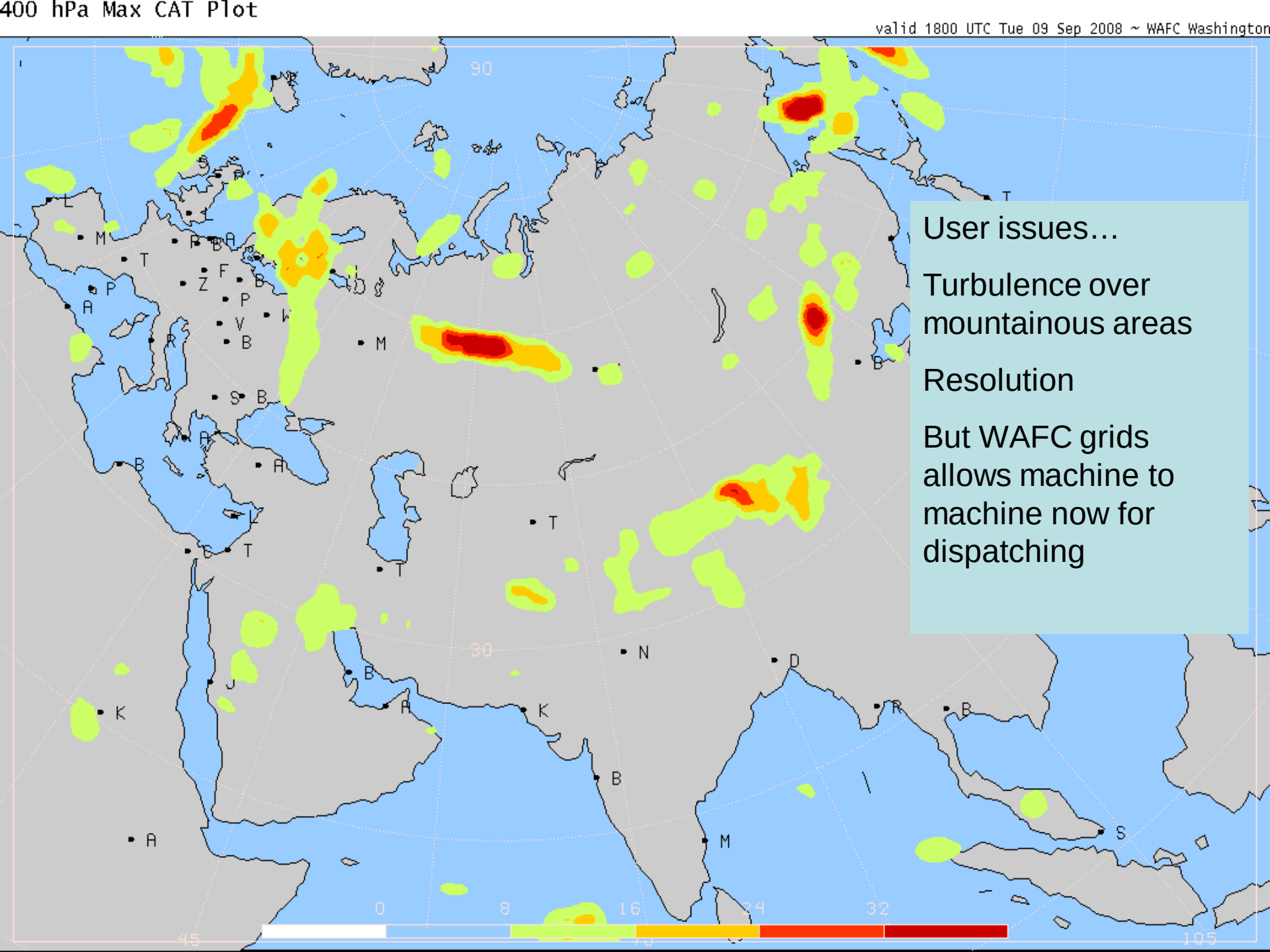
ICAO global requirements for Turbulence and the linkage to NextGen

Mike Graf

Meteorologist/International Liaison
Aviation Services Branch/NWS
michael.graf@noaa.gov

Current Algorithms used to produce automated WAFC Turbulence global grids

- Currently the WAFC turbulence areas are manually generated
- Work is being done to automate that process
- Both London and Washington WAFCs use Ellrod algorithm TI1 (Ellrod and Knapp, 1992)
- Users recognize there are issues with current algorithm above


400 hPa Max CAT Plot
valid 1800 UTC Tue 09 Sep 2008 ~ WAFC Washington
User issues…
Turbulence over mountainous areas
Resolution
But WAFC grids allows machine to machine now for dispatching
0
8
16
24
32
45
105

Updated requirements for automated WAFC Turbulence global grids

- clear-air and in-cloud turbulence, and geo-potential altitude of flight levels shall be prepared four times a day by a WAFC and shall be valid for fixed valid times at 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 hours
- after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based
- The dissemination of each forecast shall be in the above order and shall be completed as soon as technically feasible but not later than 6 hours after standard time of observation

Updated requirements for automated WAFC Turbulence global grids

- The grid point forecasts prepared by a WAFC shall comprise clear-air turbulence for layers centered at flight levels 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 340 (250 hPa), 390 (200 hPa) and 450 (150 hPa)

- in-cloud turbulence for layers centered at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa

- *Forecasts referred to are currently of an experimental nature, labeled as "trial forecasts" and only distributed through the Internet-based FTP services*. . .

