**Title Page**

Title

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Keywords: 4 to 6 key words are required for indexing purposes.

**Abstract**

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**Introduction**

Motivate satellite vs. in situ comparisons

Mini lit review of previous satellite in situ comparisons – when are they typically the same (= very similar) and when are they quite different?

Satellite skin vs sampling at depth – might miss upwelling, problems if water column is not well mixed

Satellite nighttime-only analyses

Why it’s good for satellite

Considerations when asking similar questions with in situ data

**Materials and Methods**

**Study location**

**In situ temperature measurements**

Field deployment

Site choice, multiple sites per region (explanation), all regions represent different 5-km satellite pixels

Depth = 10 m

In situ data processing

Data QC

Standardize and interpolate to daily (first to by-minute, then hourly)

All times processing

Nighttime only processing

**Satellite temperature measurements**

CRW download information (version, dates downloaded)

Since it’s already curated daily data, no additional processing necessary for comparison with in situ

**Statistical comparison – in situ vs. satellite & temperature consistency around island**

*Mean and variance offsets*

*Correlation*

*Power spectral density*

Cite figures as Fig. and Table as Table

Date Format: Use English date formats, i.e., 3rd March 2005; 1–3 March2003; between 1 and 3 March 1980; 1 March to 1 April (not 1 March–1 April); March 1980 to August 1981; March – April 1991.

**Results and Discussion**

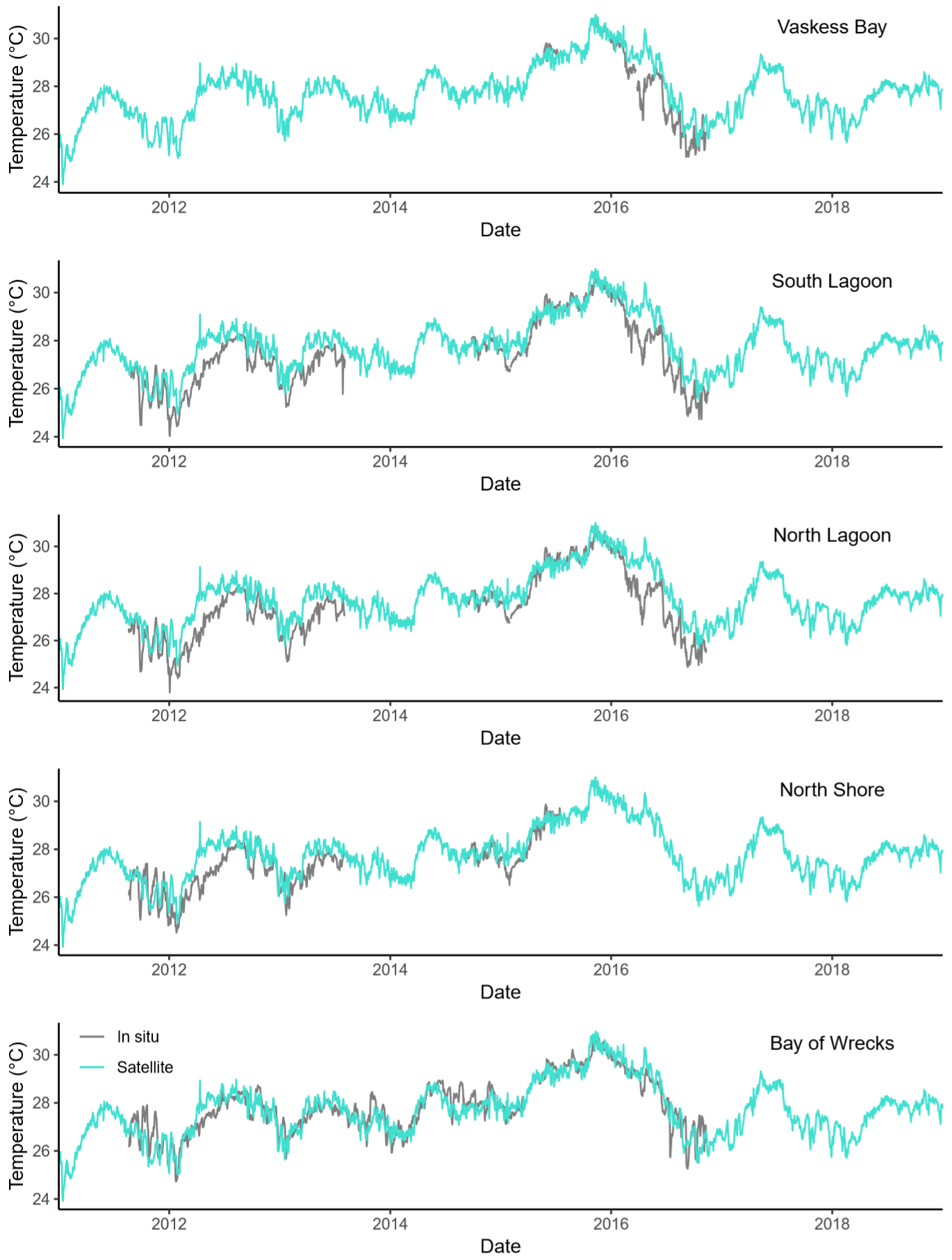


Figure 1. Satellite (NOAA CRW CoralTemp 5-km product) vs. in situ (Sea-Bird 56 temperature loggers). Satellite data are continuous throughout the time-series, in situ data are plotted when data are available for that region.

