TROPICAL DESK, END OF TRAINING PRESENTATION

An short review of forecasting methods, tools and guidelines studied at the Tropical Desk.

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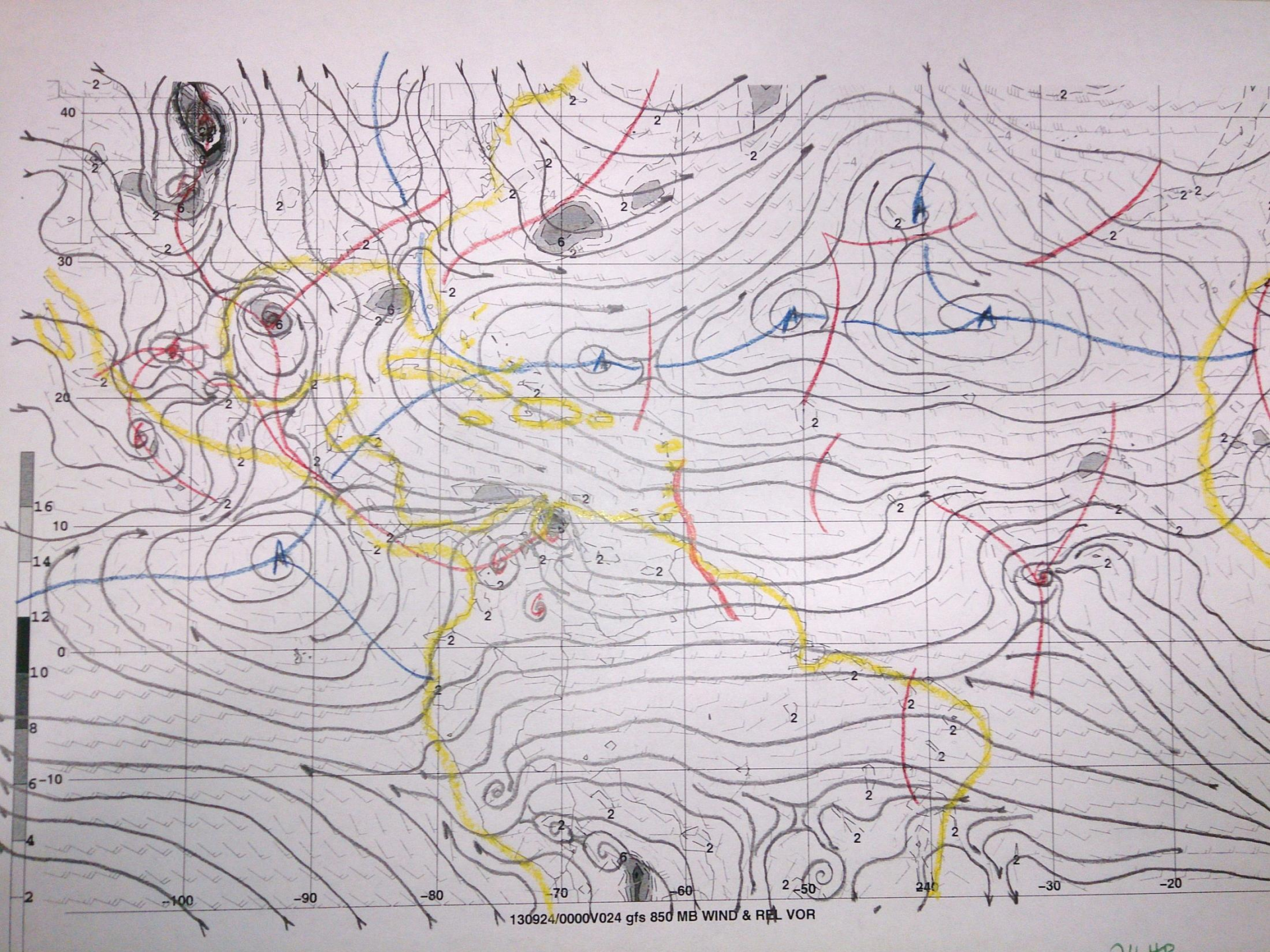
Jose Galvez

Flow Analysis

- important in ascertaining the positions of systems within the forecast region
- highlights the depth to which perturbations, circulations and other synoptic and mesoscale systems exist

Good examples are Tropical Waves and Tropical Upper Tropospheric Troughs, where interaction between the two in the vertical can significantly amplify the convection associated with an event. High Pressure Ridges are significantly stronger when the vertical extent exceeds the boundary layer, resulting in reduced rainfall. Within moisture boundaries, these can also present hazy conditions which assist in forecasting visibility.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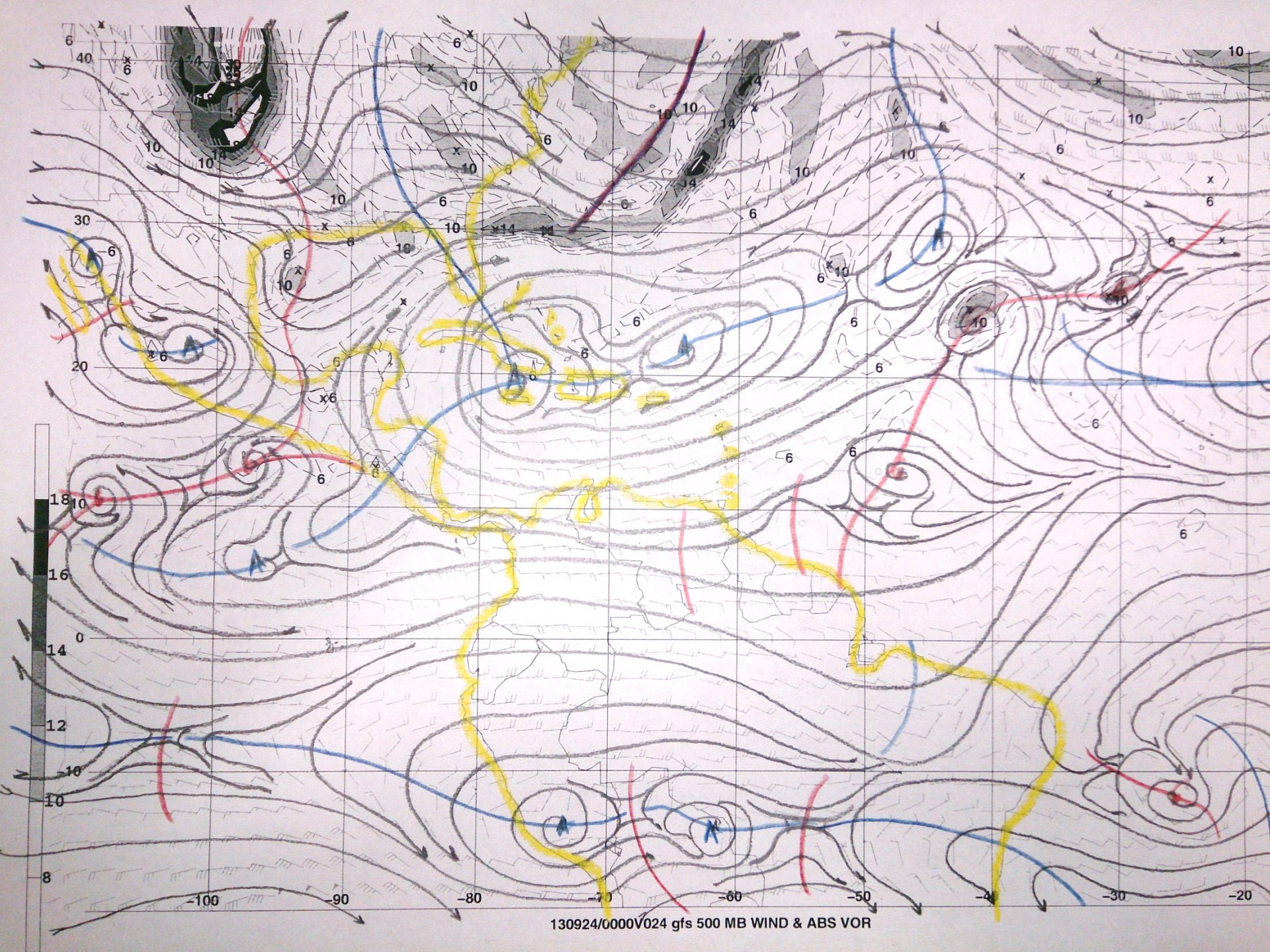
130924/0000V024 gfs 850 MB WIND & REL VOR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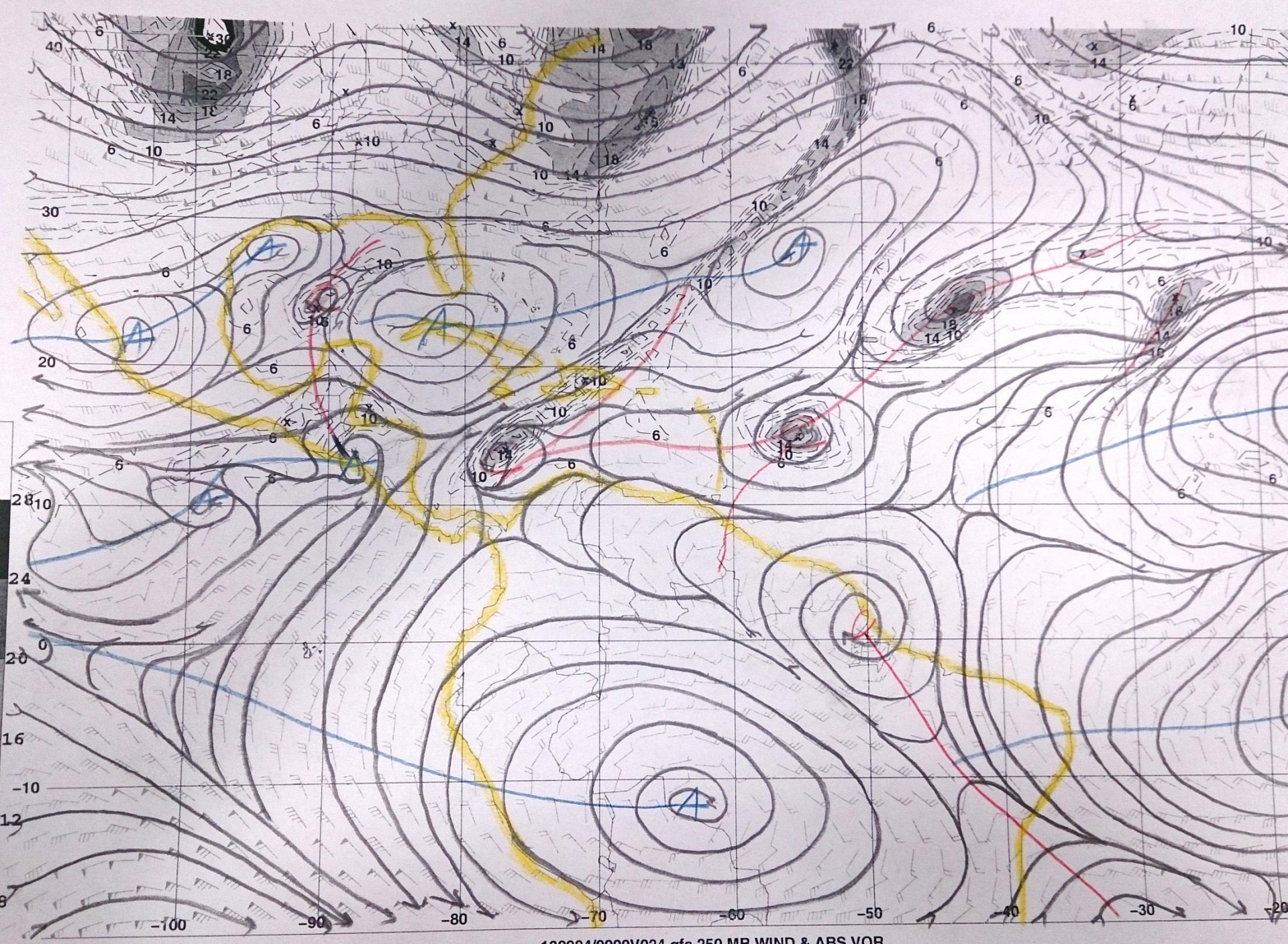
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Model Guidance

