Ross Island Area Severe Weather Conditions

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Abstract:
Antarctica is home to some of the harshest weather on planet earth. Temperatures regularly drop well below zero with snow and windstorms reducing visibilities to near zero. Every year, numerous locations across Antarctica experience severe weather. The Ross Island region of Antarctica, home to the United States Antarctic Program (USAP) McMurdo Station, is no exception. In the USAP, there are three levels or conditions of severe weather: Condition 1, Condition 2 and Condition 3. Condition 1 is characterized by winds above 55 knots, wind chill lower than -100 degrees Fahrenheit, and/or visibility of less than 100 feet. Condition 2 is characterized by winds between 48 and 55 knots, wind chill between -74 and -100 degrees Fahrenheit, and/or Visibility between 100 feet and a quarter mile. Condition 3 is anything less severe than Condition 2. This project analyzes the severe weather conditions declared on and near Ross Island. The next goal for this project is to search for satellite imagery to contribute to case studies of these events. Combined with the frequency and trends of severe weather occurrences, this study aims to characterize the worst weather occurring in this region. The project results will help forecasters and logistics planners who support scientists’ travel to Antarctica. This is the first analysis of these severe weather conditions as declared in this region of Antarctica, and the first attempt at bringing all available information together into one place.

Sample Data

Reporting Locations
- Phoenix Field (Pegasus Prior to 2017)
- Road to Phoenix Field (Road to Pegasus Prior to 2017)
- LDB Site (Offline for most of 2016)
- Williams Field (Offline October 2009 to August 2014)
- T-Site
- Arrival Heights
- Scott Base
- Road to Scott Base
- Ice Runway (Only up to 2010)
- Road to Ice Runway (Only up to 2010)
- McMurdo Station
- Sea Ice (September 2018-Present)

Observations
- Phoenix, Road to Phoenix, LDB Site, Williams Field, Sea Ice Frequent Con 1 and 2
- Arrival Heights, T-Site Frequent Con 2
- Road to Scott Base occasional Con 1 or 2
- Scott Base, McMurdo; Con 1 or 2 rarely
- Ice Runway and Road to Ice Runway data prior to 2010
- August 2014 EXTREMELY Active

Satellite Imagery August 15, 2014
- Condition 1 occurring at Pegasus (now Phoenix), Road to Pegasus, LDB Site, T-Site and Arrival Heights (High winds, reduced visibility due to blowing snow)
- Condition 2 occurring at Road to Scott Base and McMurdo (High winds, blowing snow)

Future Case Study Work
- November 2009
- 2011-2012 (Lack of Severe Weather Conditions)
- August-October 2014 and 2015
- October 2017
- August 2019

Antarctic Meteorological Research and Data Center
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Antarctic AWS Observations
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