AUTOMATED WHALE DETECTION AND LOCAL, HIGH RESOLUTION ICE MAPPING USING A 360° SHIP-BASED THERMAL IMAGER

D.P. Zitterbart[1,2], L. Kindermann[1], E. Burkhardt[1], O. Boebel[1]

[1]AWI, [2]Erlangen University

Time: Sometime between Friday 11 June 16:00 and 17:30
theme: Theme 5. New frontiers, data practices and directions in polar research
session: T5-2 Polar observing systems
event: Poster session PS3 - Section A
location: Hall C

Ship borne visual observations are the predominant method to detect whales in the context of cetacean research and mitigation efforts during noise producing anthropogenic marine activities. Detections in most cases rely on spotting the whales' blow, which is frequently of low contrast and visible for a few seconds only, requiring utmost concentration of the observer. Hence, to reliable conduct such observations for multi-week periods on a 24h per day basis, large teams of observers are necessary to compensate for observer fatigue and the limited human field of view. Moreover, visual observations are restricted to daylight hours.

For high-latitude regions, a whale's blow contains fluid droplets which are significantly warmer than the polar environment, making thermal imaging a promising detection method for both day- and night-time. Here we present first results from a ship-borne, 360°, thermal imager, FIRST-Navy (RDE, Germany), which provides a continuous video stream of the ship's perimeter. The imager is mounted in the crow's nest of RV Polarstern and comprises a fully stabilized gimbal and a high resolution, 8-12 µm cooled infrared scanner.

Video data collected near Spitsbergen reveal that whale blows were clearly visible up to a distance of at least 1.5 km, even under relatively warm water conditions of 6°C. With decreasing water temperatures, detections ranged up to 3 km. Currently, automated detection algorithms are under development, with first results from an ongoing Antarctic cruise to be presented at this conference.

In addition, the IR video data may be used to generate a high resolution infrared map of the ship's immediate surrounding (approximately 1km). In particular, such images directly represent the local ice coverage in real time. This may be used for research applications, such as the calibration of satellite-based ice imagers or navigational purposes (finding leads or avoiding growlers), particularly at night.

Tip a friend Print view