- look at several parameters including precipitable water, potential temperature and equivalent potential temperature fields, as well as humidity, precipitation and pressure
- Increased model input also increases forecast accuracy
- The GFS, ECMWF and UKMET are the primary models used at the Desk, with the NAM and CPC Climate models helping to give a general estimate of the oscillations which affect tropical weather
- Forecast confidence increases with model agreement and corresponding accurate analysis. improves with climatological persistence.

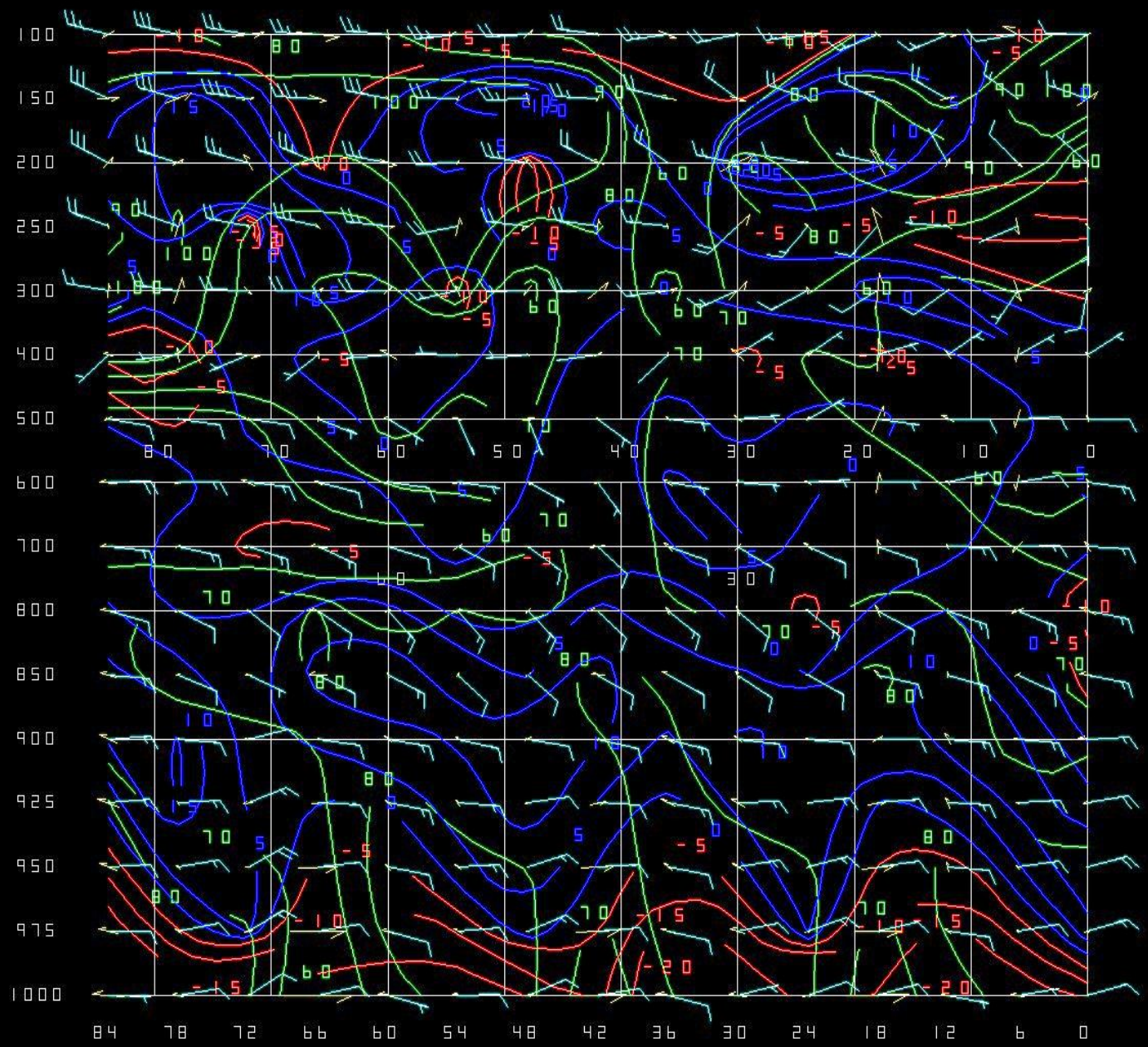
Tropical waves, easterly waves, TUTT induced waves and inverted ‘V’ waves