- The foregoing grid point forecasts shall be prepared by a WAFC in a fixed regular grid with a horizontal resolution of 140 km 1.25° of latitude and longitude

US algorithms for WAFC can compliment future NextGen challenges

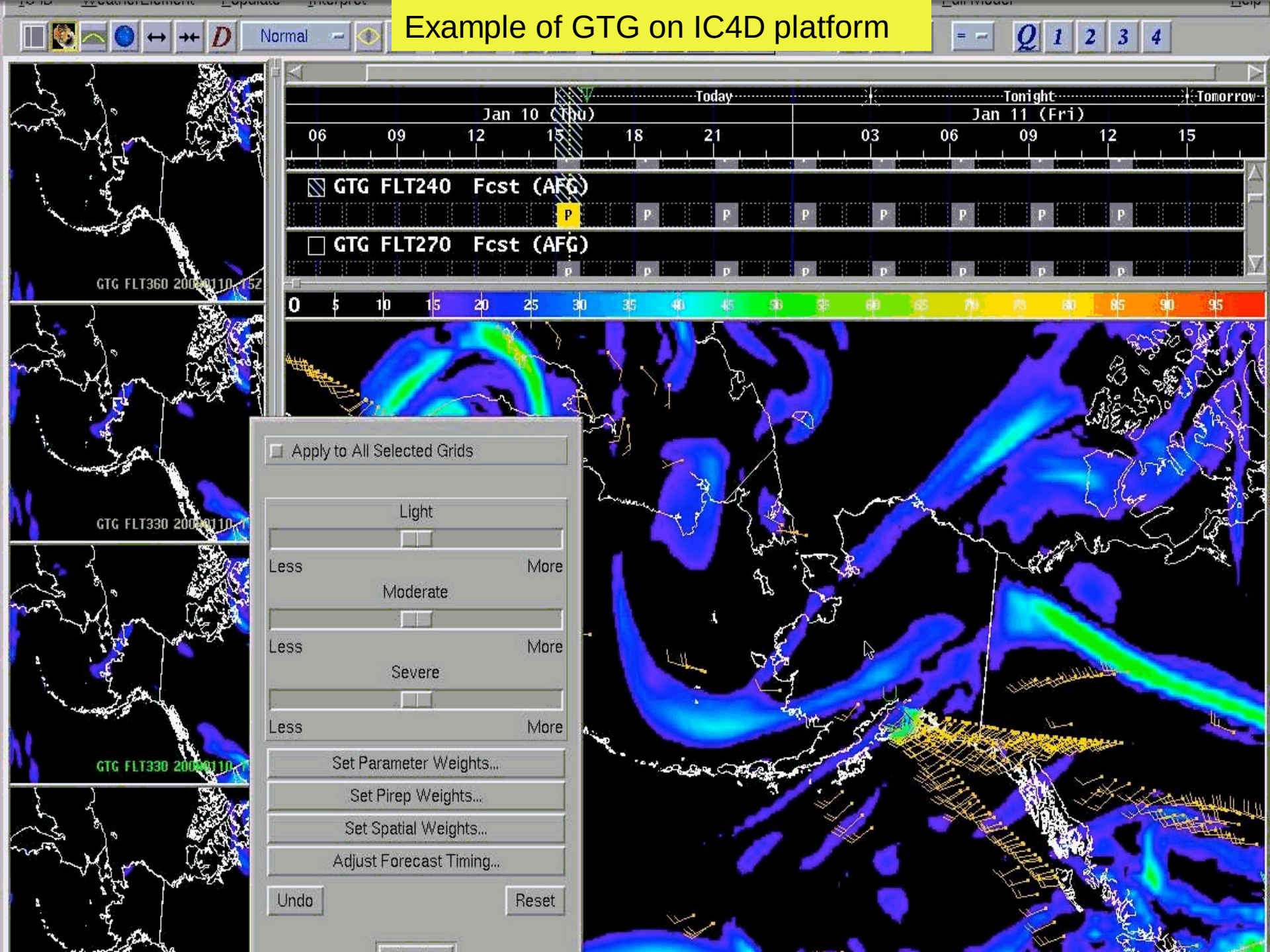
- Turbulence…Must have involvement from research…for the global environment. Can't we do better than Elrod in 2010? Need research to focus globally…The timeline for these WAFC global grids in sometime after 2013.

- Problems with the "goodness" of future automated grids generated by algorithms is a major stumbling block that the WAFCs are encountering now…and thus Algorithm development will be a NextGen issue as well

for forecaster in the loop (IC4D) and algorithms used to produce turbulence…currently GTG and the NAM for Alaska

- Provides a route for research and development to operations
- Driven by NCAR guidance for turbulence (GTG) and icing (severity and potential)

Example of GTG on IC4D platform



Mike Graf
Michael.graf@noaa.gov

301-713-1726X117