



Tanzanian and UK scientists develop affordable ocean drifters to investigate the sustainability of local fisheries

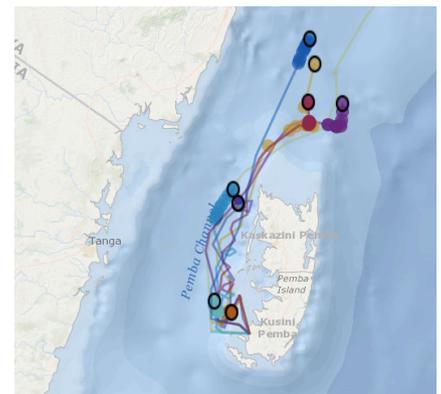
Partners from the Tanzanian Institute of Marine Studies and the UK National Oceanography Centre deployed a series of user-developed satellite-tracked ocean drifters in the Pemba Channel (West Indian Ocean) in a de-risking exercise ahead of experiments with ocean robots in 2019.

The experiment used nine simple surface drifters that were constructed from inexpensive, off-the-shelf electronics, and locally available materials, to identify the complexity of flow in the lee of Pemba Island, north of Zanzibar, during the South-East monsoon season, the most energetic period for this part of the West Indian Ocean (WIO).

The deployment had two objectives. First, to better understand the small-scale dynamics of the flow of the Pemba Channel, which is not typically covered by established global drifter monitoring programmes; and second, to identify potential challenges and risks ahead of a more comprehensive SOLSTICE observational campaign due to take place in 2019, that will include deployment of submarine gliders from the National Oceanography Centre's National Marine Facilities – Marine Autonomous and Robotic Systems (NMF-MARS) fleet.



Zanzibar and mainland Tanzanian coastal communities are dependent on local small pelagic fish (anchovies, sardines, mackerel, threadfin and herring) for food and income. The abundance of these fish varies from year-to-year, and these fluctuations may be linked with changes in the climate and marine environment, which can affect the food supply for both larval and adult fish. However there has been limited scientific research in this region, and consequently knowledge of the physical and biogeochemical mechanisms supporting these important fisheries is largely based on remote sensing and existing model data.



The drifters being tracked via GPS signal as they move through the Pemba Channel

The drifter experiment successfully identified numerous physical features, including the fast-flowing central currents associated with incoming WIO waters, and persistent eddies in the lee of small islands and outcropping shallow reefs. Tidal modulation of these features was clearly evident, and the drifters that managed to exit the Pemba Channel also identified the time dependency of flows into Kenyan waters to the north. These data will now be used - along with high resolution remote sensing data - to validate regional scale models to identify physical mechanisms contributing to productivity in the region.

In total, three separate deployments of three drifters were made over a two-day period, timed to capture the changing tidal and meteorologically driven dynamics in the Pemba Channel. The drifter deployments were made possible by the assistance of the Pemba Fisheries Department and Fisheries Patrol.

The Global Challenges Research Fund (GCRF) is a £1.5 billion fund, which supports cutting-edge research and innovation that addresses the global issues faced by developing countries. SOLSTICE is part of the Research Councils' GCRF Growing Research Capability call launched in 2016. The call was developed to grow research capacity around the globe and to strengthen and broaden skills and expertise to address specific challenges of developing regions and countries.



About the SOLSTICE Project

Poor coastal communities are at the frontier for climate change impacts, compounded by population growth and food demand, but are among the least resilient to the challenges of the future.

SOLSTICE is a four year collaborative Global Challenges Research Fund project that brings together recent advances in marine technologies, local knowledge and research expertise to address challenges facing the Western Indian Ocean region in a cost-effective way via state-of-the-art technology transfer, collaborative environmental and socio-economic research and hands-on training.



The project outcome described in this Success Story contributes to the following objectives of the GCRF program “Growing research capability to meet the challenges faced by developing countries.”

Objective	Contribution
Strengthening capacity of individuals, organisations and institutions of DAC-listed countries to effectively carry out and disseminate high quality research	HIGH
Strengthening capacity of UK organisations to undertake interdisciplinary research in ODA context	HIGH
Strengthening capacity of UK organisations to apply leading-edge technologies in developing countries (remote sensing, ocean modelling, robotics)	HIGH
Creating equitable partnerships characterised by transparency, joint ownership, mutual responsibility and benefits for all partners	HIGH
Addressing GCRF challenge area “Secure and resilient food systems supported by sustainable marine resources and agriculture”	LOW/MEDIUM
Interdisciplinarity (collaborations which bring together a breadth of disciplines to effectively tackle the development challenges)	LOW
Developing global research networks	MEDIUM