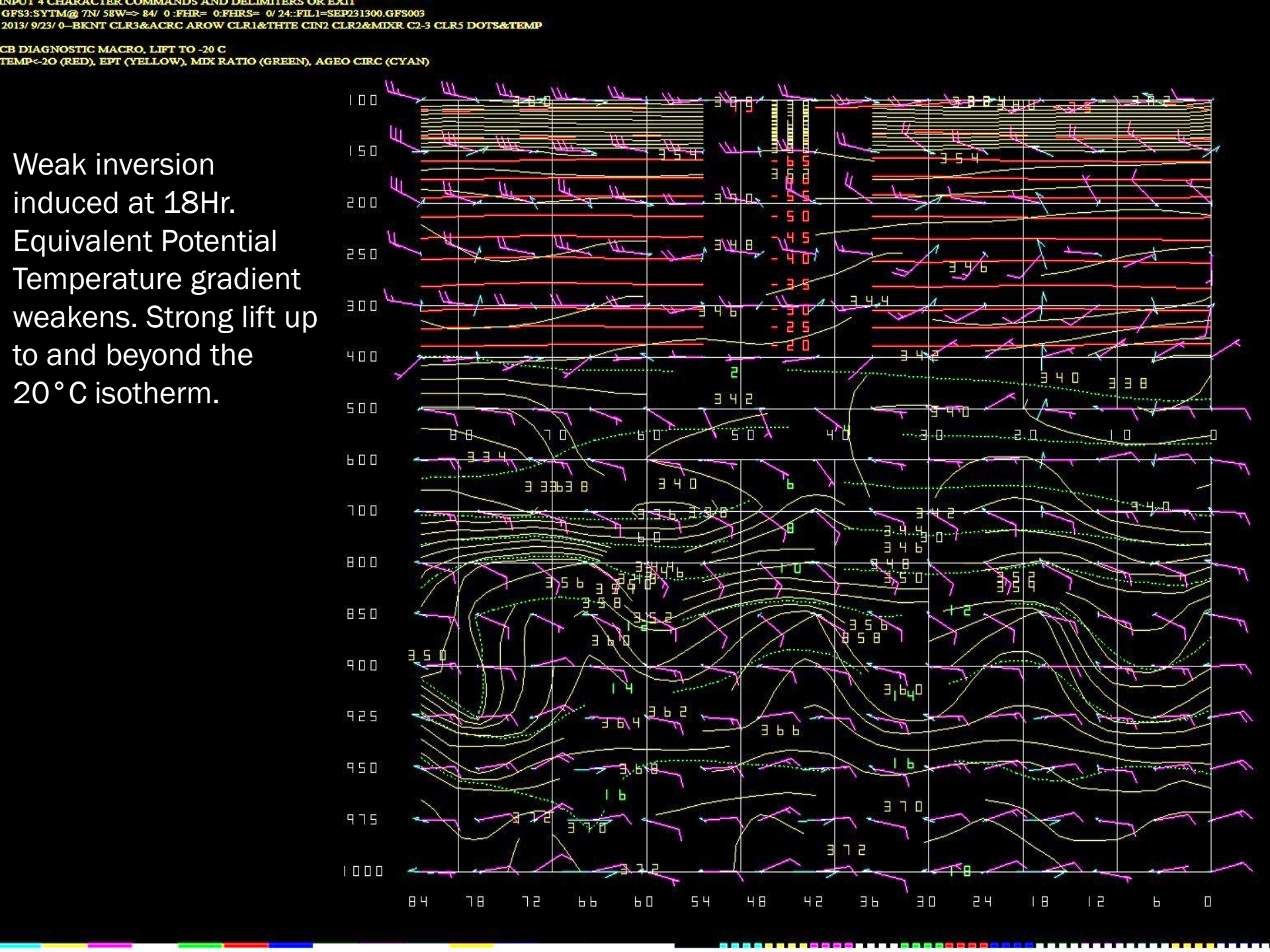
- all features of the Tropical atmosphere in the wet season/summer months
- waves propagate east to west at speeds anywhere from 5-25 knots, depending on the intensity of the flow around them
- spotted by looking at the 850 and 700mb levels for kinks in the winds or anti-clockwise turning /vorticity
- models are then projected through time, and markings are made of the positions of the anti-clockwise turnings at select hours
- Waves can provide a pool of moisture, high equivalent potential temperature and a warm base when they pass under a TUTT
- the cold core of the TUTT significantly deepens the convection associated with a tropical wave. can develop into a more significant system such as a depression

The time series and time section

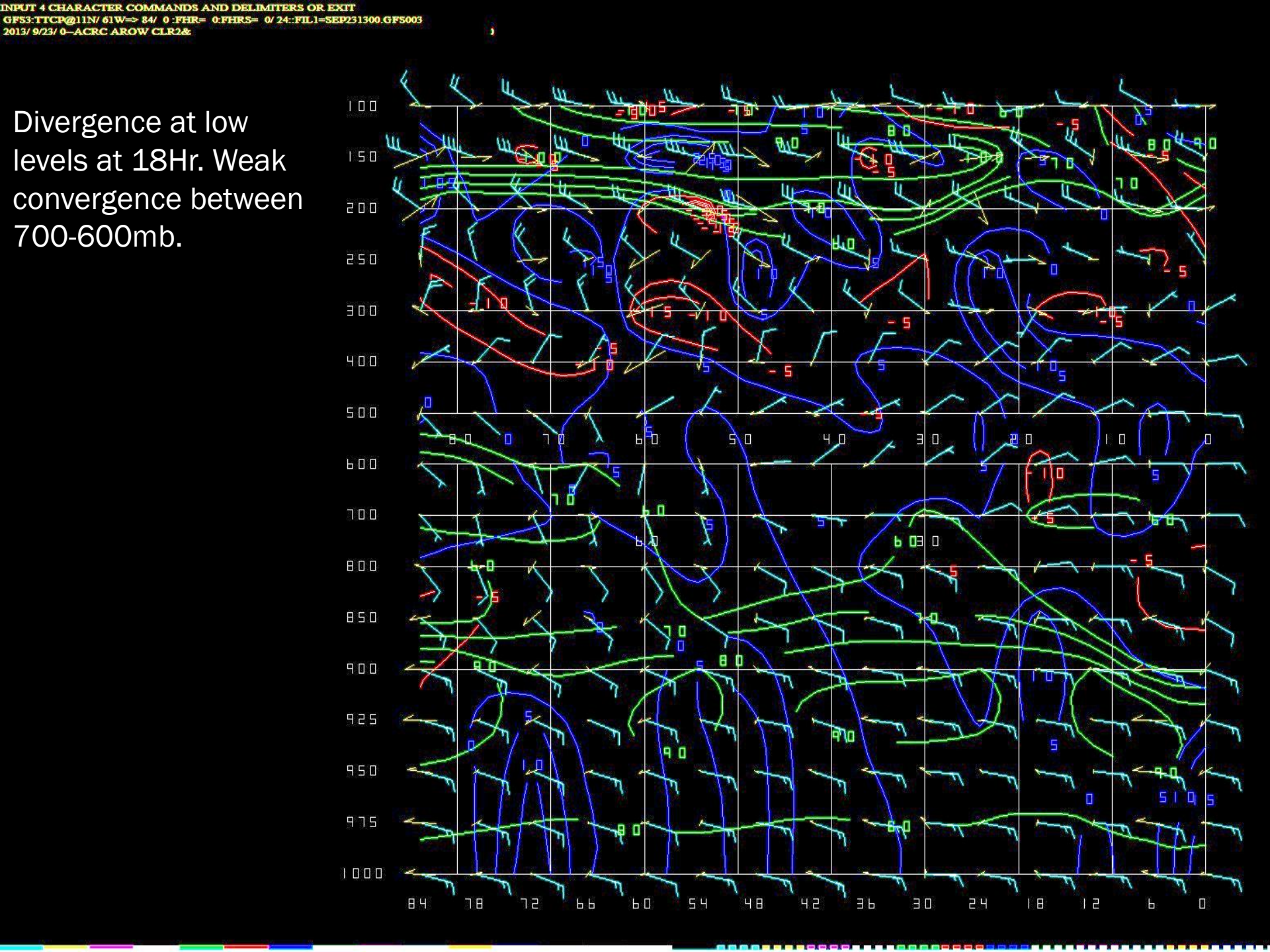
- these macros in the WINGRIDDS software are important tools because they give latitude based positioning of the parameters
- for instance, the TSCT macro can be input with a latitude/longitude position, to then yield a vertical section projected over a specified period, showing winds, the equivalent potential temperature, 20 degree isotherm as well as the mixing ratio and forcing
- through the equivalent potential temperature, we can ascertain the warming or cooling of a layer with height. We can also determine if an inversion is present
- The height of the inversion is also important because with the amount of upward forcing through the layer, the inversion can be ‘broken’ and some amount of activity can occur