General comparison of satellite and in situ data (Figure 1). Note the event in early 2016 along the western side of the island – likely an upwelling event that was not captured by the satellite.

Figure 2. Mean and variance offsets between the satellite product and in situ measurements for each sampled region of Kiritimati.

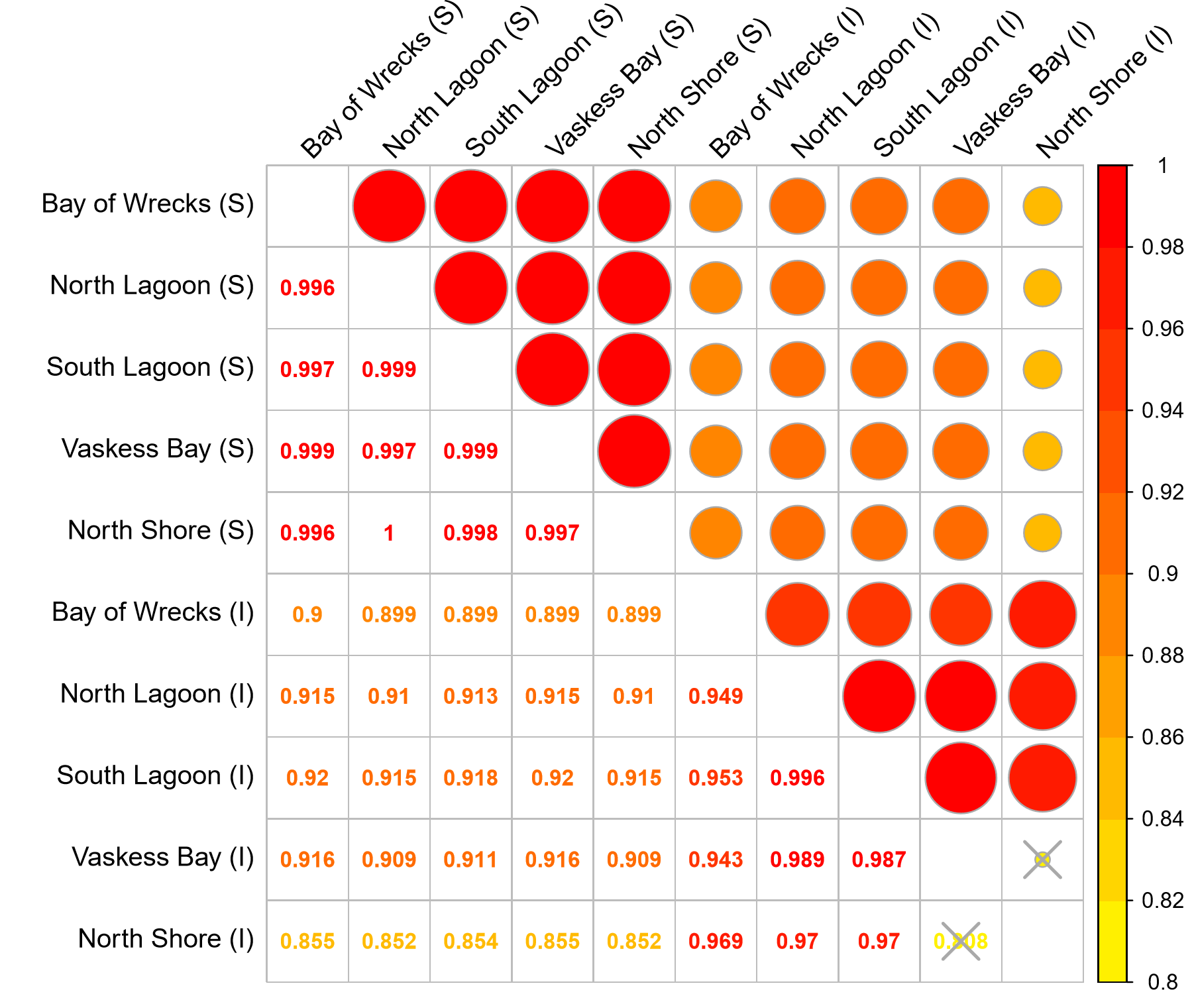


Figure 3. Correlations between satellite SST product (S) and in situ measurements (I) for all available regions on Kiritimati from 2011 to 2018. The top right quadrant of the figure shows correlations between data sources, scaled by size and color. The bottom left quadrant shows correlation values between each pair. Due to limited overlap between North Shore (I) and Vaskess Bay (I) (n = 62 days), this comparison is excluded from this analysis.

Correlations between nearby satellite pixels are high, caution for using satellite SST to resolve fine-scale thermal variability (at least in this location). Although in situ were remarkably correlated with one another as well, so perhaps different in more variable regions.

Figure 4. Power spectral density plots for both the satellite product and in situ measurements for each sampled region of Kiritimati.

Frequencies in a stable region (limited seasonal change). Similarities and differences between satellite and in situ temperatures.

Figure 5. Comparison of nighttime-only and all times in situ measurements

Daytime temperatures at depth are ecologically relevant to corals.

Daily differences between nighttime-only and all time are extremely limited, nearly nonexistent. Where might this also hold true? Where might this be different?

**Acknowledgements**

Sea-Bird, NOAA CRW team, Julia’s grants, Danielle’s grants, KI field team

**Reference List**

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**Figure Legends**

Do not embed figures, only add legends here

**Tables (move to separate document)**

Single space the body of tables