# Title:

**“**Watershed and oceanic controls on spatial and temporal patterns of sediment accumulation in a fringing reef flat embayment”

# Outline:

*Goal for the manuscript:*

From dissertation proposal: Use measurements of monthly terrigenous sediment accumulation on the reef to develop a spatially distributed model of net sediment accumulation based on sediment input and water residence time in the Bay.

## INTRODUCTION

**Background of the problem:**

* Complex sediment inputs and hydrodynamics control sediment dynamics, which control coral health
  + Sedimentation linked to watershed input but hydrodynamics can limit by prevention and resuspension
  + Sediment accumulation in tropics is controlled by interplay of sediment input and hydrodynamics
  + Given watershed disturbance, an integrated understanding of sediment from source to reef is needed
* Measuring sedimentation: physical methods and interpretation.
  + Discontinuous vs Quasi-continuous
  + Tube traps most common but maybe not relevant indicator? SedPods way forward?
  + Basics of sedimentation not known at study site
* Linking watershed inputs to sediment accumulation

**Specific knowledge gap:**

Faga’alu is exposed to enhanced sediment input, hydrodynamics are heterogeneous, so where and when is sediment accumulation occurring?

**So we did “X” to learn “Y”:**

We monitored sediment input and modeled residence time over the reef, and monitored sediment accumulation in tubes and SedPods to determine:

1. How do flood-supplied terrigenous sediment and hydrodynamic conditions interact to control the gross and net rate of terrigenous sediment deposition at monthly time scales in a coral reef embayment?
2. What controls the spatial distribution of sediment accumulation, and can it be predicted by the flow velocities of water over the reef and distance from the stream mouth?

## MATERIALS AND METHODS

### Study Area

* Location, size, layout, depths, physical and biological characteristics of reef
* Description of seasonality and prevailing waves, winds, and tides
* Flood plume dynamics from Faga’alu Stream to Faga’alu Reef, and referring to other papers in Faga’alu
* Figure 2. Flood plume pictures in the bay
* Previous studies/data: Sabater unpubplished, Pilot study??
* Other on-going work includes sediment yield monitoring from watershed, sediment accumulation on the reef, and larger restoration efforts of USCRTF

### Methods

O*utline the methods used*

**Tubes**

**SedPods**

**Sediment input**

**Residence time**

**Analytical methods**

## RESULTS

*Results are the data - not methods. You can compare the results to other studies to put them in context, but don't explain why you think you're seeing the patterns you're seeing - that's for the Discussion.*

## DISCUSSION

*The Discussion is where you first discuss how well the Lagrangian and Eulerian methods compare, then characterize the findings by the different types of forcing and why you think you're seeing these patterns you see in the data. You then can discuss the relevance to residence times and what they mean for sediment, nutrient uptake, etc.*

*Wrap it all up with the big take-away message* *No Conclusion in “Coral Reefs”, give big take-away message*

**Take-away message**