Forecasting Challenges through the Years

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1. INTRODUCTION

This informative paper provides a brief history of operational meteorology conducted for the United States Antarctic Program from the 1980s to present. It outlines major improvements in systems, guidance, and the meteorology community which have enhanced the skill set of the current forecasting and observing operations. In review this paper is expected to bring forth not only the improvements made in recent years but look at a practical sense of the continued difficulties that plague flight operations in this austere environment to include the lack of normality within seasonal patterns, and difficulties establishing impacts to operations in a changing environment.

2. HISTORICAL MILSTONES

1987 - With the installation of the first TeraScan system "GODDESS" it provided the first time forecasters could animate images. Short range forecast accuracy improved ~5% (based on go-no go tracking).

1991 to 1994 – After the end of the cold war and Russia economic collapse forced the closure of Molodezhnaya and Novolazarevskaya stations and applicable intercontinental air transport. The reduction of the Russian Antarctic Program eliminated many manned stations providing weather reporting. Forecast accuracy had a slight and slow decline.

2000 to present – Many improvements have allowed a peak with another roughly 5% increase in short term forecasts from the peak in 1988 – 1991 and an unmeasured notice in the ability to have confidence in longer range projections (24 – 48 hours). Improvements include:

1. Cooperative with science / research NCAR, OSU, U/W
2. Implementation of AMPS MM5/WRF
3. AWS network to include unification through AMRC cooperative and LDM Software
4. Increased number of orbital satellites decreasing the mid-day gap
5. Joint science/operations awareness through established relationships, meetings, and active correspondence providing new concepts for tools and education

3. CHALLENGES IN EVALUATION PERFORMANCE

Logging IMC vs. VMC weather elements it stands clear the "norm" is merely an average of extremes. Annual tracking shows each season has its own characteristics impacted by variations in the global and regional situations. From the early 2000's with ice bergs changing the Marginal Ice Zone (MIZ) impacting the seasonal variability to the lack of sea ice during the 2010-2011 summer season where exaggerated meridional flow expressed a greater influx of horizontal heat exchange in the Ross Sea in the spring through early summer period.

Seasons range from extremely active IMC periods to lulls in hazardous weather conditions. It is noted that even seasons with high activity do not follow similar patterns from month to month. This vast difference adds to the difficulties to make seasonal pattern forecasts. Individual system inconsistencies are mostly driven by extreme terrain issues coupled with small nuances within the system's structure. Although AMPS provides a great detail of information a greater focus over the upcoming years to indentify patterns in grouped

observational devices in tandem with system pattern recognition. The outcome is expected to yield the highest level of forecast proficiency with the current guidance available.