

Cyclone Hazards in French Polynesia: Impacts of TC Oli on Tubuai Island.

SAMUEL ETIENNE

Université de la Polynésie Française – GEPASUD

CNRS – UMR 6042 GEOLAB

Campus d'Outumaoro BP 6570

98702 FAA'A

Tahiti – French Polynesia

samuel.etienne@upf.pf

French Polynesia is a vast territory (5 M km² EEZ) spread across the central South Pacific Ocean. Its 118 main islands are divided into low-lying atolls and high volcanic islands. Major natural hazards vary greatly over the territory: landslide hazard is prevalent on steep volcanic islands, tsunami hazard is significant in the Marquesas archipelago in the absence of coral reefs surrounding the islands, storm surge is the principal hazard on the atolls, whereas cyclones can affect all five archipelagos. Yet, the level of cyclone hazard varies strongly over the territory, according to location. Cyclone return periods since 1945 range from 5.9 years (Australes) to 65 years (Marquesas). The Australes (western Polynesia) is the archipelago most affected by cyclones [1].

In February 2010, TC Oli struck French Polynesia seriously impacting the Leeward Islands (Bora-Bora, Huahine) and Australes Islands (Tubuai, Rurutu). Tubuai Island lay in the direct trajectory of TC Oli on February 4th. Numerous natural and societal impacts have been felt resulting from the high speed winds (up to 180 km h⁻¹) and unusually high storm surge and waves (over 8 m on tide-gauge recording). On Tubuai, 504 of the c. 700 houses were damaged or destroyed by TC Oli and hundreds of islanders became homeless.

This paper will present the results of a scientific field expedition to Tubuai Island one week after TC Oli. Measurements of beach erosion, inland sand deposition, sandy island (motu and cay) migration and coral reef impacts are discussed. The paper also addresses the variation in damage to buildings, and considers especially the effects of pre-cyclone vegetation cover along the coastline.

References

- [1] S. Larrue S. and T. Chiron, *Pac. Sci. Inter-congress* (2009).