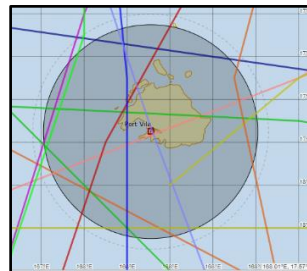
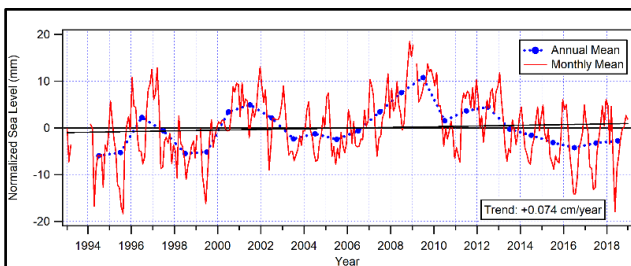
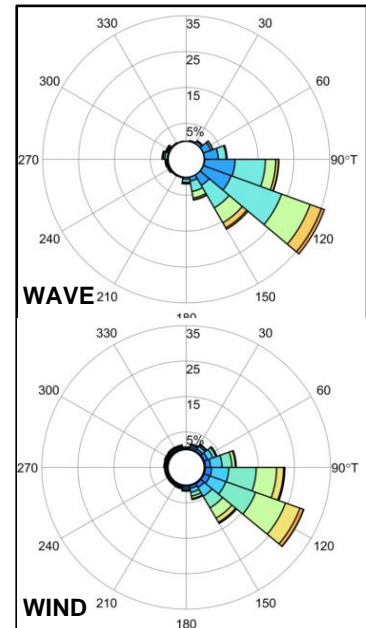


ASSESSMENT OF THE COASTAL ENVIRONMENT

LELEPA ISLAND, VANUATU



(top left) Lelepa Island located to the west of Efate.in Vanuatu (top right) Rose plots of wave and wind showing the dominance of the south-easterly trade winds (bottom L to R) Variation of mean sea level at Port Vila (1993 – 2019) showing the intra-annual variations (red line) as well as multi-year fluctuations (blue); Tracks of cyclones passing within 50 km of Port Vila; eCoast scientists deploying an Aquadopp wave, water level and current meter.

PROJECT INFORMATION:

Location: Lelepa Island, Vanuatu

Client: Downer Engineering, Royal Caribbean Cruises

Project Date: 2019

SCOPE OF WORK:

- Instrument deployment, data analysis
- Bathymetry survey
- Numerical modelling of coastal dynamics
- Coastal Hazard Assessment

PROJECT DESCRIPTION:

For this project we conducted a comprehensive coastal environmental assessment for Lelepa Island, Vanuatu. This included an ecological field survey, a detailed bathymetric survey and the deployment of oceanographic instruments to record water levels, wave heights and current speeds. This data was in turn used to develop and calibrate hydrodynamic models of waves and hydrodynamics for the purposes of informing a coastal hazards assessment. In addition, we conducted an analysis of tsunami hazards and assessed the tsunami inundation potential for the site. One of the key findings of this study is that Lelepa is situated in an area of very high coastal hazard. The island is in one of the most active cyclone regions on earth. Most recently, in 2015 Cyclone Pam, a category 5 tropical cyclone passed to the east of Efate. Despite being ~50 km from Lelepa, the wave and pressure surge inundated the village on the southern end of the island and resulted in the death of one resident. Cyclones notwithstanding, Lelepa also sits along a major tectonic plate boundary known to produce tsunamigenic earthquakes. The region around Lelepa has numerous reports of moderate to large earthquakes resulting in sometimes large and generally highly localised tsunami effects. Despite the omnipresent hazard, the northern areas of Lelepa Island are spectacular. The area features crystal clear water, abundant and diverse marine life and white coral sand beaches. If this project were to proceed the developers are strongly cautioned to incorporate the most stringent environmental and sustainability design principles to protect this fragile environment.