Agenda Item 4: Improvements of MET services in accordance with the new operational requirements in support of ATM

Implementation of new World Area Forecast Center (WAFC) algorithms for 2018-19

(Presented by the US WAFC provider)

SUMMARY

This paper illustrates current WAFC icing and turbulence products and highlights future WAFC products that will include severity for en-route icing and turbulence forecasts.

1. INTRODUCTION

1.1 The United Kingdom MET office and the United States' National Weather Service operate two WAFCs. WAFCs are meteorological centers designated to provide global upper-level wind and temperature forecasts, in grid point format, for use in flight planning by airlines. WAFCs also prepare and issue significant weather forecasts for en-route aviation. These WAFS forecasts are available to users via the WAFS Internet File Service (WIFS), and the Secure Aviation Data Information Service (SADIS).

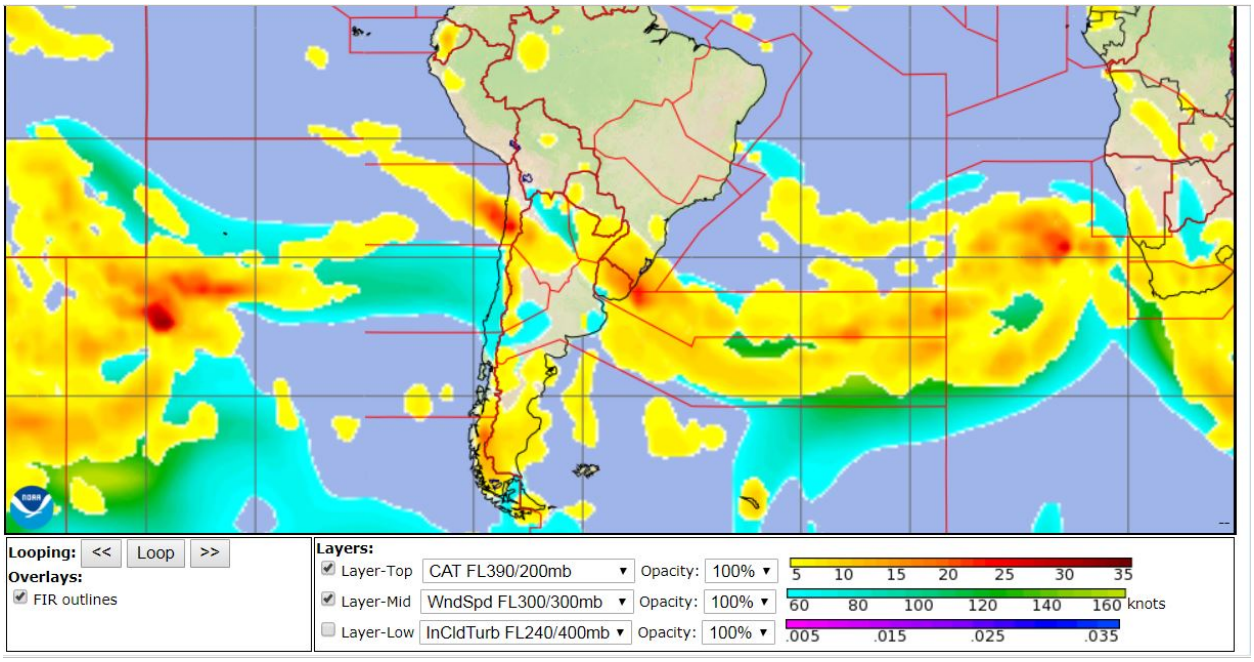
1.2 In 2018-19 improved algorithms that forecast Icing and Turbulence severity will be introduced.

2. DISCUSSION

2.1 This paper highlights the gridded data, specifically the current icing and turbulence potential. For ease of viewing, the data is visualized via the experimental viewer located at: https://www.aviationweather.gov/wafs. This website demonstrates how the WAFS gridded data can be displayed. For more information on how to gain access to the gridded data, see the link to the WIFS website at: https://www.aviationweather.gov/wifs/

