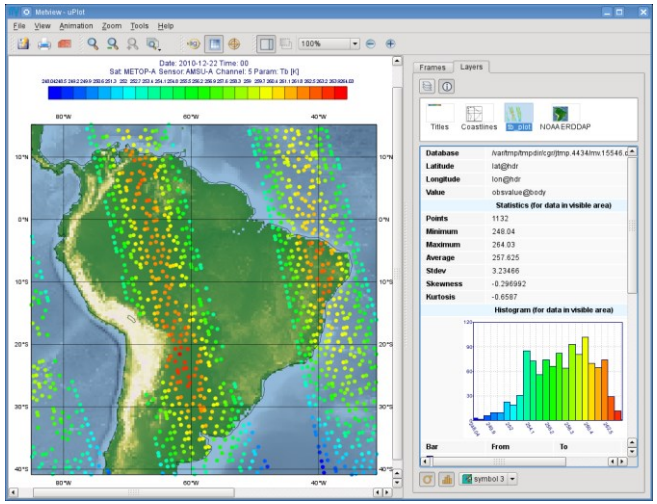


Examining data

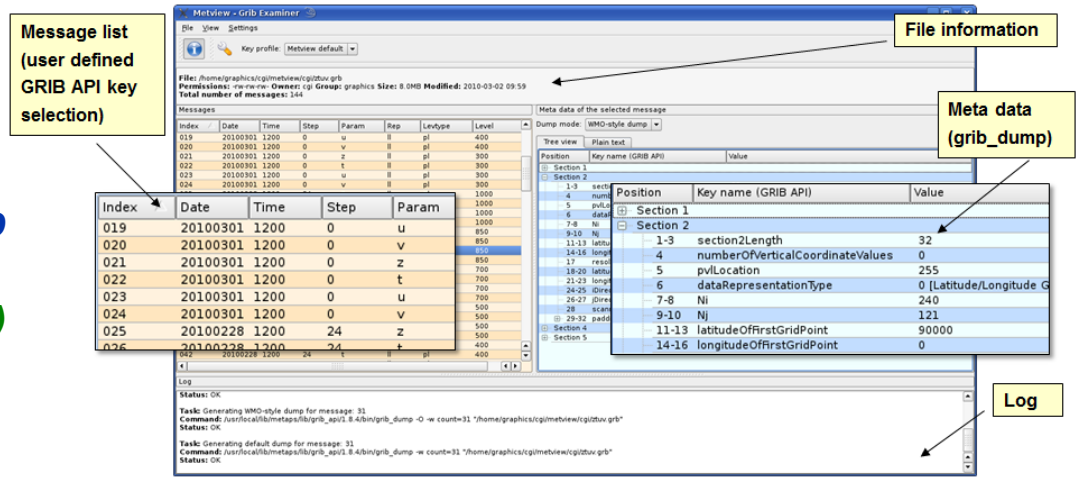
- **Metview provides tools to inspect data to**
  - **check contents and structure**
  - **inspect headers**
  - **spot errors or inconsistencies**
- **Supported formats: GRIB, BUFR, ODB, netCDF, GeoPoints**
- **Statistics of data are shown in sidebar of plot window**
- **Or through the *Examiners***
  - **from the user main interface**
  - **standalone:**

metview –e grib test.grib

(–e bufr , –e odb)



Display window with data statistics (right)



GRIB Examiner

Many more features …

Tephigram

Hovmøller

Metgrams

Strike Probability Map

Clusters

Coloured Wind

Scatter plots

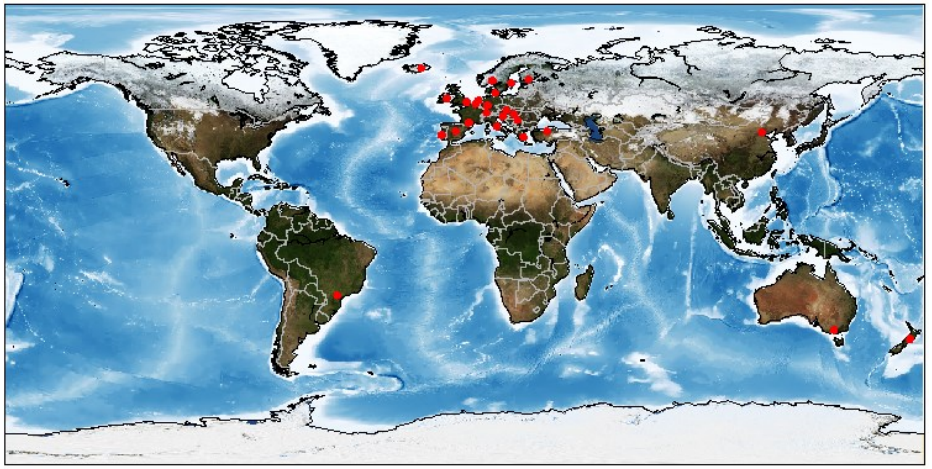
WMS with Satellite and radar by NOAA nowCOAST

Interface with FLEXTRA

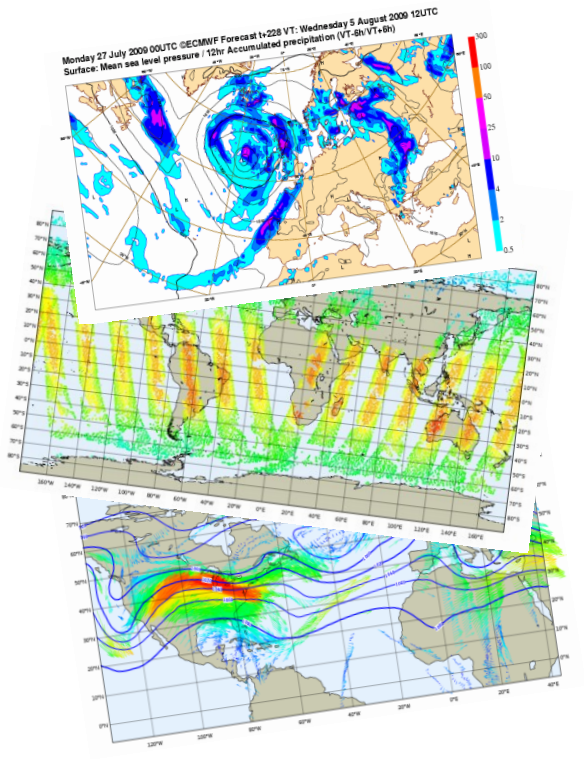
VAPOR interface

Who uses Metview?

- **Used internally at ECMWF by researchers and operational analysts**
  - **To assess the quality of Observations/Forecast**
  - **To develop new (graphical) products**
  - **For general research activities**
- **Member States (local installations and remotely on our *ecgate* server)**
- **Other national weather services and Universities**
- **Commercial customers**



For more information …



email us:

- **Metview: metview@ecmwf.int**

web pages:

- **https://software.ecmwf.int/metview**
  - **Download**
  - **Documentation and tutorials available**
  - **Metview articles in recent ECMWF newsletters**
- **http://download.opensuse.org/repositories/home:/SStepke/**

Metview training course at ECMWF, 26 - 30 September 2016