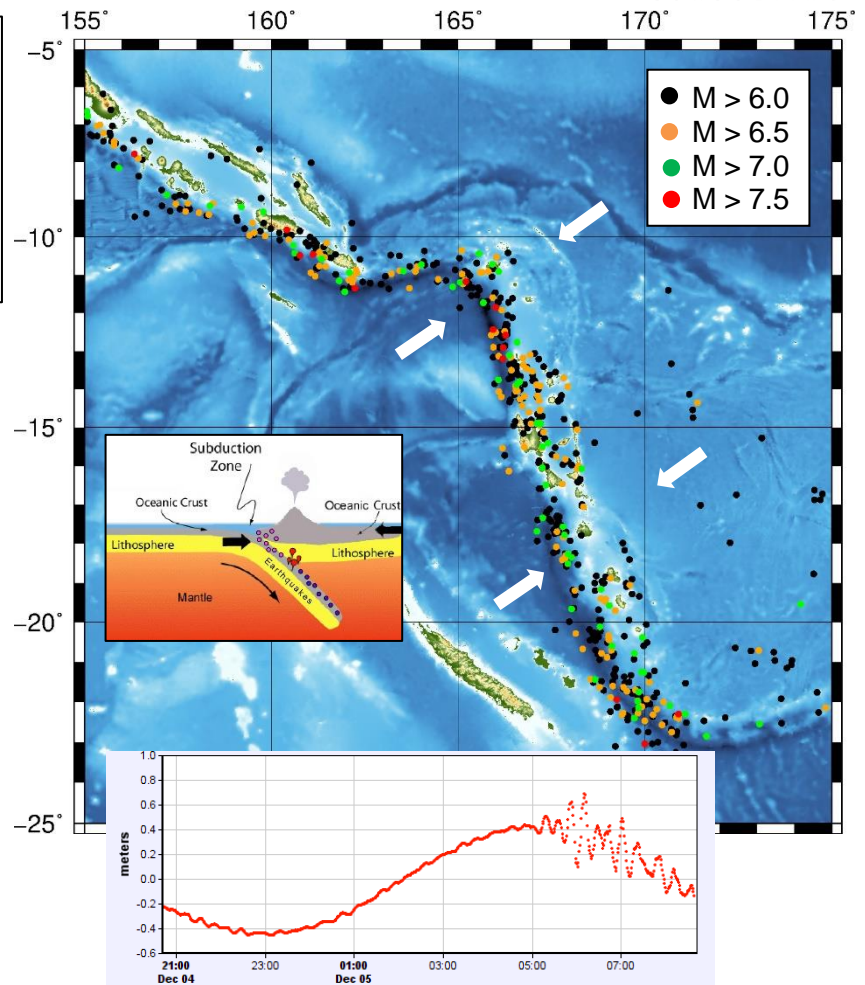
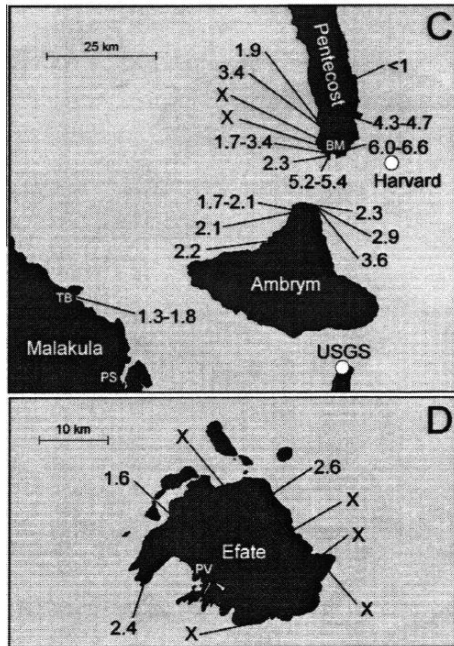
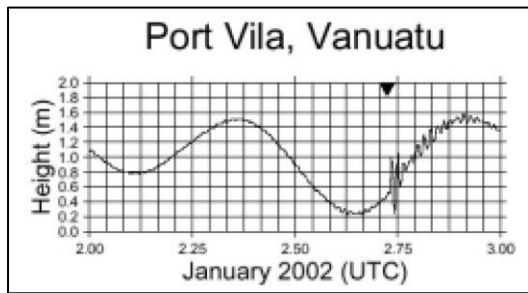


# TSUNAMI HAZARD ASSESSMENT

LELEPA ISLAND, VANUATU



**(top right)** Vanuatu is located in a tectonically active region, dots indicate locations of earthquakes since 1976, inset figure shows a schematic of the subduction zone with the sense of plate motion indicated by the white arrows. **(top left)** Tide gauge record of the January 2002 tsunami in Port Vila. **(left panel)** Measured tsunami runup heights after the November 1999 M 7.4 earthquake. **(bottom right)** Tide gauge record from Port Vila following the M 7.5 earthquake of December 2018.

## 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:

As part of an overarching assessment of the coastal environment of Lelepa Island, Vanuatu, we conducted a historical review of the regional tsunami hazard. The study found that in general, tsunami effects have been highly localised, affecting individual islands or even just individual bays. Furthermore, the causative earthquakes have generally been small relative to the size of the tsunami produced with effects suggestive of non-tectonic source mechanism such as submarine landslides. Earthquakes of many different focal mechanisms have caused tsunami in Vanuatu including typical thrust mechanism associated with subduction zones, as well as normal faulting in the outer rise or back arc regions and strike slip or oblique faulting. Vanuatu has not experienced a large subduction zone mega-thrust type earthquake such as the events that caused the 2004 Boxing Day tsunami in the Indian Ocean or the 2011 Japan tsunami. These events were both greater than magnitude 9. While both regions had experienced relatively large ( $M > 8$ ) events in recorded history, neither were believed to be capable of producing  $M 9$  level earthquakes, yet it happened. The New Hebrides/Solomon Islands subduction zone has only produced one earthquake with magnitude of 8.0 or greater in recorded history, but this is by no means an indication that significantly larger earthquakes cannot happen there. Due to Vanuatu's proximity to the subduction zone and the faulting areas, there would be very little warning time before the tsunami affected the area.