AGU Abstract
Program: Ocean Mesoscale Processes

The quiet revolution: continuous glider monitoring at ocean 'choke' points as a key component of new cross-platform ocean observation systems

A quiet revolution is taking place in ocean observations; in the last decade new multi-platform, integrated ocean observatories have been progressively implemented by forward looking countries with ocean borders of economic and strategic importance. These systems are designed to fill significant gaps in our knowledge of the ocean state and ocean variability, through long-term, science and society-led, ocean monitoring. These ocean observatories are now delivering results, not the headline results of a single issue experiment, but carefully and systematically improving our knowledge of ocean variability, and thereby, increasing model forecast skill and our ability to link physical processes to ecosystem response.

Here we present the results from a 3-year quasi-continuous glider monitoring of a key circulation 'choke' point in the Western Mediterranean, undertaken by SOCIB, the Balearic Islands Coastal Ocean Observing and Forecasting System. For the first time data from the high frequency glider sampling show variations in the transport volumes of water over timescales of days to weeks, as large as those previously only identifiable as seasonal or eddy driven. Although previous surveys noted high cruise-to-cruise variability, they were insufficient to show that in fact water volumes exchanged through this narrow 'choke' point fluctuate on 'weather' timescales. Using the glider data to leverage an 18-year record of ship missions, we define new seasonal cycles for the exchange of watermass, challenging generally held assumptions regarding the northward flow and providing a full annual cycle for the southward flow. The pattern of the exchange is further simplified through the characterisation of 5 circulation modes and the defining of a mean annual cycle for the interplay between mesoscale and basin scale dynamics. This new insight will be vital in improving our regional model skill and in the development of integrated ocean products for society.

Restricted 'choke points' between our ocean basins are critical locations to monitor water transport variability, as they constrain the inter-basin exchange of heat, salt and nutrients. In the Ibiza Channel, the exchange of watermass is known to affect local ecosystems, including the spawning grounds of commercially important fish stocks, at a biodiversity hotspot.

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