

Portable Doppler Radar Evaluation Plan at Phoenix Field, Antarctica

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Motivation:

Antarctica is a meteorologically data sparse region which encumbers operational forecasting. Historically, the only spatial data source for United States Antarctica Program (USAP) forecasting personnel to evaluate has been polar-orbiting satellite imagery which still has latency and quality issues. To address this problem, the United States Air Force has loaned a portable Doppler x-band radar for deployment to Phoenix Airfield for the 2019-2020 USAP operating season. There is little known on the efficacy of operational x-band Doppler radar in an arid polar environment. This presentation will discuss the planned methods for evaluating the x-band radar's capability to detect local meteorological phenomena and the radar's limitations in Antarctica's unique environment.

Test Plan:

Three primary analyses will be conducted to determine the added value of x-band radar to Antarctic operational forecasting: product evaluation, phenomena evaluation, and case studies. For product evaluation, each of the radar products produced through the

incorporated software suite will be juxtaposed with other data sources for spatial and temporal validation. Phenomena evaluation will be conducted in a similar fashion but focused on anomalous propagation and attenuation effects that could affect that radar's functionality. Case studies will be used to document unique meteorological situations and standard setups that are commonly forecasted. The case studies will become primary resources to train new forecasters on the incorporation of x-band radar data into operational forecasts.

Conclusions:

Fully understanding the radar's capabilities and weaknesses is essential to maximize added benefit to the forecasting process without comprising safety. The evaluation will be conducted through juxtaposition with well known data sources and accumulated forecasting knowledge. The documentation produced from the evaluation of the deployment of the first operational weather radar to McMurdo Station will set the foundation for future generations of USAP forecasters.