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# Supplementary material for

## Influence of oceanic intraseasonal Kelvin waves on the Eastern Pacific hurricane activity

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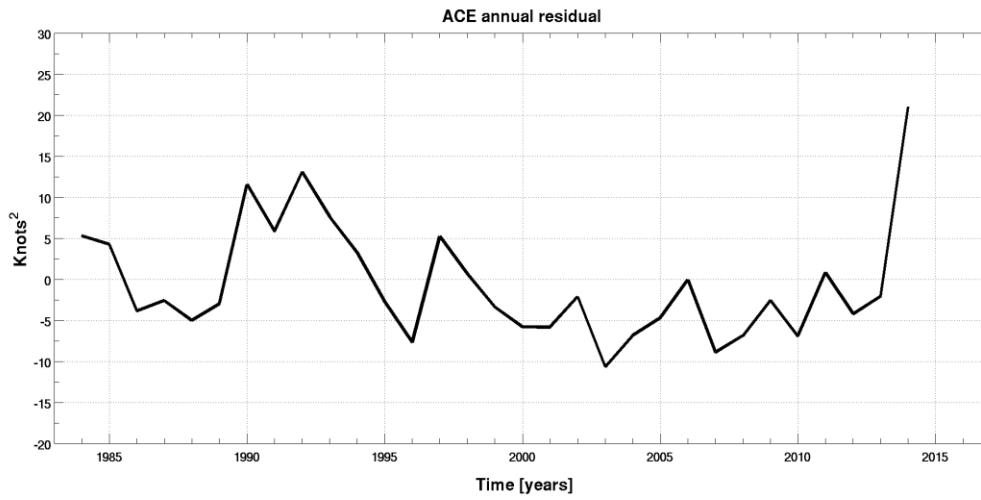
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**Figures S1 to S7**

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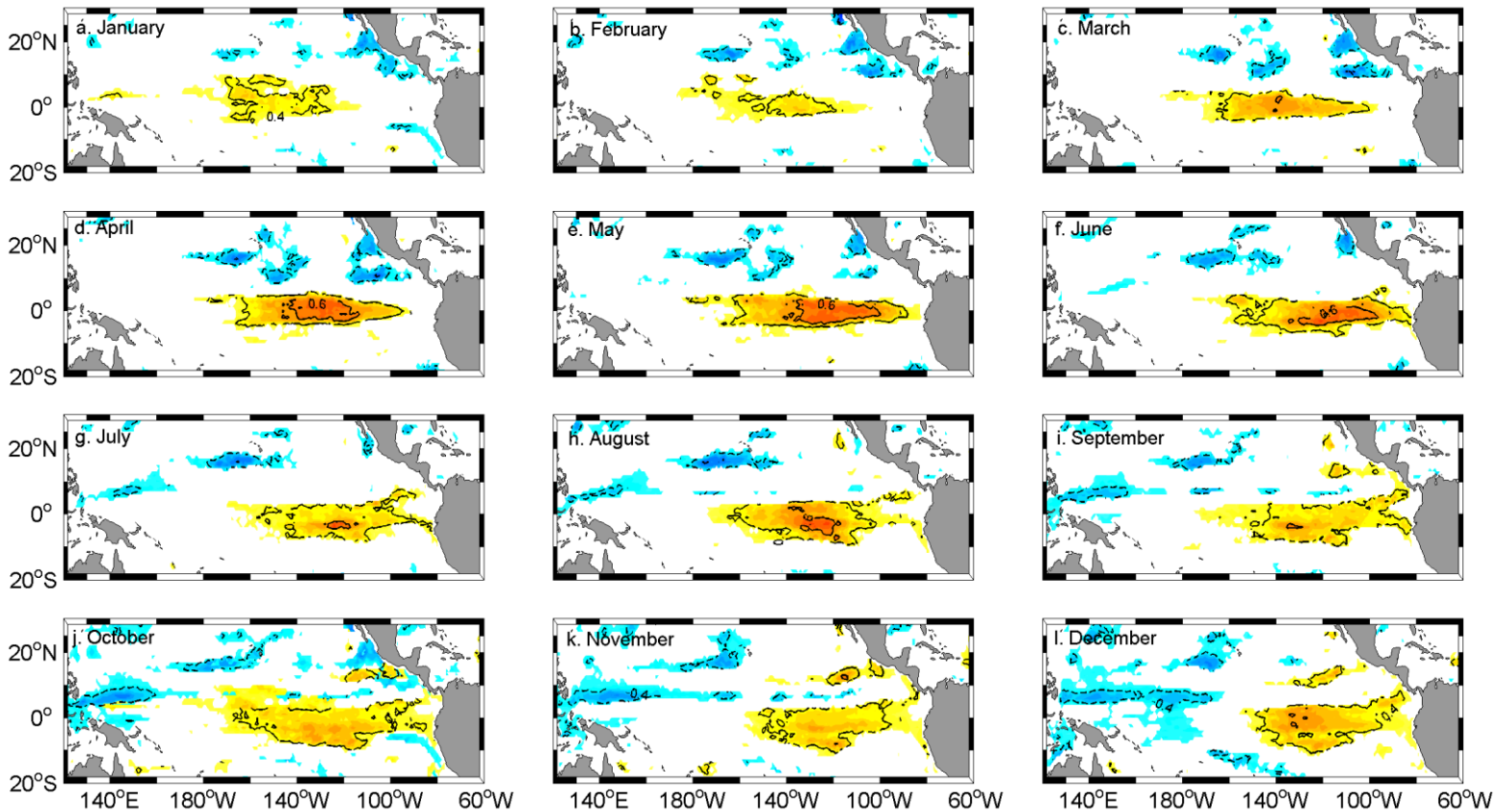
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**Figure S1.** Time series of the ACE annual residual:

