



Cloud Mass Transport from the Southern Ocean into Antarctica

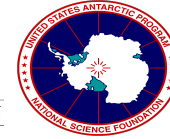
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Abstract :

Building on work by Staude, a 20 year study of Southern Hemisphere satellite composite images from 1992 through 2011 was conducted, looking for large cloud masses that entered the continent perpendicularly to the coast. These cloud mass transports (CMTs) are associated with extreme weather events at the surface including very cold temperatures and strong winds. By extending the time series to 20 years, we are hoping to reveal patterns in CMT events or correlations between events and other meteorological phenomena.

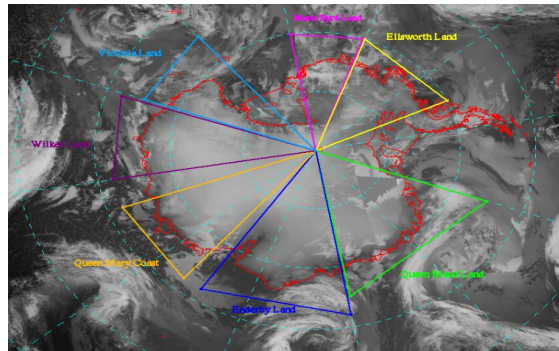


Fig 1. A map showing the seven sectors where CMT was studied. (Courtesy of Elena Willmot, 2010)

Definition of an Event:

To determine what qualifies as an "event", certain specifications need to be met:

- The cloud mass entering the continent must enter perpendicular to the coast
- It must penetrate inland rather than be broken up by coastal topography
- Must last for a minimum duration of 48 hours
- To be counted as two separate events, these criteria must NOT be met for a minimum of 12 hours

Events were counted based on location around the perimeter of the continent which was divided into 7 sectors as shown in Figure 1.

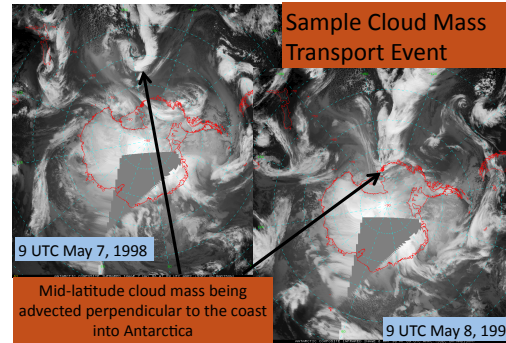


Fig 2. An example of the beginning of a transport event.

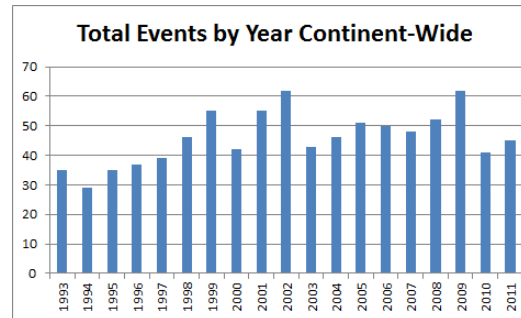


Fig 3. A climatology of the total number of CMT events recorded for each year between 1993 and 2011 for all sectors.

AMRC website: <http://amrc.ssec.wisc.edu>

Future Directions:

- Compare data to several different meteorological indices including:
 - Southern Annual Mode
 - Pacific – South American Pattern
- Characterize CMT events based on:
 - Location
 - Duration
 - Frequency
 - Etc.

in order to aid in logistical planning in the Antarctic

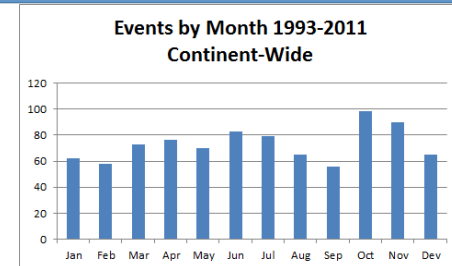


Fig 4. A count of all CMT events in every sector for each month between the years 1993 and 2011.

Conclusion:

Antarctica is known to be battered by severe storms which can prove to be dangerous for researchers, equipment, and station personnel. West Antarctica is especially dangerous for travel since weather observations from Automatic Weather Stations (AWS) are sparse, and even those stations were only recently installed. Satellite imagery has become increasingly useful in examining weather patterns and forecasting. With this data, better logistical planning will improve safety and reliability for all who conduct research in the Antarctic.

Acknowledgements:

This material is based upon work supported by the National Science Foundation, Office of Polar Programs under grant numbers ANT-0838834 and ANT-1141908