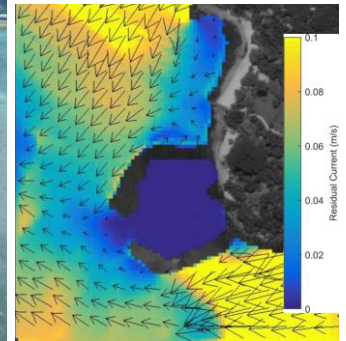


# COASTAL PROCESSES AND MARINA SILTATION

ANONYME ISLAND, SEYCHELLES



**(top L to R)** The finished marina and under construction in March 2018; modelled residual current speeds between September and December 2018 – the period of time when the siltation supposedly occurred. Note the lack of current vectors entering the marina. **(bottom)** Deploying a current meter; a proposed dewatering tube for separating dredged sludge from the water; proposed staging areas for the dewatering operation highlighted in red.

## PROJECT INFORMATION:

**Location:** Anonyme Island, Seychelles

**Client:** Anonyme Island Corporation

**Project Date:** 2019

## SCOPE OF WORK:

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

## PROJECT DESCRIPTION:

Anonyme Island is a small private island located approximately 500 m offshore of the mainland of Mahé Island in the Seychelles. We were engaged to investigate the causes of and remedies for a recently constructed marina that is shallower than its design depth. We conducted an instrumental field data campaign collecting in-situ wave, tide and current speed data and developed a calibrated numerical wave and hydrodynamic model.

Explanations for the marina being too shallow put forth included: infilling by currents between September 2018 when construction finished and December 2018 when vessels could not enter due to shallow water; slumping of the side walls of the marina; inappropriate construction methodology and sediment management and an erroneous bathymetric survey.

Each of these possibilities were considered in the context of the hydrodynamic forcing around the island. The results suggest that hydrodynamically forced infilling is unlikely, if not impossible due to fact that 1) the hydrodynamics do not support the transport of material into the marina and 2) there is no possible source for the requisite volume (10,000 m<sup>3</sup>) of silt to have been transported into the marina since the waters around anonyme are clear and silt free.

The slumping side wall hypothesis was discounted on the basis of dive inspections which found no evidence of slumping and also noted that the visibility in the marina improved over the course of the study while the thickness of the sediment layer was generally stable or decreasing suggesting that no new material was entering the marina.

Ultimately, we concluded that the likely cause of the shallow marina depths was a combination of the excavation methodology, sediment management and an erroneous post-construction bathymetry survey. Considering the construction methodology, which relied on mechanical extraction of material using excavators and storing the excavated material in mounds around the perimeter of the basin, it is easy to see how a large volume of fine material would have been left behind during construction or washed back into the marina during heavy rains. Due to the nature of the material in the marina basin, which is mostly silt and clay, the most effective means of removal would be using a suction dredge in conjunction with chemical flocculation and geotextile dewatering tubes.