Supplementary Figures

Spatio-Temporal Complexity Analysis of the Sea Surface Temperature in the Philippines

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Supp. Figs. 1 to 20



Supp. Fig. 1: The STC of the Philippine SST from 1985 to 2005 using different moving window average thresholds (j), time slice size (s) and moving cube size (c). The value j indicates the number of weeks before and after the current year being analyzed used in the moving average computation, i.e., j = 2 is a moving average of 5 weeks. El Niño years are highlighted in blue, La Niña in red and normal years in green. Overlapping time-slices were used.



Supp. Fig. 2: The STC of the Philippine SST from 1985 to 2005 with non-overlapping time slices and with different time slice sizes s, moving cube sizes c, and moving window average thresholds j. El Niño years are highlighted in blue, La Niña in red and normal years in green.



Supp. Fig. 3: The STC plots (red) together with the mean of the slice windows used in STC calculations (green) and the thresholds obtained by taking the mean of the 5 weeks centered at the current week being analyzed (blue), for each of the set of s and c in Fig. 4 (main text). The STC, slice window mean and the moving average threshold are first mean-centered, and then and then divided by their maximum to normalize the values.



Supp. Fig. 4: Same as in Supp. Fig. 3 except that the moving window is 11 weeks (j = 5).



Supp. Fig. 5: Yearly average of the STC using strong El Niño and La Niña years (left column), strong + moderate (middle column) and strong + moderate + weak ENSO years. For each STC value at each week, the values from all the years were averaged. On each row, the normal and all year groups do not vary.



Supp. Fig. 6: The STC and SST yearly average values (as computed in Fig. 8 of the main text) were mean-centered and divided by the maximum value. For El Niño and La Niña, all strong, moderate and weak years were used. Panel (a) corresponds to the right-most column of Fig. 8 of the main text, while panels (b), (c), and (d) corresponds to the top, middle and bottom panels of Supp. Fig. 5, respectively.



Supp. Fig. 7: The STC and SST average values in Fig. 8 of the main text were mean-centered and divided by the maximum value. Then for each interval (see main text for details on the intervals in Fig. 8), the scatter-plot of STC vs SST are presented. For El Niño and La Niña, all strong, moderate and weak years were used. STC parameters: s = 3, c = 3, j = 5, overlapping time slices. (a) STC and SST have very high correlation; (b) STC and SST have about the same values during the SW monsoon; (c) STC is higher than SST during the inter-monsoon; (d) STC and SST have a quadratic relationship during the NE Monsoon.



Supp. Fig. 8: The time-dependent amplitudes of EOF Mode 1 of the Philippine STC with different time slices s and moving average thresholds j (c = 3, overlapping time slices).



Supp. Fig. 9: The time-dependent amplitudes of EOF Mode 2 of the Philippine STC with different time slices s and moving average thresholds j (c = 3, overlapping time slices).



Supp. Fig. 10: The STC of each thermal region, plotted with the mean of the time slice used in computing the STC, and with the moving average threshold. The STC, slice window mean and the moving average threshold are first mean-centered, and then divided by their maximum to normalize the values. Overlapping time slices, s = 3, j = 0, c = 3. El Niño years are highlighted in blue, La Niña in red, and normal years in green.



Supp. Fig. 11: The STC of each thermal region, plotted with the mean of the time slice used in computing the STC, and with the moving average threshold. The STC, slice window mean and the moving average threshold are first mean-centered, and then divided by their maximum to normalize the values. Overlapping time slices, s = 5, j = 0, c = 3. El Niño years are highlighted in blue, La Niña in red, and normal years in green.



Supp. Fig. 12: The STC of each thermal region, plotted with the mean of the time slice used in computing the STC, and with the moving average threshold. The STC, slice window mean and the moving average threshold are first mean-centered, and then divided by their maximum to normalize the values. Overlapping time slices, s = 5, j = 2, c = 3. El Niño years are highlighted in blue, La Niña in red, and normal years in green.



Supp. Fig. 13: Scatter plots of the STC (x-axis) and the mean of the time slice (y-axis) used in computing the STC. (a) s = 3, j = 0, c = 3, corresponding to Supp. Fig. 10; (b) s = 5, j = 0, c = 3, corresponding to Supp. Fig. 11; (c) s = 3, j = 2, c = 3, corresponding to Fig. 13 (in main text); (d) s = 5, j = 2, c = 3, corresponding to Supp. Fig. 12.



Supp. Fig. 14: Scatter plots of the STC (x-axis) and the standard deviation (y-axis) of the time slice used in computing the STC. (a) s = 3, j = 0, c = 3, corresponding to Supp. Fig. 10; (b) s = 5, j = 0, c = 3, corresponding to Supp. Fig. 11; (c) s = 3, j = 2, c = 3, corresponding to Fig. 13 (in main text); (d) s = 5, j = 2, c = 3, corresponding to Supp. Fig. 12.



Supp. Fig. 15: The time-dependent amplitudes of the most dominant EOF of each thermal region, using c = 3 and different values of s and j (overlapping time-slices).



Supp. Fig. 16: The time-dependent amplitudes of the second most dominant EOF of each thermal region, using c = 3 and different values of s and j (overlapping time-slices).



Mode 1, strong+moderate ENSO years

Supp. Fig. 17: The time-dependent amplitudes of the most dominant EOF of each thermal region, grouped according to ENSO years (strong+moderate). STC parameters: c = 3, s = 3, j = 2, overlapping time-slices. Coloring: El Niño = blue; La Niña = red; normal = green; all = black.



Supp. Fig. 18: The time-dependent amplitudes of the second most dominant EOF of each thermal region, grouped according to ENSO years (strong+moderate). STC parameters: c = 3, s = 3, j = 2, overlapping time-slices. Coloring: El Niño = blue; La Niña = red; normal = green; all = black.



Supp. Fig. 19: The time-dependent amplitudes of the most dominant EOF of each thermal region, grouped according to ENSO years (strong+moderate+weak). STC parameters: c = 3, s = 3, j = 2, overlapping time-slices. Coloring: El Niño = blue; La Niña = red; normal = green; all = black.



Supp. Fig. 20: The time-dependent amplitudes of the second most dominant EOF of each thermal region, grouped according to ENSO years (strong+moderate+weak). STC parameters: c = 3, s = 3, j = 2, overlapping time-slices. Coloring: El Niño = blue; La Niña = red; normal = green; all = black.