
Victoria (Vicki) Heinrich
PhD candidate
School of Psychological Sciences
College of Health and Medicine, University Of Tasmania, Australia
Supervisors: Prof Kimberley Norris, Dr James Sauer, Dr Matthew Palmer, Prof Andrew Heathcote
Introduction & background
Research project
Work environments, information sources and weather decisions.
Why weather information use and decision-making in Antarctica?

To understand:

Why do people make the decisions they do?

What can be improved?

Psychology is the scientific study of human cognition and behaviour.

Photos: Vicki Heinrich, Pete Hargreaves

Year of Polar Prediction

Antarctic Experience
PhD Project: Use of Weather and Climate Information: Risk Perception and Decision-making in Antarctica and Australia.

Aim:
To understand factors that lead to good versus poor weather-related decisions and manage operational risks.

To improve education, training, weather services, decision-making, performance, and human safety.

Gap:
Limited research and understanding of weather information use and decision-making in the Antarctic and sub-Antarctic.

Research questions:
How, when, and why do people use the weather, climate and other environmental information in their decision-making in the Antarctic and sub-Antarctic?

What are their weather decision-making and advice networks?

Mixed methods design:
Online survey and qualitative semi-structured interviews (2019 – 2020) to participants deployed within the last 3 years.

62 survey participants and 35 interviews, over 40 hours of data.

Qualitative (thematic analysis) and quantitative (statistical) data analysis underway, papers in progress.

Ethical considerations:
small population, transient, known to each other, research fatigue

Metacognition: awareness or analysis of one’s own learning or thinking processes (Flavell, 1979)
Survey Demographics

Country of Residence
- United States & Canada: 15%
- United Kingdom: 6%
- Australia & New Zealand: 58%
- France, Italy, Spain, Norway, Sweden, Ukraine, Russia: 15%
- South Korea & India: 3%

Cumulative Antarctic Experience
- Low (< 6 months): 16%
- Medium (6-12 months): 16%
- High (1-2 years): 26%
- Very High (> 2 years): 42%
Deployment / work locations
Weather and environmental information or training before departure, or while deployed

Yes, weather or environmental information: 74 responses
Yes, training: 42 responses
No: 19 responses
Work Environments: For an average week, approximately how much worktime would you spend...

- **In a climate-controlled building**
  - Never (0%)
  - Some of my work time (<25%)
  - About half of my work time (50%)
  - Most of my work time (>75%)
  - All my work time (100%)

- **On a ship**
  - Never (0%)
  - Some of my work time (<25%)
  - About half of my work time (50%)
  - Most of my work time (>75%)
  - All my work time (100%)

- **On station**
  - Never (0%)
  - Some of my work time (<25%)
  - About half of my work time (50%)
  - Most of my work time (>75%)

- **On small watercraft**
  - Never (0%)
  - Some of my work time (<25%)
  - About half of my work time (50%)
  - Most of my work time (>75%)
  - All my work time (100%)
Usefulness of weather information rating: Not at all useful (1) to Most useful (10)

1. Wind speed and direction
2. Weather information or advice from a trained weather professional
3. Short-term weather forecast (i.e., hours to 1 day)
4. Current real-time data from an automatic weather station
5. Air temperature
6. Your experience in Antarctica and/or the sub-Antarctic
7. Just look out the window/ observe conditions for yourself
8. Aviation weather reports / present weather observations (i.e., cloud, visibility, weather type)
9. A multi-day forecast (i.e., 4, 7, or 10 day forecast)
10. Ensemble model data (i.e., US WRF model; AMPS) or graphical forecast model

Bromwich et al., (2020)
Accessing weather information via the internet

www.windy.com
www2.mmm.ucar.edu - AMPS
Ensembles (spaghetti plots)
www.bom.gov.au
BoM / AAP intranet
GRIB files
USA NSF intranet
Email
www.yr.no
USAP NSF weather services
IPEV intranet
US Naval Observatory
www.willyweather.com.au
www.earth.nullschool.net
www.ogimet.com
www.passageweather.com
www.windguru.com
www.accuweather.com
www.aviationweather.gov
www.usap.gov
www.antarctica.gov.au
www.vigiprevi.meteofrance.com
www.ventusky.com
www.antartida.aemet.es
www.weather.msfc.nasa.gov

AEMET intranet
Antarctic Meteorological Research Center USAP
National Climatic Data Center (US)
www.weatherunderground.com
www.theweathernetwork.com
www.smn.gov.ar
www.fever.byrd.osu.edu
www.spotwx.com
www.awi.de
www.weather.com
What are people’s weather decisions?

Are the weather conditions suitable for the planned job?

Is the weather worsening?

What time will the weather change occur?

How many days do we have good (suitable) conditions for?

Will we be safe and comfortable?

What clothing or equipment will I need?
Findings:

People use weather information to plan, schedule, start and stop tasks, find weather windows, and manage safety.

Weather-related decisions are most often discussed with work colleagues, weather professionals, supervisors, and station management.

Participants are constrained by weather conditions and limited information.

Top sources of weather information are websites, station intranets, forecasts, current weather displays, and meteorological professionals.

58% of participants spent at least half of their worktime outdoors, only 16% always worked in climate controlled buildings. 40% spent some worktime (¼) on small watercraft and 16% worked mostly (¾) or always on ships.

Results demonstrate that for participants current and future functioning, and planning, decision-making, and risk management needs in Antarctic and sub-Antarctic regions:

- Access to detailed, reliable, location specific, high resolution, quality weather information
- Education in using and interpreting information
- Enhanced, tailored services and products in all seasons

Are important.


This research contributes to the research of the Polar Prediction Project, Societal and Economic Research and Applications (PPP-SERA) program initiated by the World Weather Research Programme (WWRP) of the World Meteorological Organisation (WMO).