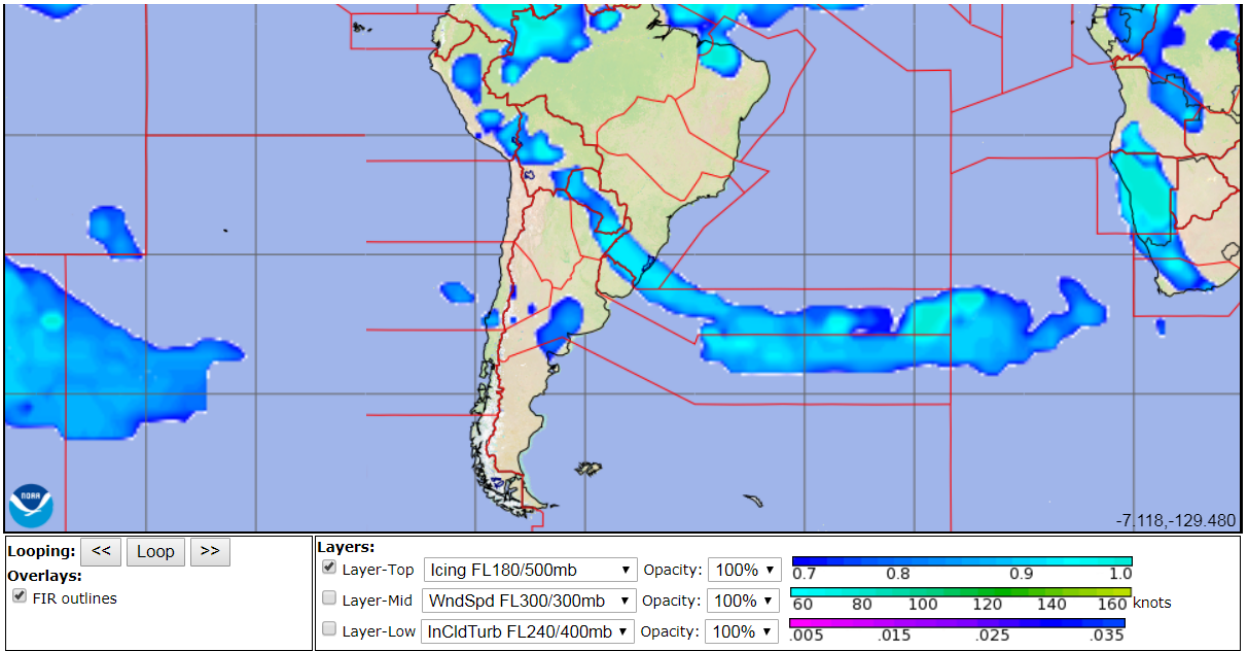
Turbulence – currently is derived via an algorithm that is based on the Ellrod Index. The Ellrod Index results from an empirical technique for forecasting clear-air-turbulence (CAT). The index is calculated based on the product of horizontal deformation and vertical wind shear derived from numerical model forecast winds aloft. The theoretical limit to the data range is zero to one hundred, but over 98 percent of the values will be below 11, and they will rarely exceed 40. The numbers are not a probability, but are instead a potential of encountering turbulence of any severity.

Example:



Icing – The icing algorithms are based on a combination of cloud condensate (ice and water), temperature, relative humidity and vertical motion parameters that estimate the presence of super-cooled liquid water. The values range from 0 to 1 and are a potential for the presence of icing.

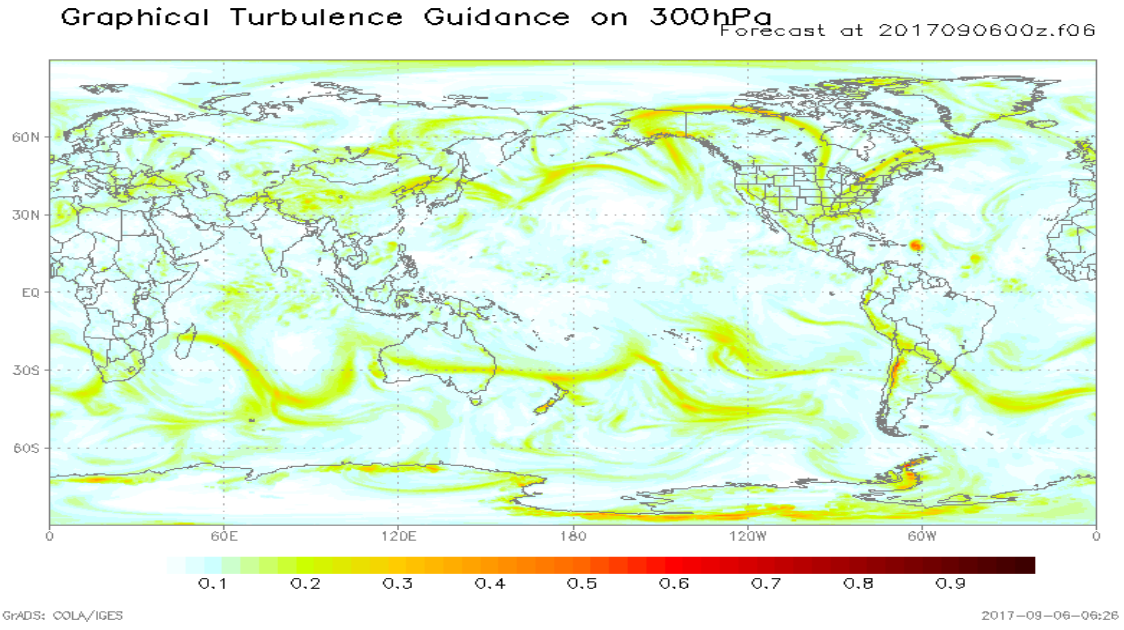
Example:



