

USING SATELLITE SEA SURFACE TEMPERATURE TO PREDICT MASS CORAL BLEACHING

ANSWERS

A. WHAT WERE THE LOCAL CONDITIONS AT YOUR REEF ON SEPTEMBER 2, 2005?

1. What was the temperature at your reef on that day?
B: 28°C LSI: 31°C PR: 31°C USVI: 31°C
2. Was the temperature at your site unusually warm? If so, what was the anomaly?
B: +0.75°C LSI: +0.25°C PR: +0.75°C USVI: +1°C
3. Were there doldrums over your reef? Were there doldrums regions close to your reef?
B: no, no LSI: some over the reef, and more to the east PR: no, no USVI: no, bit to the west
4. What was the wind speed in the region around your reef on that day?
B: 5–7 kt LSI: 5–7 kt PR: around 5 kt USVI: less than 5 kt

B. HOW HOT WAS THE WHOLE LATE SUMMER/EARLY FALL SEASON?

- 5a. How hot did the water get?
B: 28.5°C LSI: 31°C PR: 30.5°C USVI: 30°C
- 5b. When did the temperature first reach the bleaching threshold?
B: mid-August LSI: late July PR: mid-August USVI: mid-August
- 5c. How long did the temperature stay at or near the threshold?
B: about a month LSI: 1 month, then a decrease, then another month PR: 2 months USVI: 3½ months
- 6a. When did DHWs start to accumulate at your reef site?
B: mid-August LSI: late July PR: mid-August USVI: mid-August
- 6b. How high did the DHWs get?
B: 3°C-weeks LSI: 6°C-weeks PR: 8°C-weeks USVI: 11°C-weeks
- 7a. Do you expect that there was coral bleaching at your reef site in 2005?
B: maybe LSI: yes PR: yes USVI: yes
- 7b. If so, how severe do you think the bleaching was?
B: mild, if any LSI: moderate PR: severe USVI: very severe

C. HOW STRESSED WAS YOUR REEF SITE COMPARED TO OTHER REEFS IN THE CARIBBEAN REGION?

8. Was the DHW value at your site in the lower third, middle third, or upper third of the range of values experienced in the Caribbean in 2005?
 B: lower third LSI: middle third PR: middle third USVI: upper third
9. How did the thermal stress at your site compare to the stress experienced by the other three reefs highlighted in this exercise?
 B < LSI < PR < USVI or B < LSI = PR < USVI
10. How severe do you think the bleaching was at your site compared to the other three reefs?
 B < LSI < PR < USVI or B < LSI = PR < USVI

SO HOW BAD WAS THE BLEACHING, REALLY?

(Top) Regional observations from over 1500 on-site surveys conducted during the 2005 bleaching event. Each dot represents the average percentage of the coral colonies bleached at that location. (Bottom) Bleaching surveys within 50 km of the four sites in this exercise. As expected, the bleaching was worst in the US Virgin Islands, where about 76% of the coral colonies were bleached. Puerto Rico had 36% of colonies bleached; LSI had 49%. Note that there is a lot of variability in the data (shown by the error bars); Puerto Rico and Lee Stocking Island were statistically identical. In Bermuda, the bleaching was very light: less than 1% of coral colonies bleached.

Thermal stress: B < LSI < PR < USVI

Actual bleaching data: B < LSI = PR < USVI

