

Multi-Hazard Management of Coastal Zones Supported by HF Radar

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HF radars have been installed in many coastal sites around the world to monitor ocean parameters between the coast and maximum of about 250 km offshore. The main product of phased array radars is gridded maps of surface currents, wave heights and wind directions. Maps of surface currents (see Figure 1) can be produced every 10 – 20 minutes which, in real-time, improve navigation safety in restricted areas commonly found near ports and harbours. The time-sequence of surface current maps enables Lagrangian tracking of small parcels of surface water. This analysis of the data is being used for hazard mitigation in managing suspended sediments in dredging, in emergency situations where flotsam and other drifting items need to be found, and in pollution control.

Additionally the surface current measurement capability is used to assist tsunami warnings. The newly launched Tsunami Warning Center in Oman includes a network of phased-array HF radars to provide real-time tsunami monitoring.

Real-time mapping of significant wave heights is being used to improve operational safety for coastal shipping and small boats. Long-term records of wave heights are needed for managing the coastal environment.

Wind direction maps are being used to locate the position of cold fronts in the open ocean and to monitor the timing and strength of sea-breeze fronts in key locations.

This paper presents case studies showing how HF radars are currently being used for monitoring these ocean parameters at various sites around the world. The oral presentation will end with an example of hazards whose impact could be reduced with an HF radar installation.

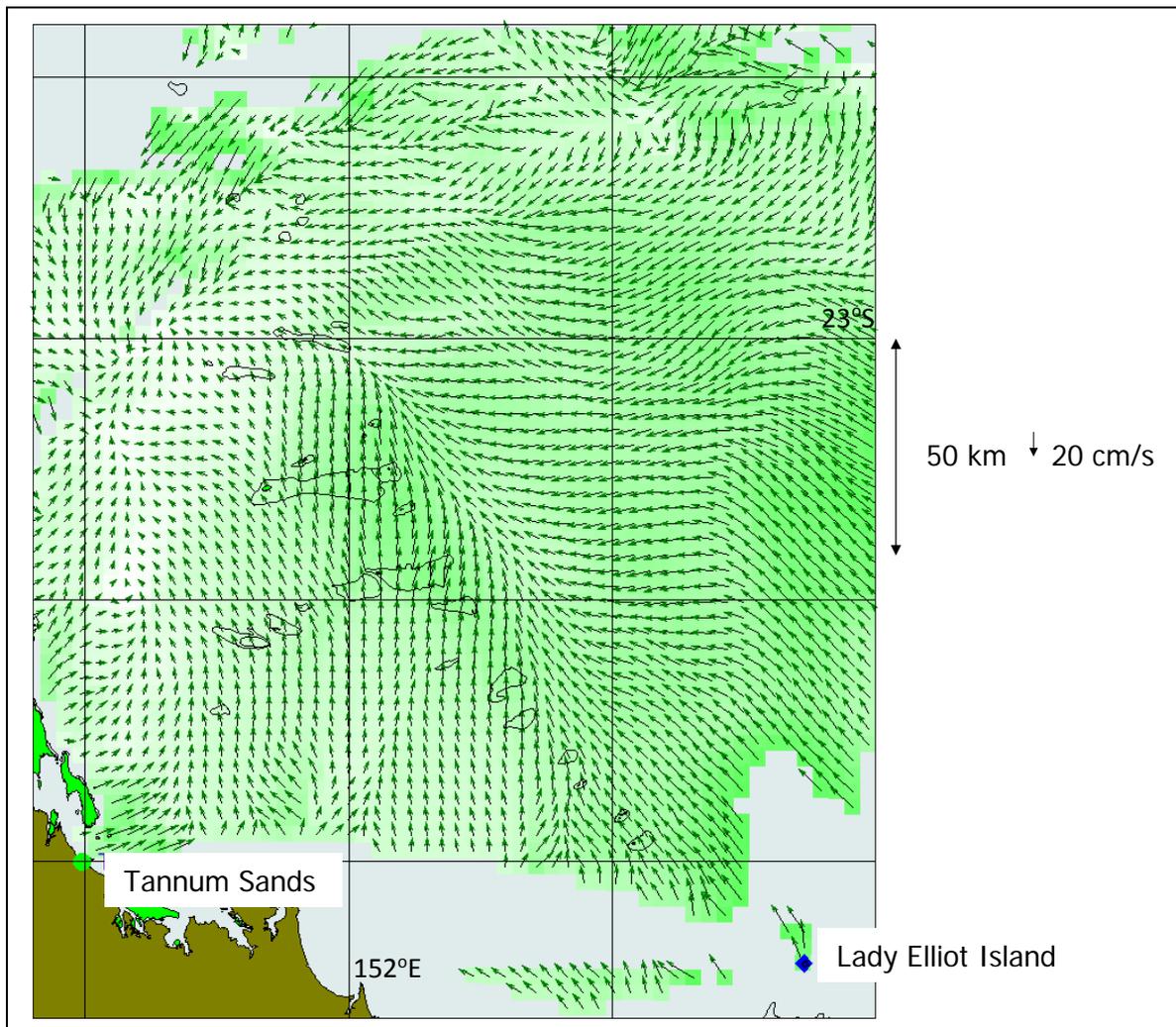


Figure 1. Gridded surface current vectors from the phased array HF radar stations at Tannum Sands and Lady Elliot Island in the southern Great Barrier Reef.