2.2 The new severity algorithms for icing and turbulence can be found and viewed at the following non-operational site: http://www.emc.ncep.noaa.gov/gmb/icao/grdplot/plot.html

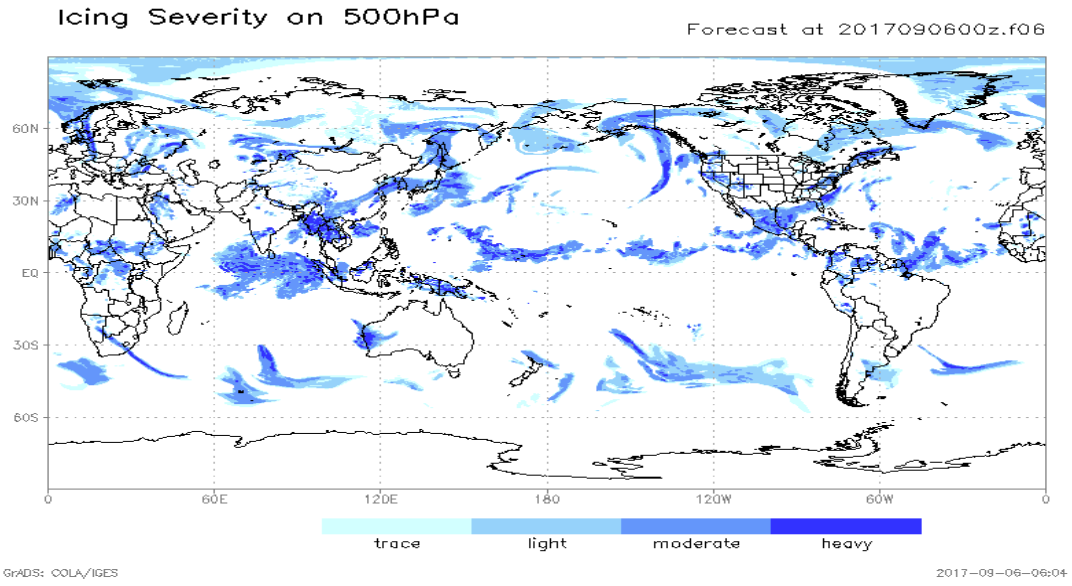
Turbulence severity – The new algorithm is an optimal solution out of multiple turbulence diagnostics for both CAT and Mountain Wave Turbulence (MWT). The final product is an Eddy Dissipation Rate (EDR) scale, which is a physically sound magnitude (severity) of turbulent eddy in atmosphere, which is the ICAO standard for turbulence report.

Example:



Icing severity: The new algorithm for icing is based on the fuzzy logic algorithm estimating the optimal solution of super-cooled liquid water droplet in atmosphere. It is using the model outputs, satellite and radar observation data (where available), and METAR data, and then is matched with the observed pilot reports (PIREPs) for icing severity.

Example:



3. NEXT STEPS

3.1 Work with States to collect feedback and planned implementation scheduled for 2018-19.

States wishing to provide feedback should contact Matt Strahan via e-mail at: matt.strahan@noaa.gov

4. RECOMMENDATION

4.1 The group is invited to note the information above.

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