18 Hr lift above 800mb, with significant low level convergence.

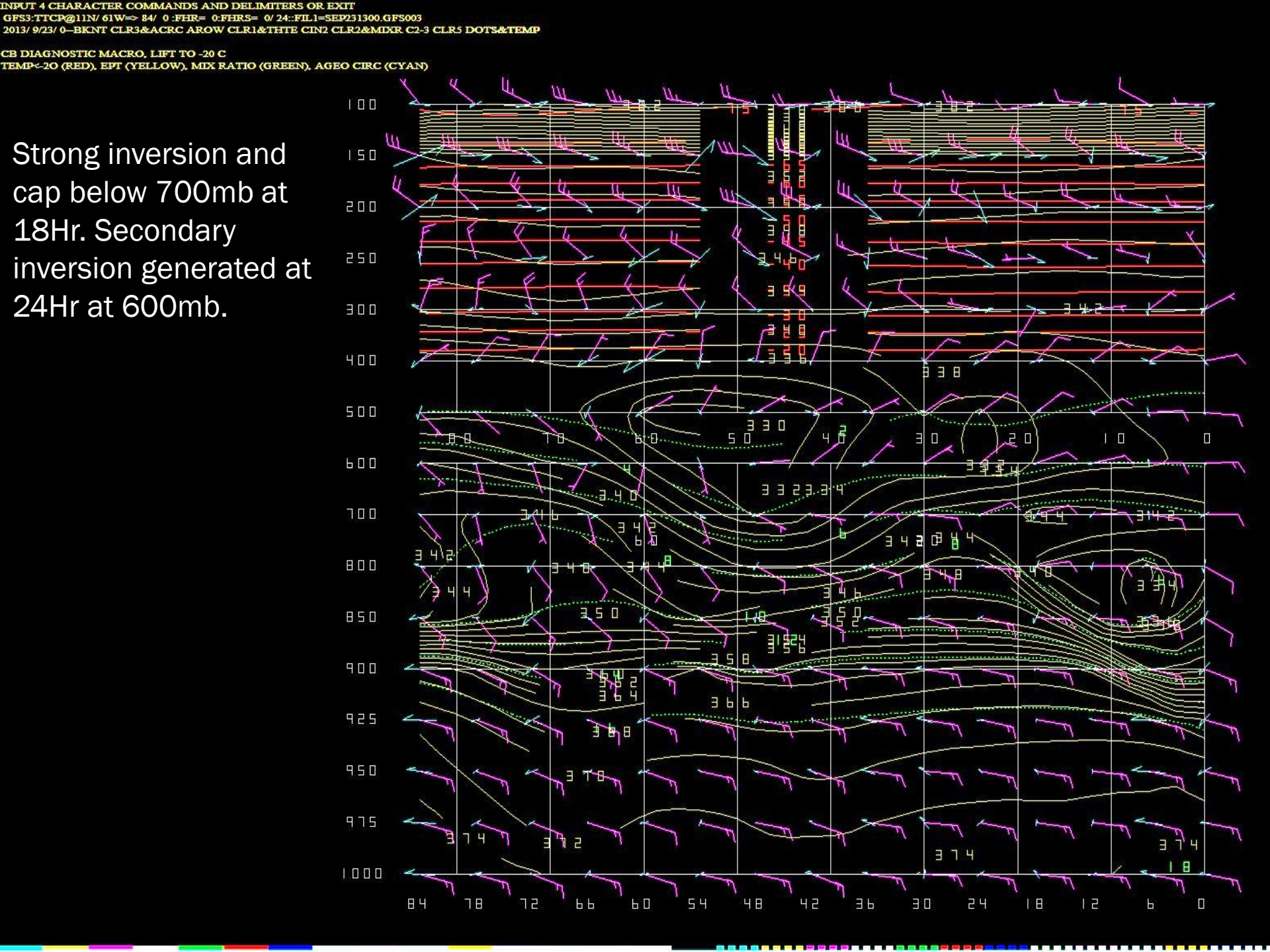




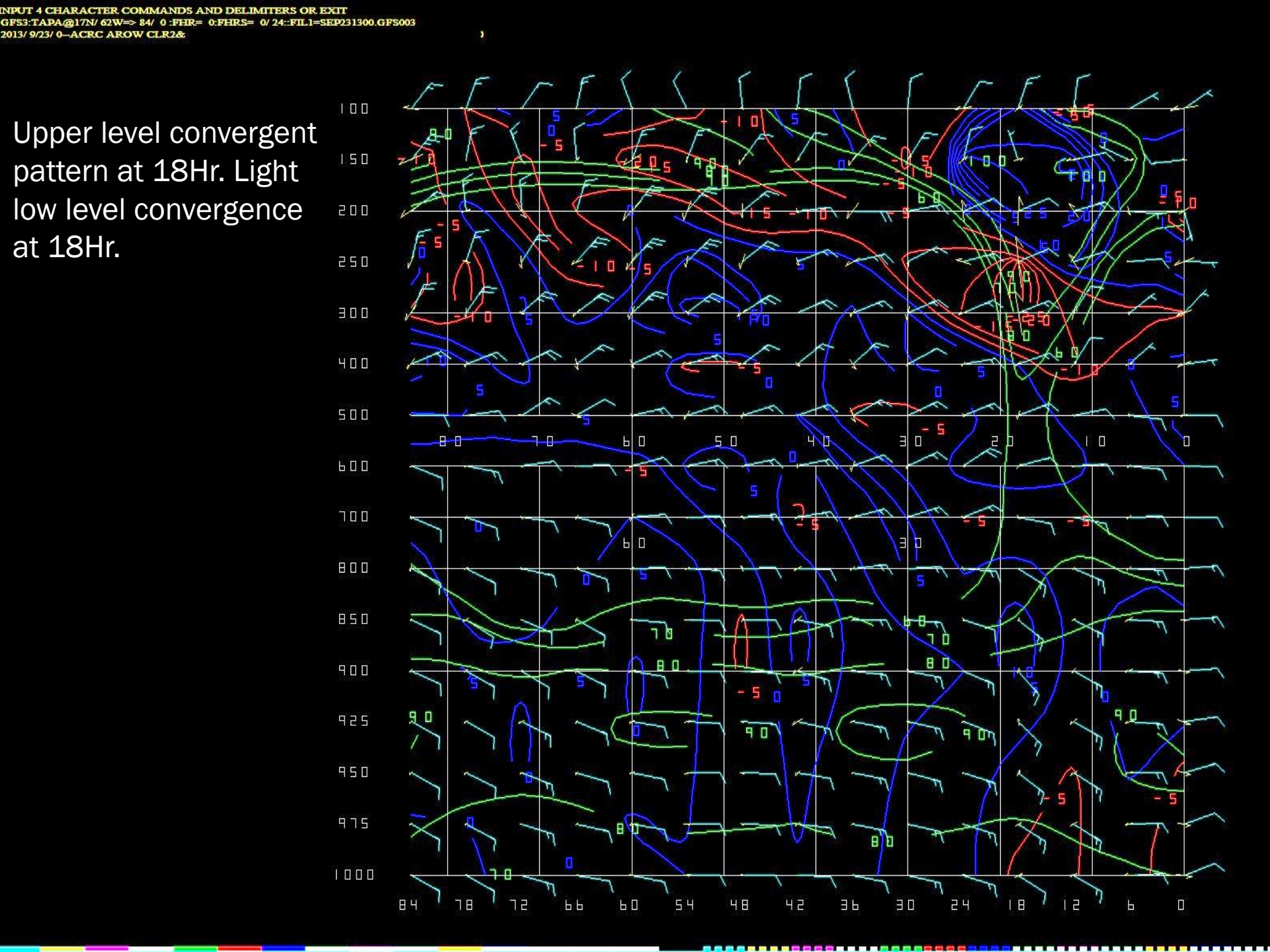
Weak inversion induced at 18Hr. Equivalent Potential Temperature gradient weakens. Strong lift up to and beyond the 20°C isotherm.



