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Chiefs of Staff, News Directors

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Professor: Boats, crews and gear all count, but race entrants must go with the flow

It's not quite where the rubber meets the road. But it is where yacht racing encounters the numerous mysteries of the ocean – enough to occupy the thoughts of crew sitting on the 'rails' in this year's 630-nautical mile Rolex Sydney to Hobart Yacht Race.

Perhaps the most fascinating, says Professor Craig Johnson, from the University of Tasmania's Institute for Marine and Antarctic Studies, focuses on what drives the system of ocean currents tracking south, north and eastwards further into the Tasman Sea, and the accompanying ocean eddies.

The University of Tasmania is sponsoring Dr Tony Lyall's 52ft *Cougar II* in this year's Sydney-Hobart race, and it will be a hot chance for a podium finish on handicap if the crew reads the lanes on the ocean – the ocean currents – correctly.

Professor Johnson says that in 1944, a year before the first Sydney-Hobart yacht race, scientists began taking measurements in the Tasman Sea east of Maria Island, beginning what has become one of the longest series of ocean observations in the country. The data from those observations is held by the Integrated Marine Observing System (IMOS).

From these measurements they know that ocean temperatures in this region have increased by about 2˚C over this time as a result of the East Australian Current (EAC) shedding more frequent and larger eddies at the point about half way down the NSW coast where the EAC turns eastwards towards New Zealand.

These eddies track southwards, crossing Bass Strait and moving down the coast of Tasmania. Since 1980 this change in ocean circulation has seen nearly 50 species of fish establish in eastern Tasmanian waters.

"The East Australian Current itself is considered a meandering, low-nutrient warm water feature and before the aid of modern technologies sailors would use a thermometer to check that they were in the current and getting a lift to Hobart," Professor Johnson said.

"But this was hit and miss because eddies spin in either a clockwise or anticlockwise direction, and sailors armed only with thermometers had poor ability to tell whether they were in a part of the eddy giving them a slingshot towards Hobart or a part pushing them back towards Sydney.

“It is the nature of coastal geography and seafloor bathymetry, acting together with the winds, that drive the currents, shape the waves and influence the formation of ocean eddies. Knowledge of the exact position of currents, eddies and filaments provides a massive strategic advantage to any navigator looking for the slingshot to Hobart in a current running at up to 2-3 knots.

“Currents can also be a problem if a yacht ends up in a northerly flow or if the wind is against the current, which causes waves to build and steepen providing a rough ride and sometimes forcing sailors to back off to prevent damaging their boat.

“It is also at the boundaries between currents and eddies that the mixing of different waters can set up sites of high production and biodiversity – everything from plankton blooms through to tunas and game fish, and a host of other species such as sunfish which skippers have reported hitting in past races,” Professor Johnson says.

In contrast to testing the temperature of water in a bucket, Sydney-Hobart race entries can today access satellite information and the results of modelling to tell them about the location, velocity and direction of ocean currents and eddies. Competitive yachts will make it their business to use this information in sophisticated computer programs that will help them choose the fastest route to Hobart.

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