$$Residual = ACE / TCI @_{May - Nov} - aNino_{3.4} @_{May - Nov} - bTsub @_{May - Nov}$$

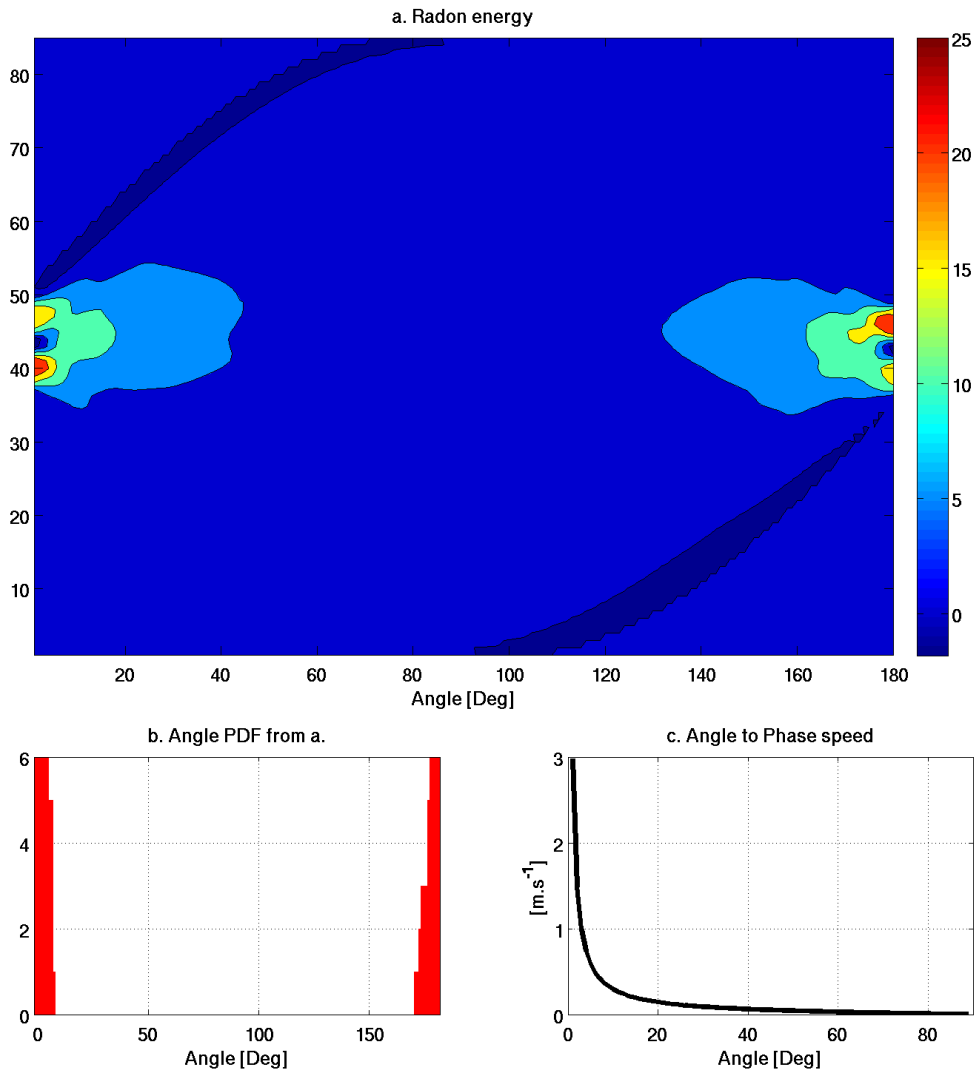
See Section 2 of the manuscript for mode details.