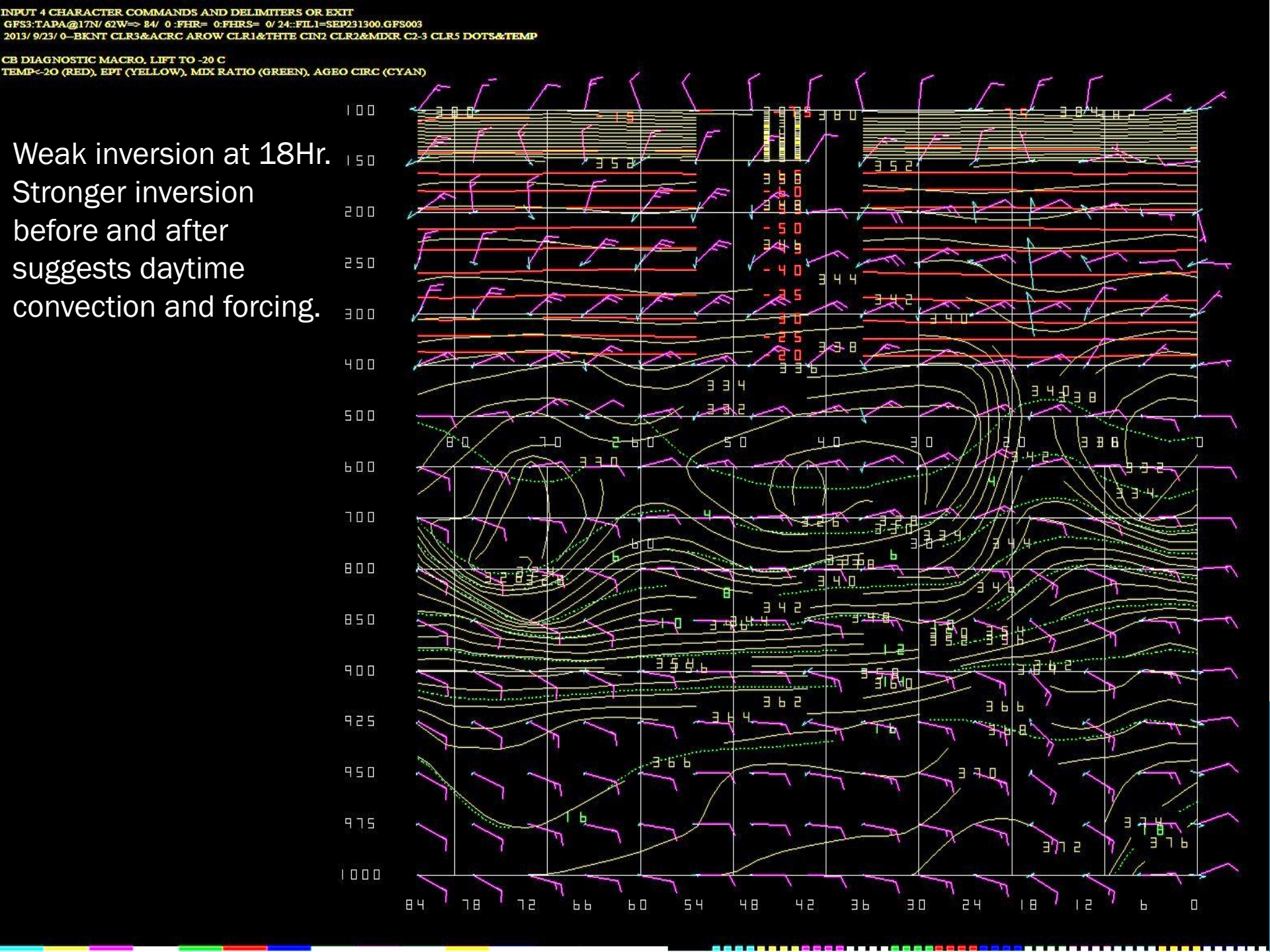
Divergence at low levels at 18Hr. Weak convergence between 700-600mb.



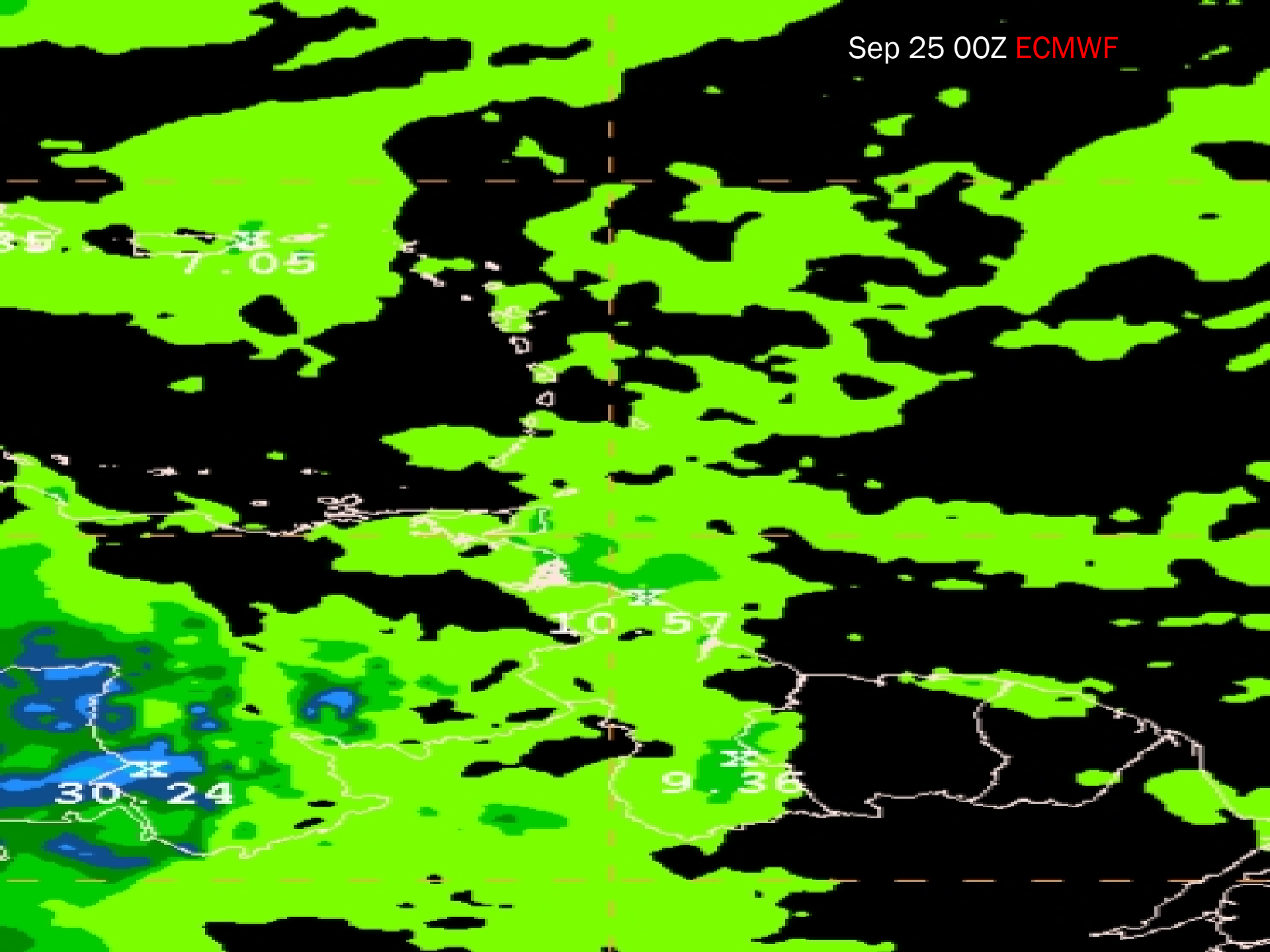
Strong inversion and cap below 700mb at 18Hr. Secondary inversion generated at 24Hr at 600mb.



Upper level convergent pattern at 18Hr. Light low level convergence at 18Hr.



Weak inversion at 18Hr. Stronger inversion before and after suggests daytime convection and forcing.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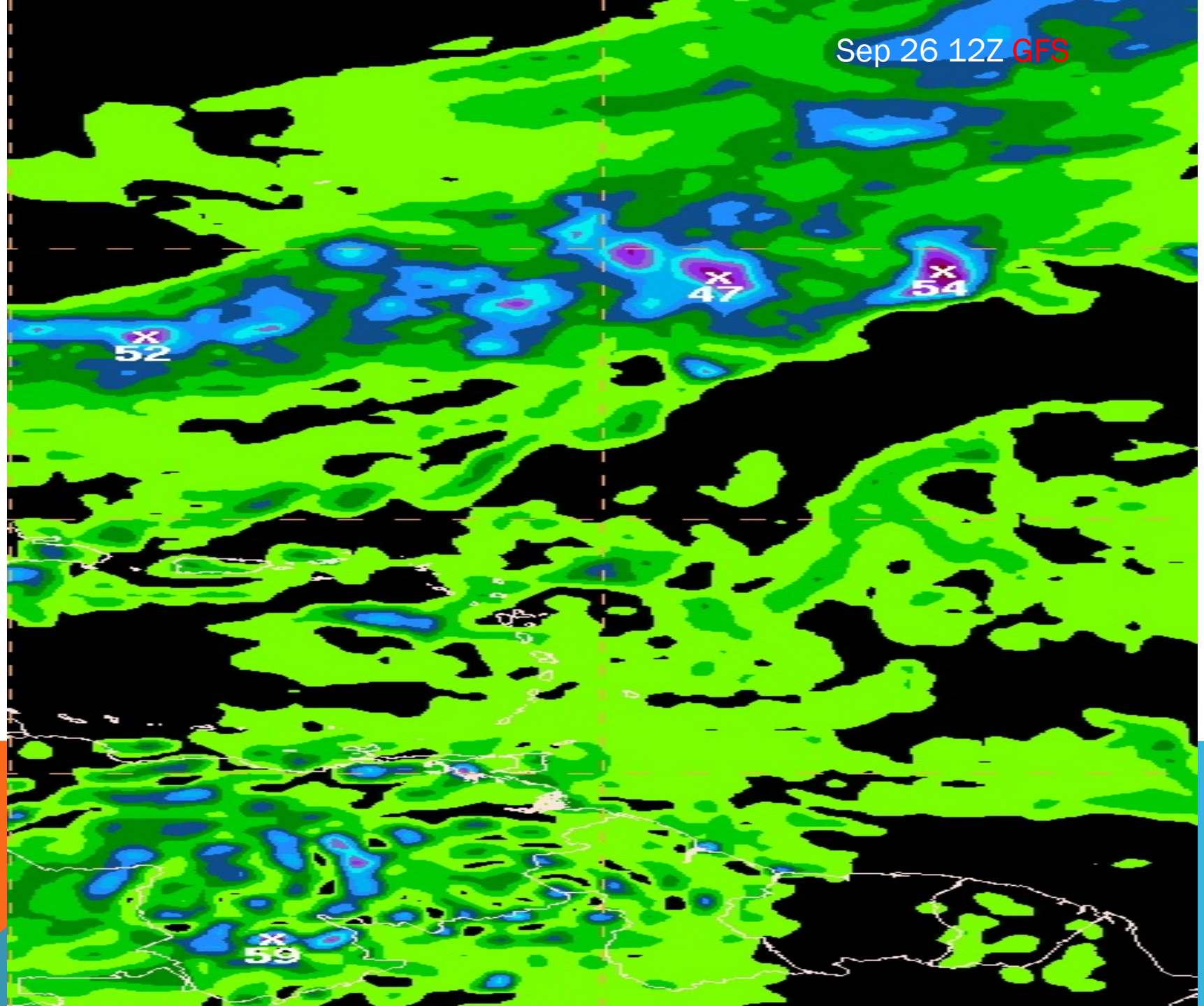
10.57
30.24
9.36


