

Title:

Assessing Shoreline Changes in Funafuti Atoll, Tuvalu through Time Series Analysis of WorldView

Group Members:

Aaron Richmond-Crosset & Abbie Phillips

Introduction:

A vital part of Tuvalu's natural and cultural legacy is the Funafuti Atoll, situated in the Pacific Ocean. Due to their effects on the ecosystem and nearby residents, shoreline alterations inside the atoll constitute a significant cause for concern. Monitoring and understanding shoreline dynamics is crucial because of the atoll's fragile ecosystems, distinctive biodiversity, and function in sustaining local livelihoods. By analyzing recent and historical satellite data, such as WorldView, researchers can monitor changes in shoreline limits and evaluate the long-term stability of the coastline. Planning safeguards, maintaining the atoll's ecosystems in the face of natural stresses such as sea-level rise, and guiding environmental management strategies depend on this analysis.

Research Goals:

- Identify shoreline dynamics for the islands that make up Tuvalu
- Assess the extent to which shoreline change has happened between 2015 & 2023

Research Questions:

- How has the shoreline changed in Tuvalu between 2015 and 2023?

Study Area Map:

Funafuti Atoll, Tuvalu

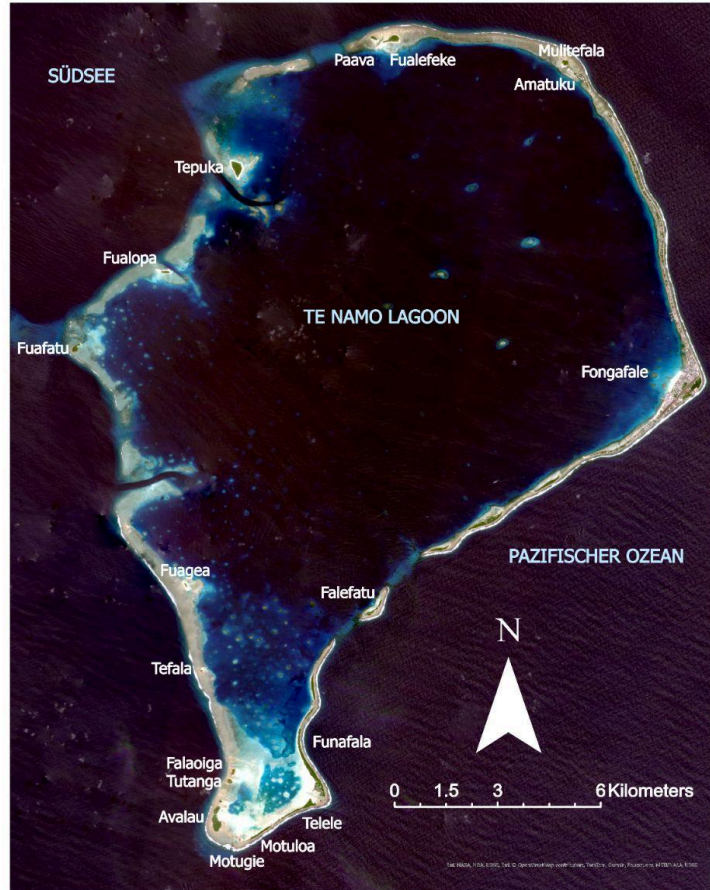


Figure 1. Map of study areas - Funafuti atoll

Data Needs:

Name	Source	Type
Planet Labs 2015/2024	Planet Labs	.tif
Shapefiles from 2005/2015 study - need to see what other data is available to us from this dataset	Michino Hisabayashi	.mxd

Proposed Methods:

- Collect satellite images that captured the study area for each year with cloud cover >10% with optimal view angle.
- Create and use training data to identify vegetation and urban areas on the islands.
- Land classification with decision tree algorithm: vegetation, sand, shallow water, seagrass, and coral rim.
- Calculate areas of each island using edge of vegetation (EOV) polygons.
- Compare absolute/percentage changes from 2015-2024.

Expected Results:

- Some islands experienced a gain in the edge of vegetation while other islands decreased in edge of vegetation
- There is a net loss of edge of vegetation, which signifies loss of land due to sea level rise.

Data that would be helpful:

- Shapefiles for each island in the atoll, to calculate vegetation area.

