Use of Weather Information: Risk Perception and Decision-Making in the Antarctic and Sub-Antarctic

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Understanding and managing risk in remote and extreme environments

To avoid hazards, manage risks, stay safe, and successfully carry out their outdoor activities, people in the Antarctic make weather-related decisions every day. Decision errors and a lack of situational awareness can lead to adverse incidents, deaths, costly rescues, and environmental emergencies. There is limited peer-reviewed empirical research on Antarctic weather information use and related decision-making, perceptions of risk, services, or user needs. This psychological sciences PhD focuses on understanding weather information use and human behaviour in regions from Australia and Antarctica. It aims to inform service provision, training, and education, and support wellbeing, preparedness, and safer weather-hazard decision-making in Antarctica and globally.

Methods, Participants, and Analysis

A mixed-methods approach, including an online survey and 35 semi-structured interviews was used to explore how people find, interpret, and use weather information, and perceive and manage weather hazards and risks in Southern Polar Regions. Participants (N = 62) were self-selecting, English speaking adults over 18 years (M = 44.93, SD = 12.77, 29% female), with recent Antarctic and/or sub-Antarctic experience (M = 2.6, SD = 2.4 years cumulative time). Participants deployed across a range of roles, activities and locations (Figure 1) with National Antarctic Programs (48% Australian) and/or polar tourism operators (24%). Qualitative and quantitative data were collected and statistically and thematically analysed using MS Excel, SPSS and NVivo software. Throughout this study the first author drew on their lived experience, including during conceptualisation, question development, coding, interpretation, and reflexive thematic analyses.

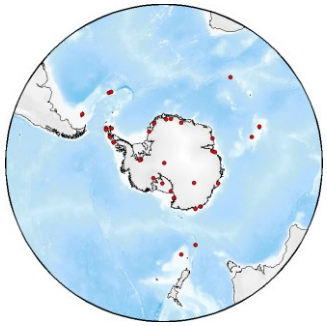

Figure 1: The deployment locations of all respondents across all visits. SOMaps (Maschette et al., 2019).

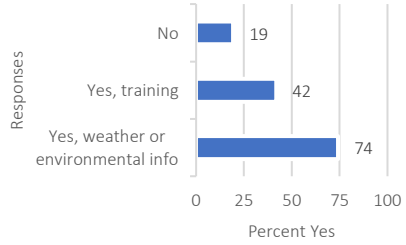

Figure 2. Was weather and environmental information or training provided by an employer before departure, or while in Antarctica and/or the sub-Antarctic.

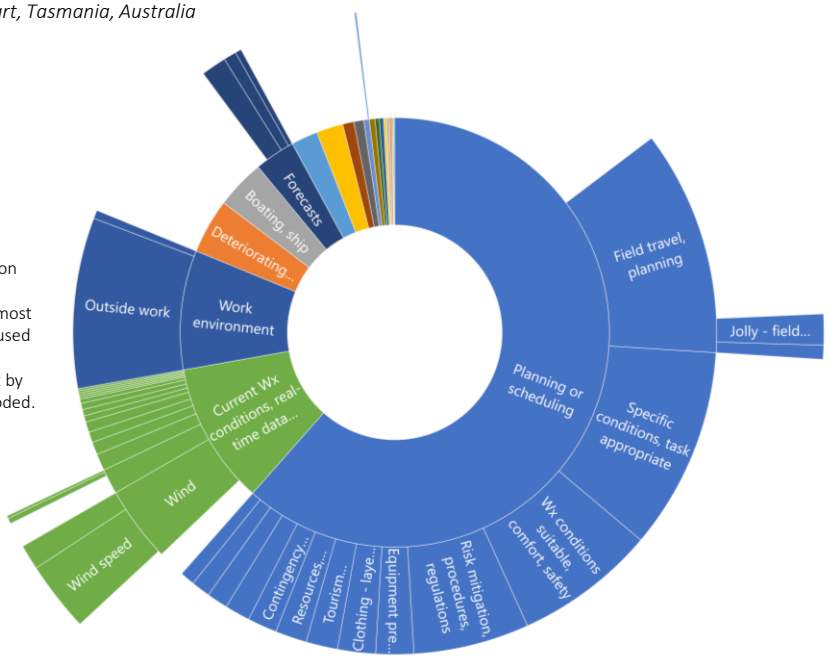

Figure 3: Weather decision themes from responses describing participants' most common decisions that used weather information. Sunburst hierarchy chart by number of references coded.

Findings

Levels of weather service provision and training varied and were often not fit-for-purpose. Concerningly, 19% of participants received no weather-related training or information (Figure 2). Which weather information source was used when, and how, depended on people's decision contexts, location, activities, experience, and knowledge. Antarctic decision-makers were continuously accounting for, considering, prioritising, and integrating multiple factors and information sources (not just weather information), throughout their pre-activity and in-activity planning and decision-making. Most decisions were strategic, using predictions for pre-activity planning and scheduling (Figure 3). However, during activities, continuously updated real-time weather data and personal observations, along with local knowledge and experience were important for reactive and tactical decision-making. Real-time observations and experience assisted participants with maintaining situational awareness, managing safety and comfort, and adaptation to changing conditions and risks profiles. Further research is needed. However, polar prediction models are of poorer quality and forecasts, observations and services are scarce and often inaccessible. Inadequate information, in conjunction with the inadvertent use of inaccurate or unreliable information, exacerbated by a lack of skills and training in finding, interpreting, and using weather information, may lead to poorer decision-making performance. The consequences of poor performance include inefficient operations, increased risks to human and environment safety, and less resilient Antarctic communities. Results contribute to our understanding of the challenges, barriers, and needs facing polar weather users, and how we may support people in Antarctica to develop the experience, knowledge, and non-technical skills necessary for safe, efficient, and successful outdoor activities.

YOPP YEAR OF POLAR PREDICTION
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