Sep 26 12Z GFS
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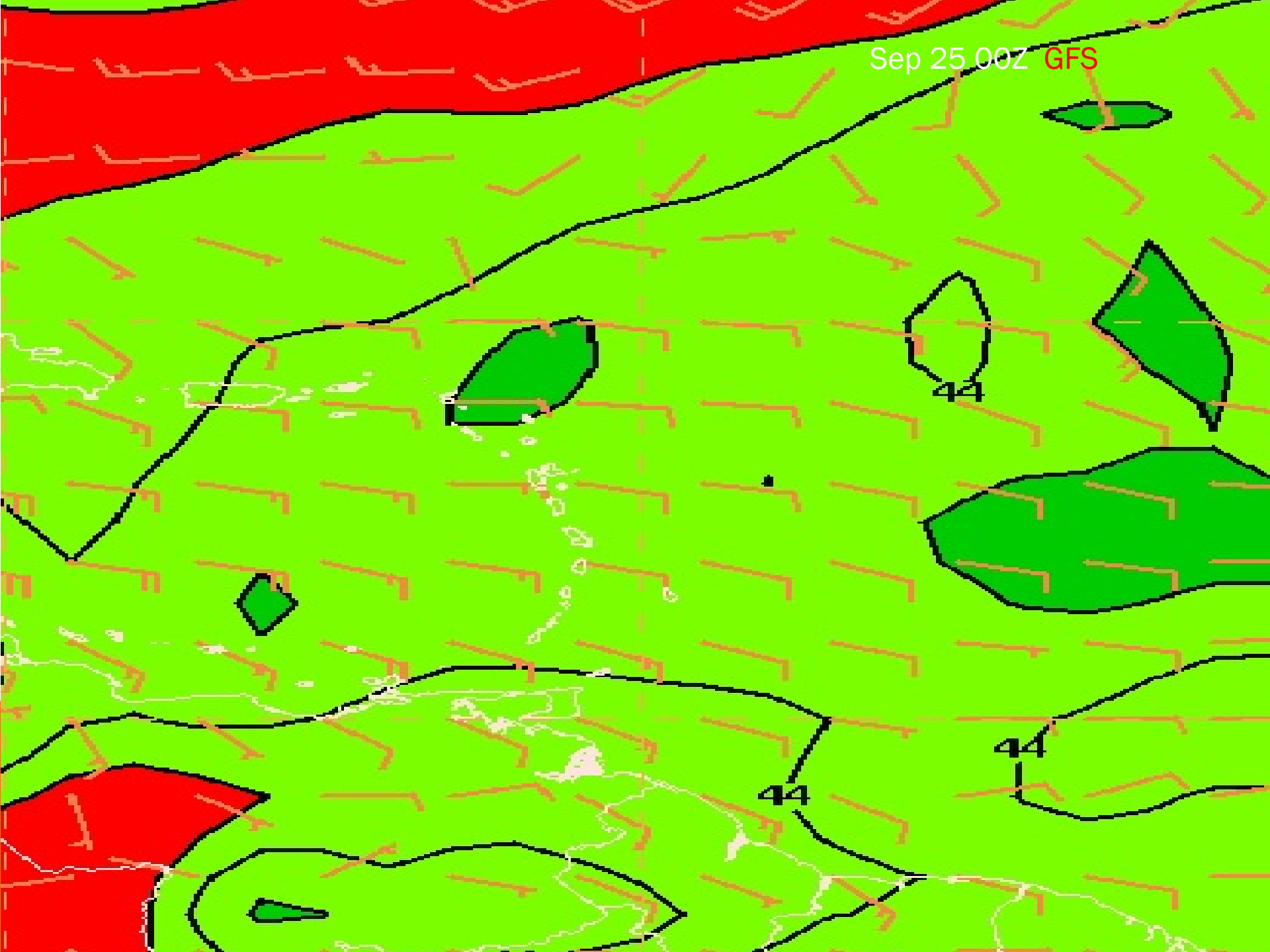
Sep 25 00Z GFS
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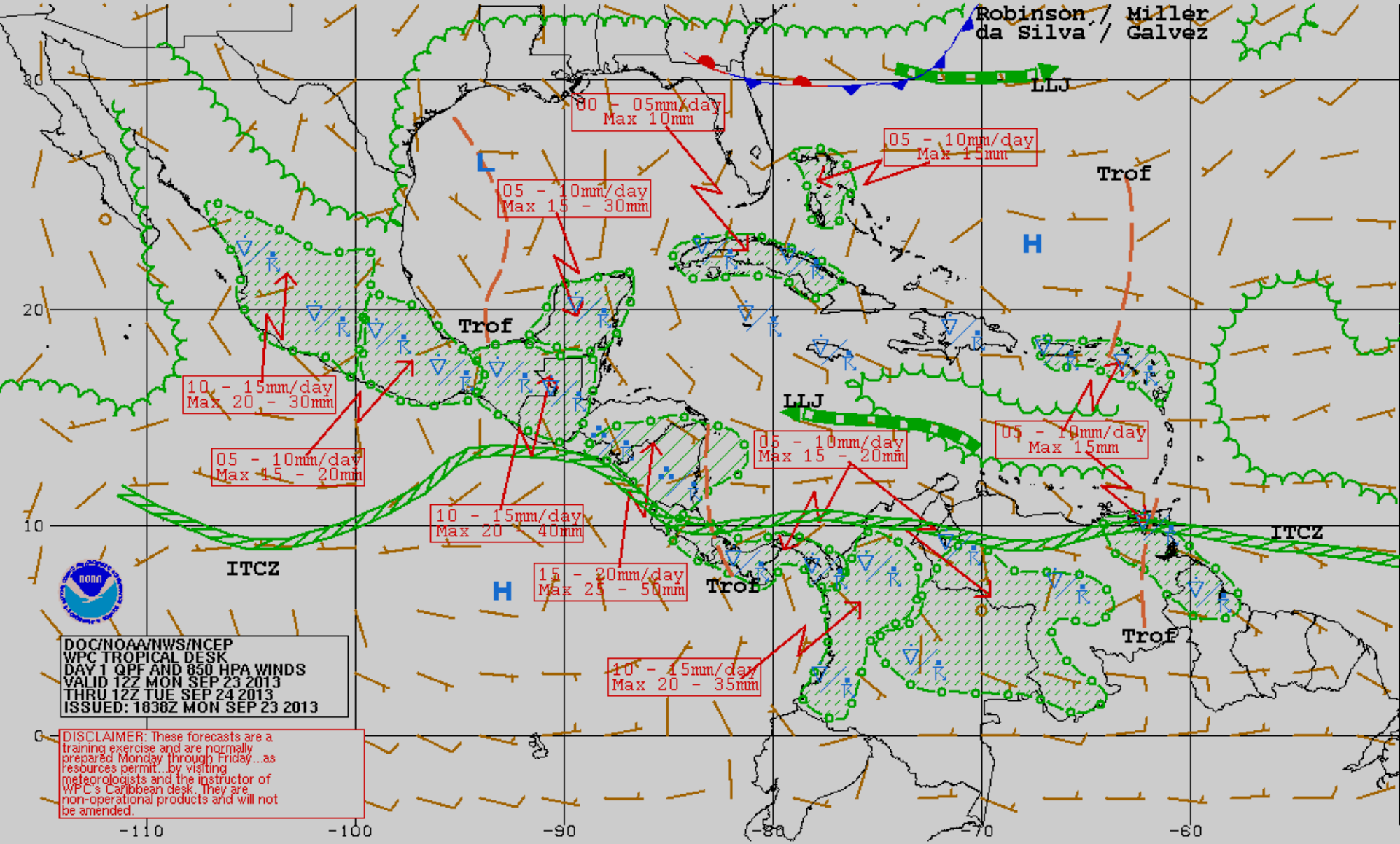
Robinson / Miller
da Silva / Galvez
LLJ
00 - 05mm/day
Max 10mm
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LLJ
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ITCZ
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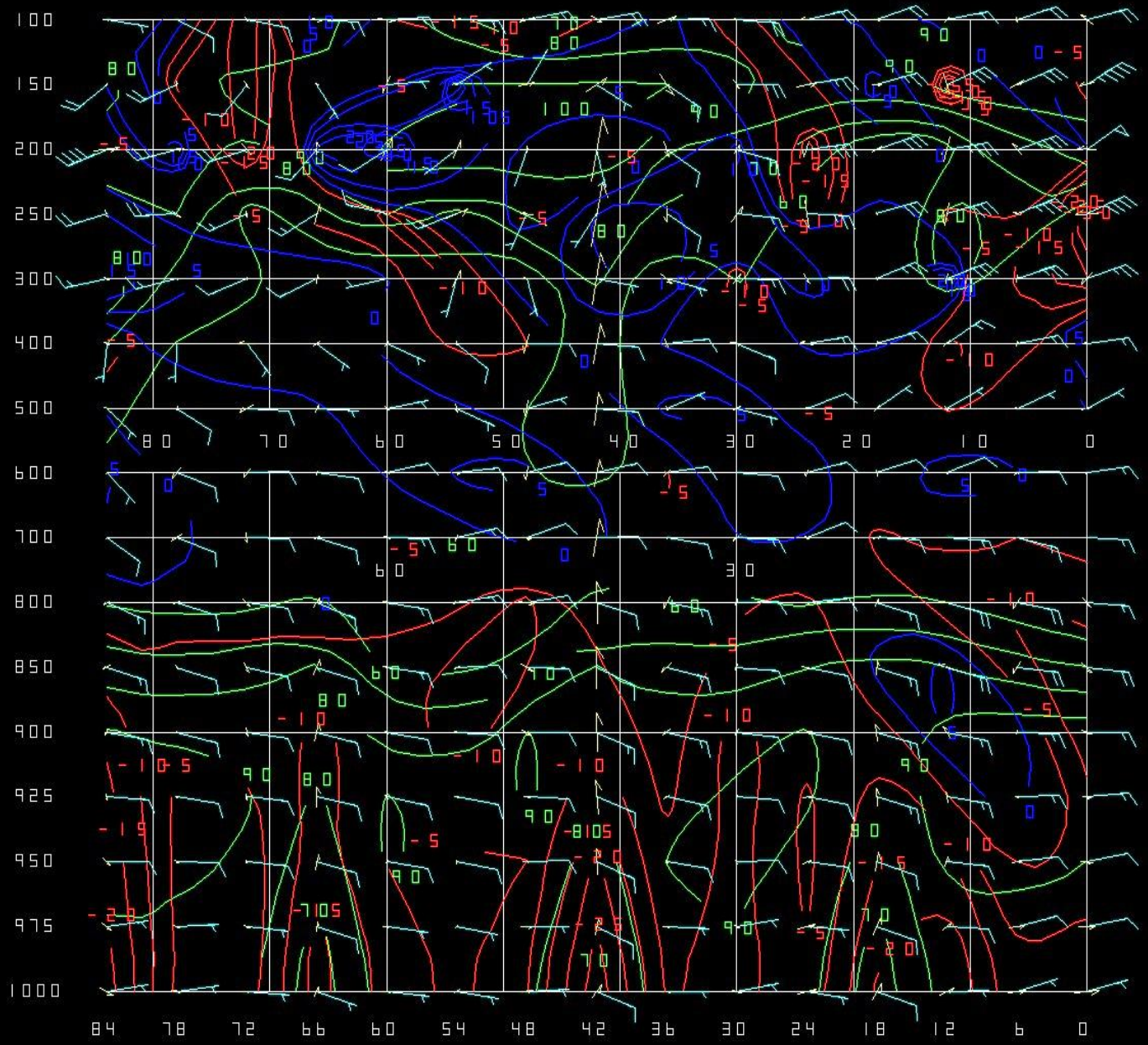
Max 20 - 35mm
DOC/NOAA/NWS/NCEP
WPC TROPICAL DESK
DAY 1 QPF AND 850 HPA WINDS
VALID 12Z MON SEP 23 2013
THRU 12Z TUE SEP 24 2013
ISSUED: 1838Z MON SEP 23 2013
DISCLAIMER: These forecasts are a training exercise and are normally prepared Monday through Friday...as resources permit...by visiting meteorologists and the instructor of WPC's Caribbean desk. They are non-operational products and will not be amended.
30
20
10
0
-110
-100
-90
-80
-70
-60