Correlation between TDA and residual from TCI bi-linear regression



59 **Figure S2.** Significant correlations at the 93% confidence level between annual anomalies of  
 60 thermocline depth for each calendar month (January (a) to December (l)) and the annual  
 61 residual from the Tropical Cyclone Intensity (TCI) bi-linear regression onto Nino3.4 and  
 62 Tsub (monthly anomalies averaged in region TC; 160°W-90°W; 5°N-25°N (indicated by the  
 63 black box in manuscript's Figure 1a); 5-80m and during the boreal hurricane season, i.e. May  
 64 to November). Contours are 0.2.

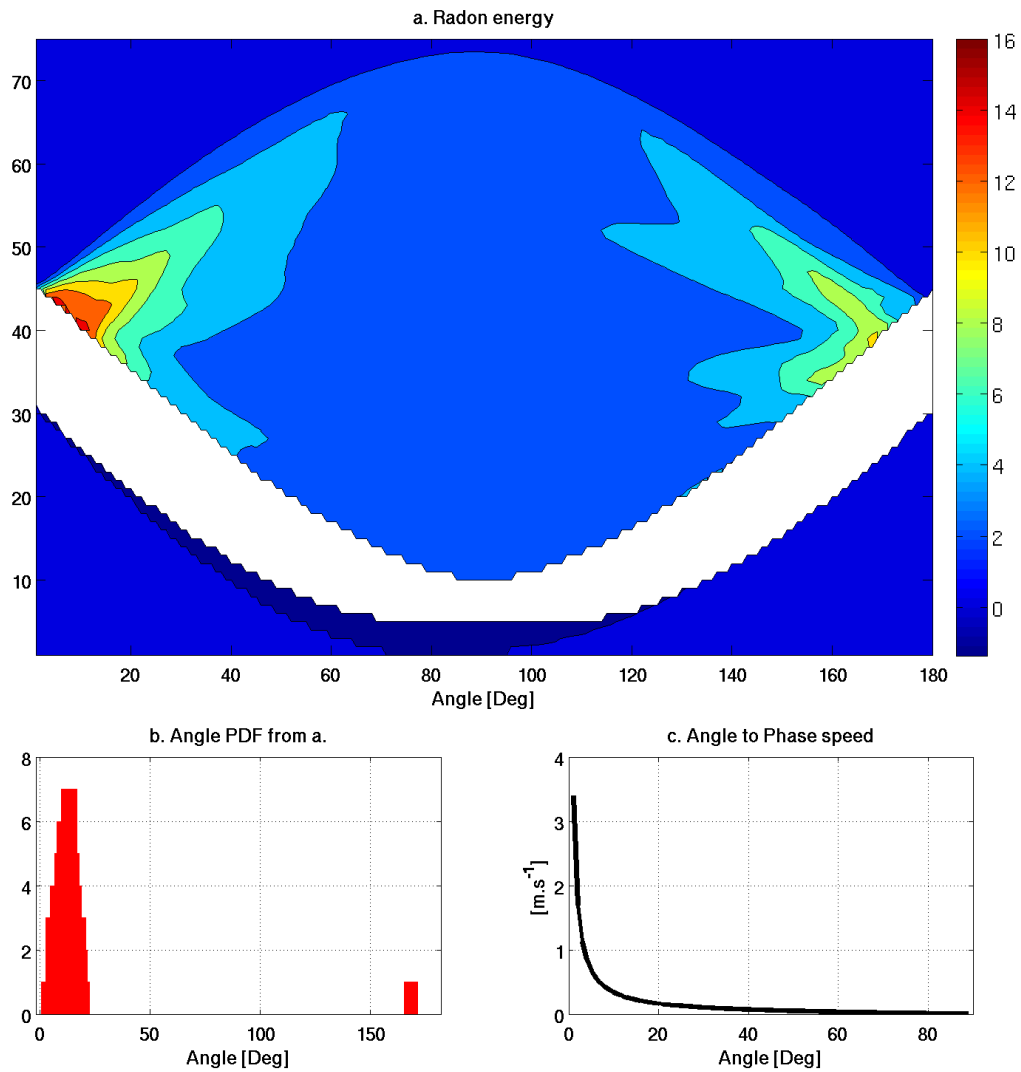
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111 **Figure S3.** Radon transform of Figure 4a (a). Probability Density Function (PDF) of angles  
 112 that exhibit values of Radon energy above 65% of the Radon energy maximum (b).  
 113 Relationship between propagation phase speed and angles (c).

