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Space satellites help UCT researcher dive into study of southern African ocean currents

Marjolaine Rouault's PhD thesis, *Agulhas current variability determined from space: a multi-sensor approach*, used complex earth observation techniques to study the major ocean currents around southern Africa.

Rouault's research approach, which employed data from various Earth-observing satellites, was very successful in identifying both the average and variable nature of the ocean's surface flow. Her use of a combination of regular satellite-based observing techniques was used to gain better insight into the structure and evolution of large offshore instabilities that propagate slowly south-westwards downstream. These so-called "Natal Pulses" and other large offshore meanders were explored in a systematic manner, and have resulted in new and exciting results on the structure and variability of this major current system.

This very strong current hugs the narrow continental shelf of Africa's southeast coast, and subsequently makes a U-turn south of the continent back into the Indian Ocean. This major current has been sparsely sampled by standard *in situ* ocean measurement systems, so Rouault used both conventional satellite-derived measurements and the novel use of new Synthetic Aperture Radar Doppler derived radial current speed, from the Advanced Synthetic Aperture Radar instrument on the Environmental Satellite (ENVISAT).

Rouault's multi-sensor approach included the use of METEOSAT (a series of meteorological satellites providing images of weather systems and atmospheric data) second generation Spinning Enhanced Visible and Infrared Imager sea surface temperature, Aqua Moderate Resolution Imaging Spectroradiometer ocean colour, altimetry and ENVISAT synthetic aperture radar to map the highly dynamic Indian Ocean western boundary Agulhas Current System. The results from her study were recently published in two papers in international refereed journals.

Rouault has an MSc in Oceanography from UCT. She has worked in private industry as a consultant, and more recently has been working full time at the Council for Scientific and Industrial Research in Earth Observation. During this time she has been involved in processing satellite remotely sensed data from different sensors and satellites to provide data for her doctoral research. Her PhD in Physical Oceanography was supervised by Professor Frank Shillington of the Department of Oceanography.

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Please note: Information in this release is based on the supervisor's citation for the PhD thesis. UCT advises journalists to obtain a copy of the thesis and/or interview the PhD graduate to verify and expand on this information.

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