Forecast challenges

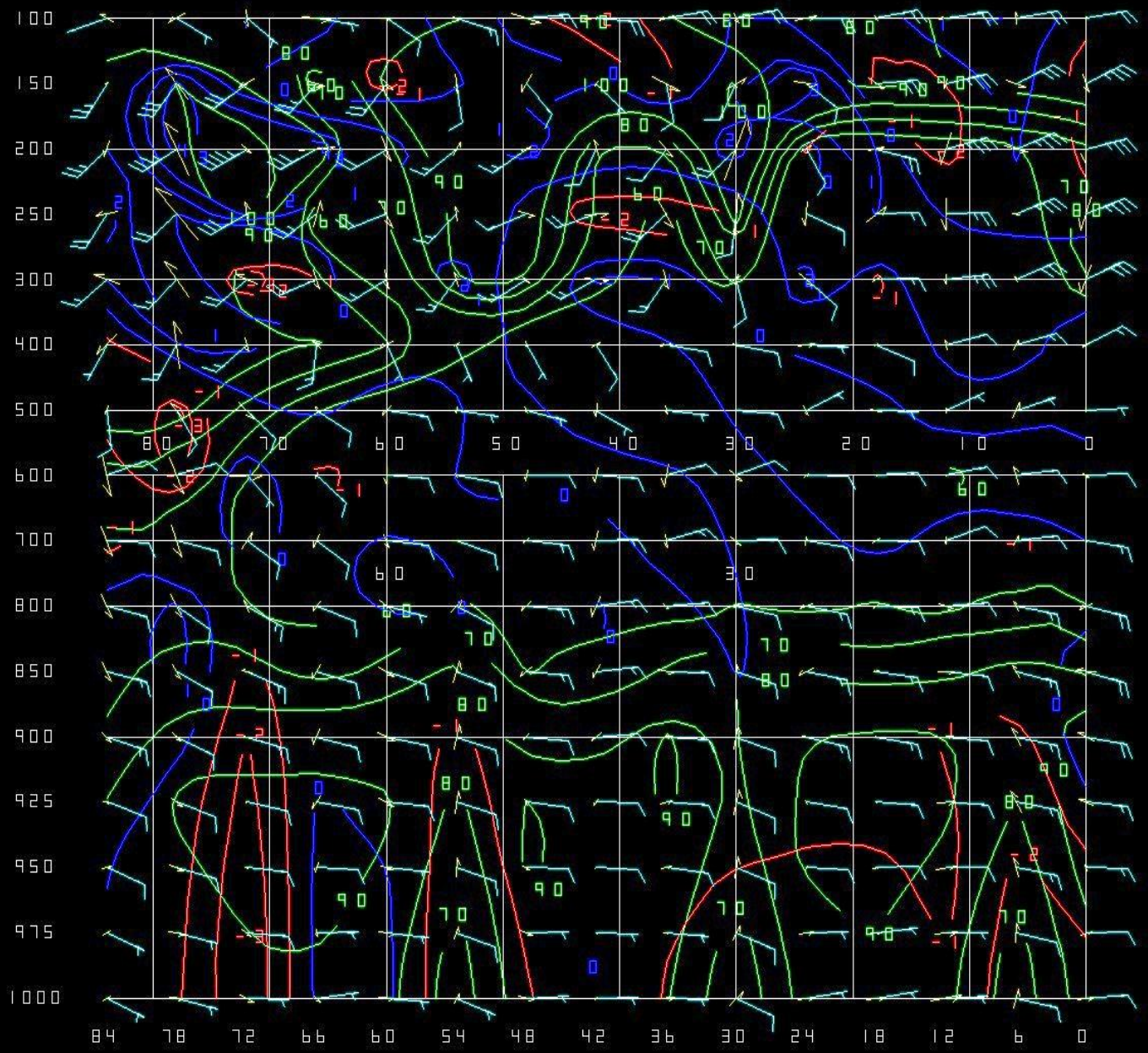
INPUT 4 CHARACTER COMMANDS AND DELIMITERS OR EXIT
GFS3:MKJP@18N/ 77W=> 84/ 0 :FHR= 0:FHRS= 0/ 0::FILA=
2013/ 9/25/12--BKNT CLR1&WDVR LT00 CLR6&WDVR GT00 CLR7&ACRC AROW CLR2&RELH GT60