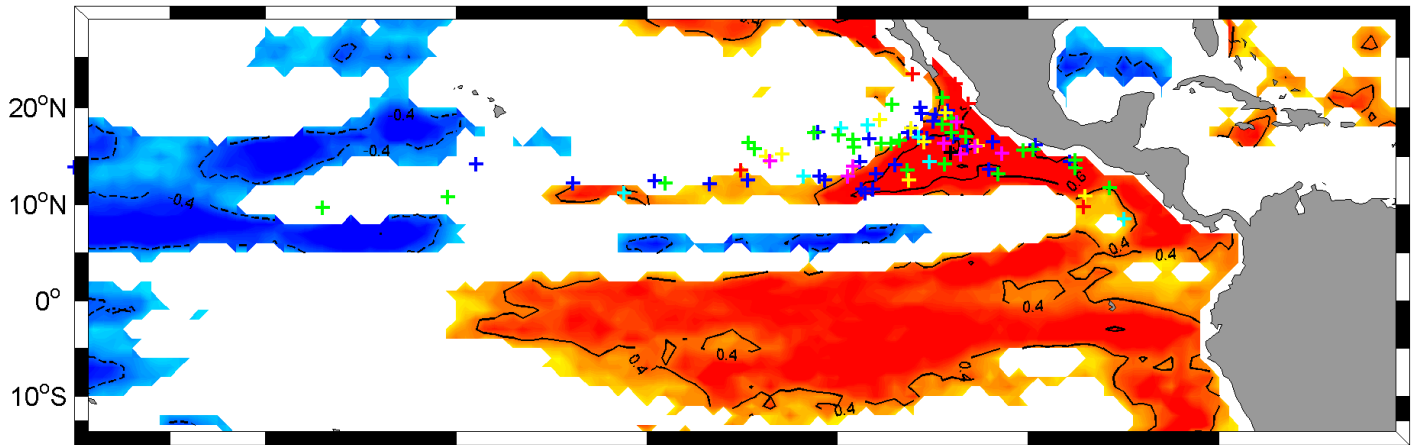
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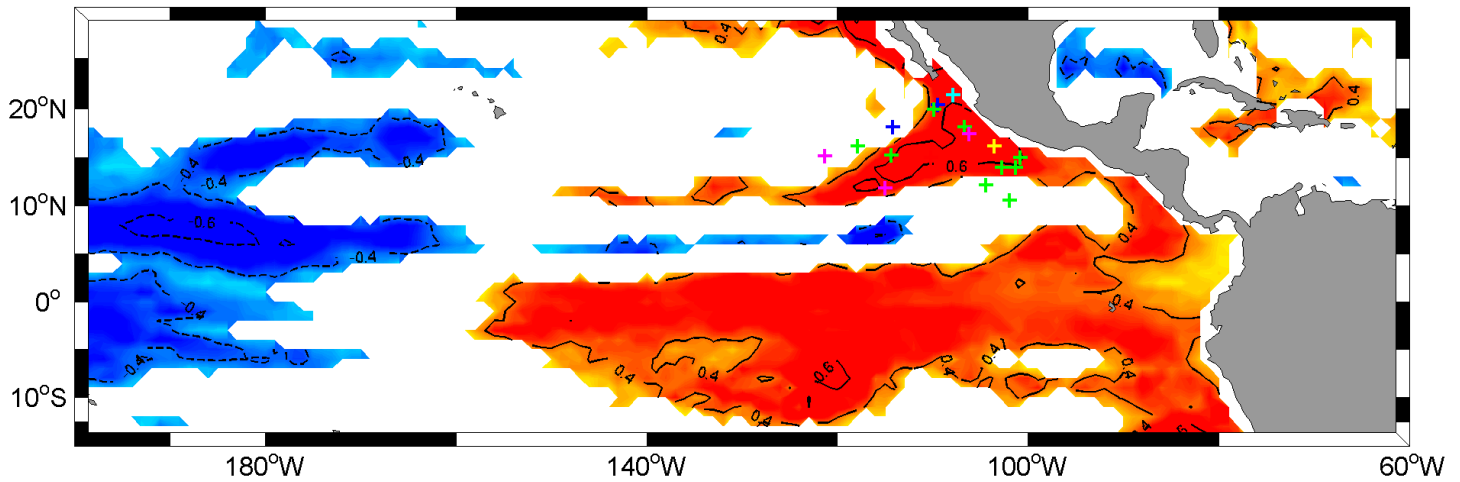
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 130 **Figure S4.** Radon transform of Figure 4b (a). Probability Density Function (PDF) of angles  
 131 that exhibit values of Radon energy above 65% of the Radon energy maximum (b).  
 132 Relationship between propagation phase speed and angles (c).  
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a. Correlation between TDA in Oct and residual from ACE bi-linear regression



