

Ocean robotics in support of fisheries research and management

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ABSTRACT:

South Africa's small pelagic fishery is an important component of the country's commercial fisheries sector, second in value only to the demersal trawl fishery. Management of this sector relies on frequent hydro-acoustic surveys, which provide measures of anchovy *Engraulis encrasicolus* and sardine *Sardinops sagax* biomass used in the assessments of stock status and in the development of management plans for the sustainable utilisation of these resources. We demonstrate how the current technological capabilities in ocean robotics at the Council for Scientific and Industrial Research (CSIR) could augment the current resource-intensive hydro-acoustic ship-based survey programme and create opportunities for its spatial and temporal expansion. We successfully implement and demonstrate an autonomous wave glider, fitted with a hydro-acoustic sensor and compare the data to a collocated 'traditional' ship-based acoustics survey. In the future these autonomous systems approaches could be seen as a means to lessen the cost burden of the ship-based survey, while at the same time with the added advantage of continuous collection over much wider spatial and temporal domains. Gliders thus have potential to increase dramatically the quantity of information available to fisheries managers, thereby reducing uncertainty and contributing to improved management of valuable fish resources. They are likely to contribute to improved knowledge of the ecology of small pelagic fish species off the coast of South Africa in a changing climate and should potentially also permit the collection of biomass data for other marine resources currently not routinely monitored.