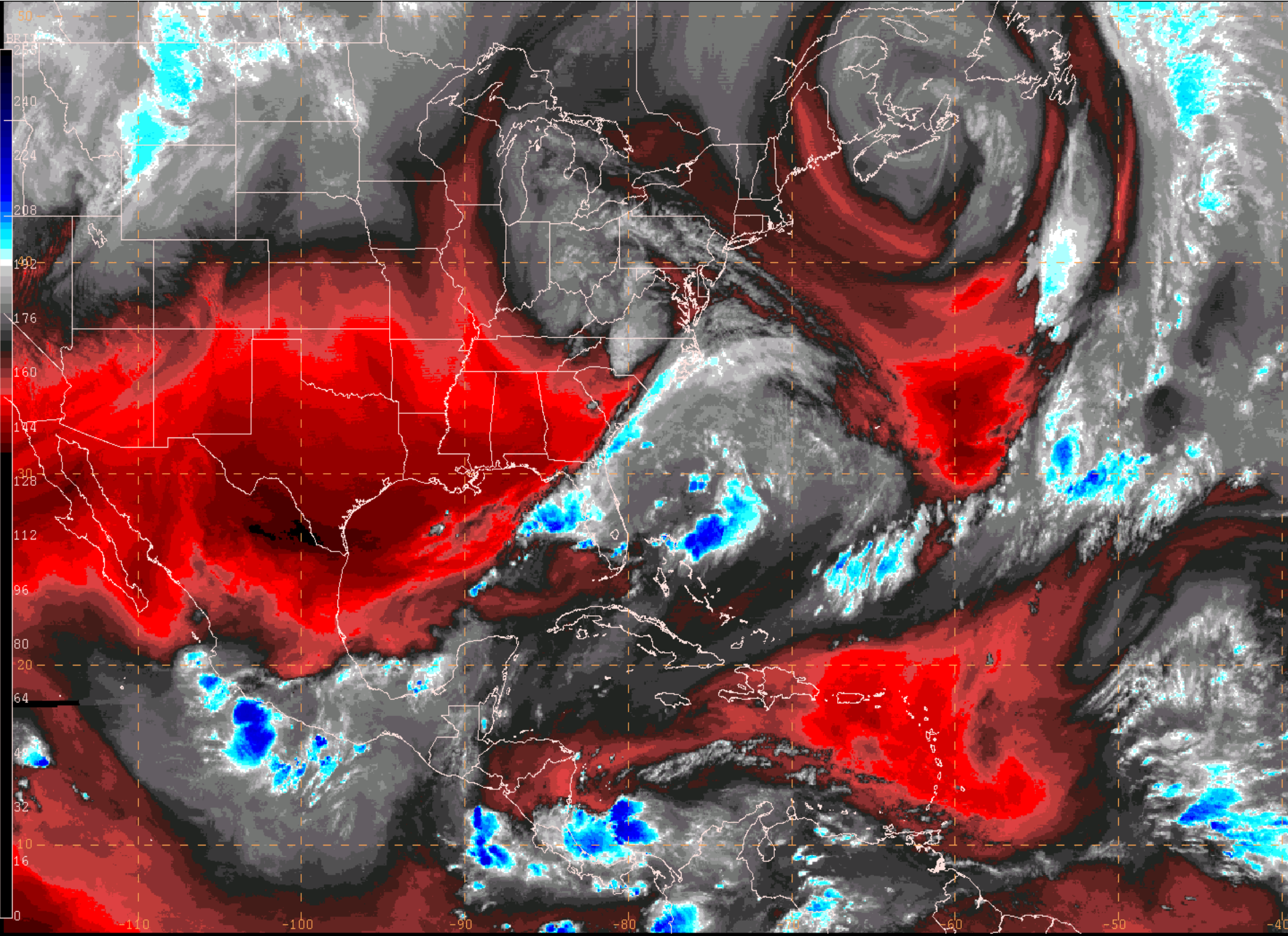
Sep 25 00Z Conv/Div



INPUT 4 CHARACTER COMMANDS AND DELIMITERS OR EXIT
GFS3:MKJP@18N/ 77W=> 84/ 0 :FHR= 0:FHRS= 0/ 0::FIL9=
2013/ 9/25/12--BKNT CLR1&WDVR LT00 CLR6&WDVR GT00 CLR7&ACRC AROW CLR2&RELH GT60

Sep 25 12Z Conv/Div

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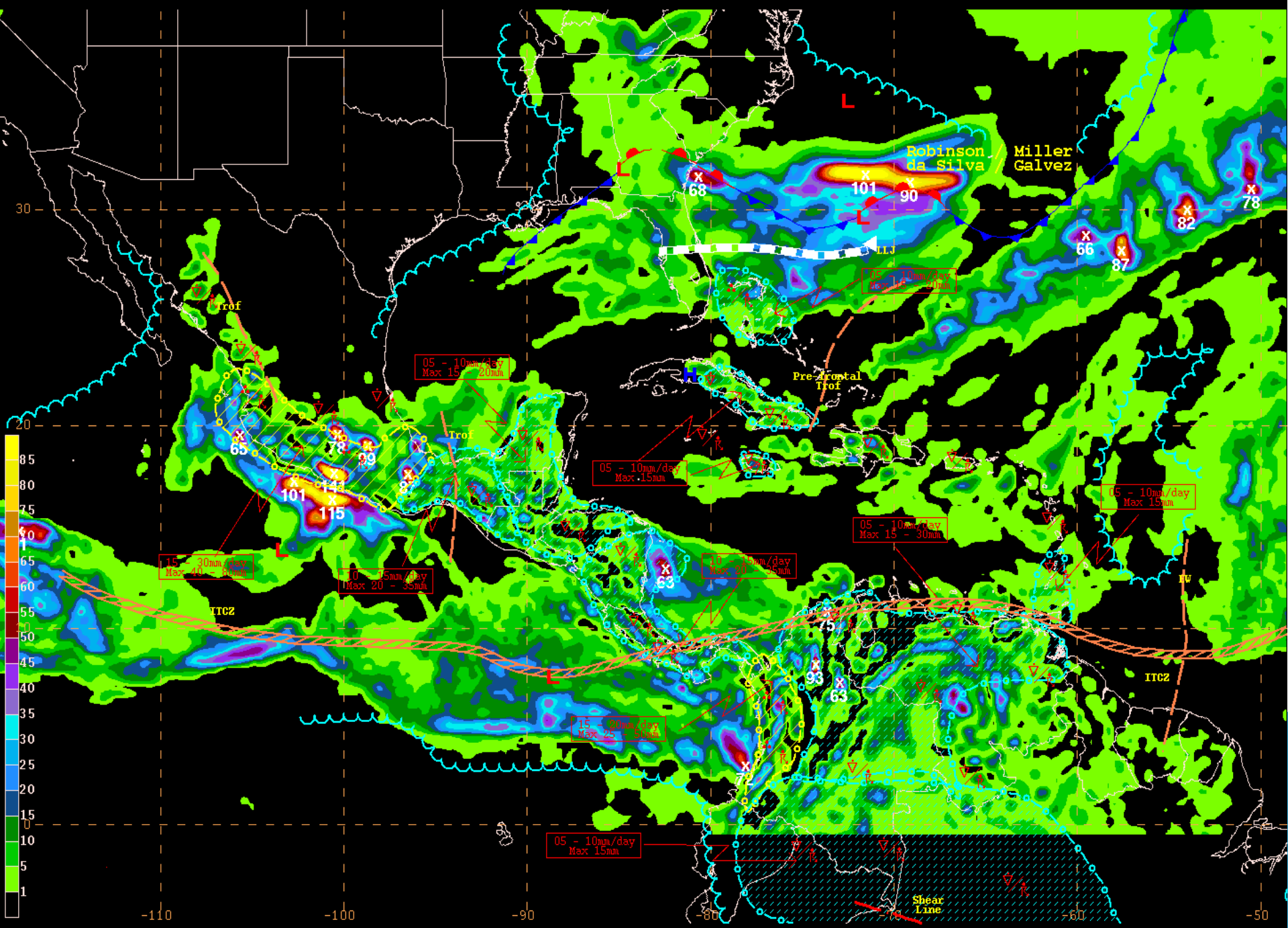
130925/1622 GOES15 IR3



GFS35_ATL THU 130926/1200V024 24-HR TOTAL PRECIPITATION (MM)

Concepts learned

- Models are forecast aids.
- Precipitation is a calculated parameter based on weather parameters/indices.
- Influences of topography and air mass characteristics are extremely significant.
- Accuracy is best achieved with good understanding of the thermodynamic and dynamic principles at each step in the decision making process.