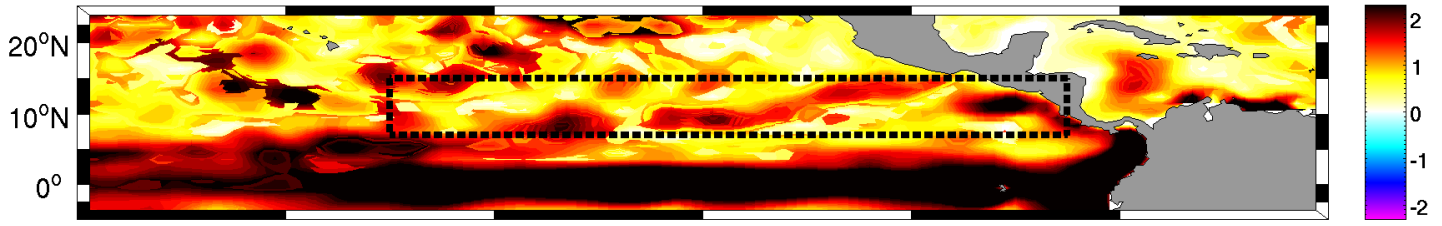
b. Correlation between TDA in Nov and residual from ACE bi-linear regression



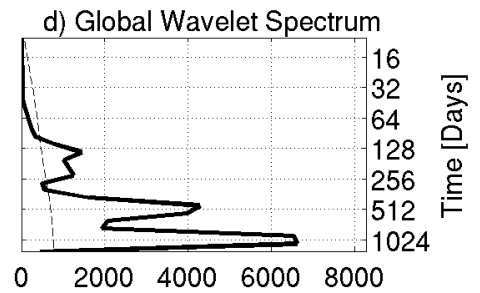
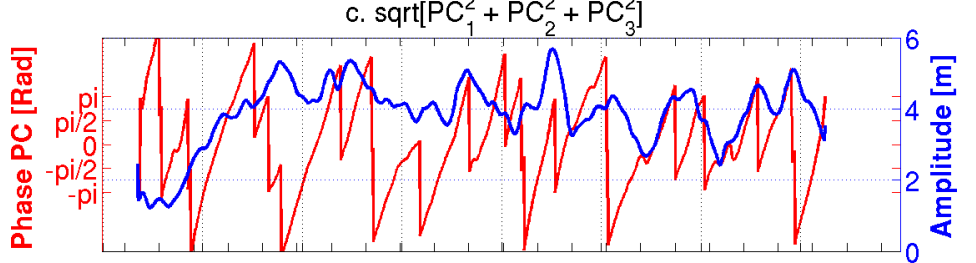
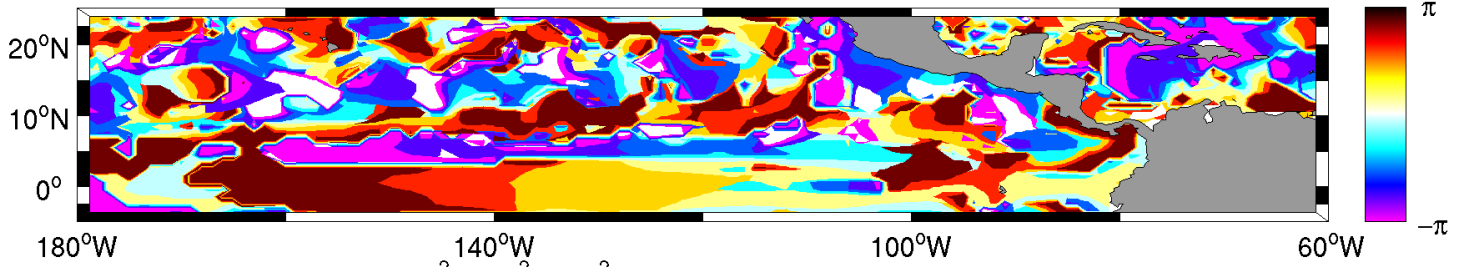
150 **Figure S5.** Significant correlations at the 90% confidence level between annual anomalies of  
151 thermocline depth for different months (October (a) and November (b)) and the annual  
152 residual from the ACE bi-linear regression onto Nino3.4 and Tsub. Contours are 0.2, with a  
153 thick black 0-line. The colored crosses represent the location of the strongest intensification  
154 (i.e., the location of maximum increase in wind speed) of every storm that occurred during the  
155 corresponding months; for instance, in (b), the crosses stand for the maximum intensification  
156 location of all TC that occurred in November between 1984 and 2014. Tropical Depressions  
157 are in dark blue, Tropical storms in cyan, Category 1 in green, Category 2 in yellow, Category  
158 3 in red, Category 4 in magenta and Category 5 in black.

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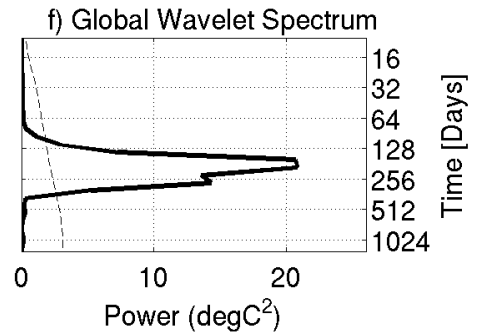
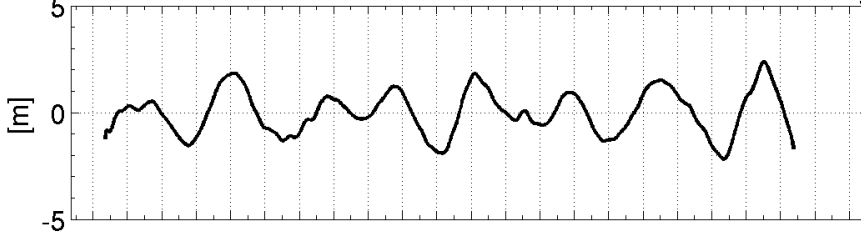
a. isoT20C Intraseasonal anomalies [10-150] days<sup>-1</sup>  $\sqrt{CEOF_1^2 + CEOF_2^2 + CEOF_3^2}$  Amplitude Expl. Var = 37.5 %



b. isoT20C Intraseasonal anomalies [10-150] days<sup>-1</sup> CEOF 1+2+3 Phase



e. Reconstructed isoT20 intraseasonal anomalies from CEOF1+2+3 in region TC

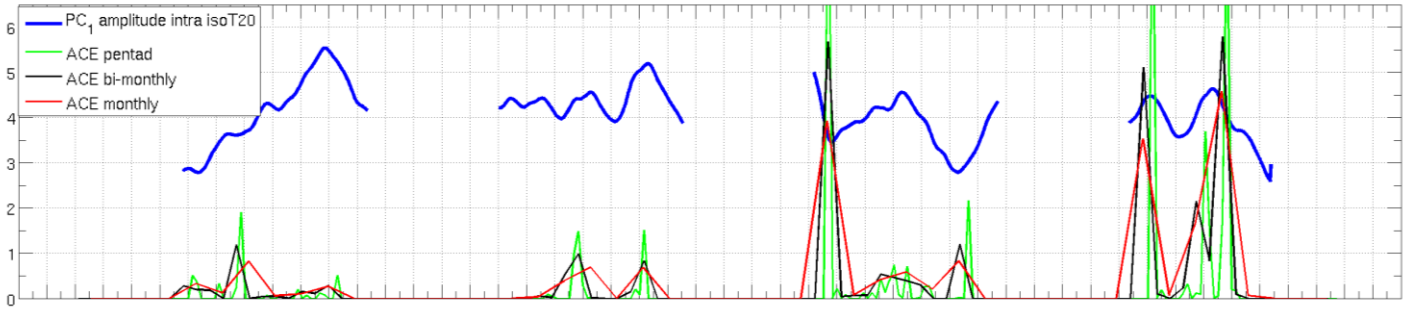


07-Dec-2011  
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22-Feb-2015  
02-May-2015  
10-Jul-2015  
17-Sep-2015  
25-Nov-2015  
02-Feb-2016

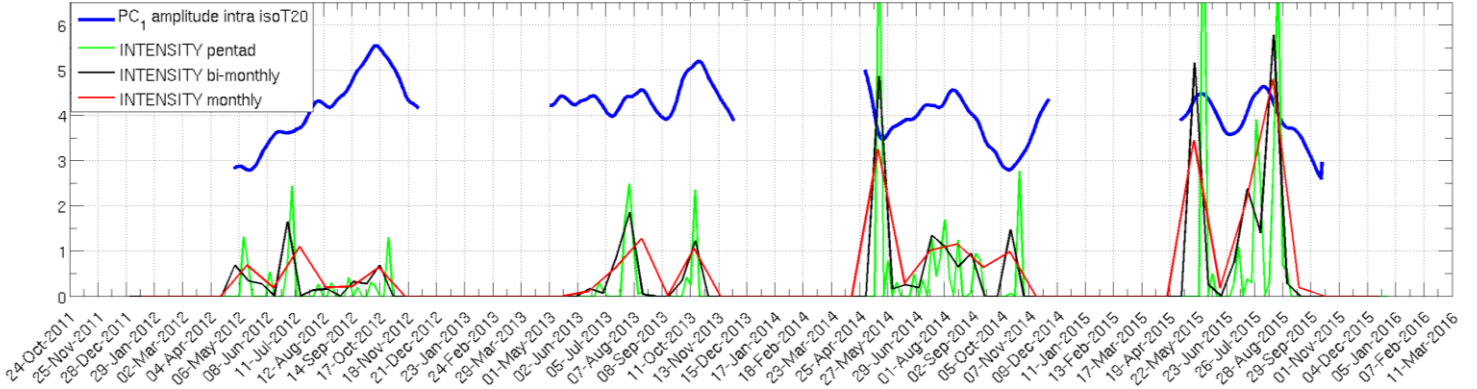
173 **Figure S6.** First three modes of the decomposition into Complex Empirical Orthogonal  
174 Functions (CEOF) of intraseasonal (band pass filtered between 10 and 150 days) anomalies of  
175 isotherms 20C. Amplitude,  $\sqrt{PC1^2 + PC2^2 + PC3^2}$  (a.) and phase (b.) of CEOF1+2+3  
176 spatial pattern. Time series of  $\sqrt{PC1^2 + PC2^2 + PC3^2}$  is shown in (c.), in blue and the  
177 phase of  $PC1+PC2+PC3$  in red. The global wavelet spectrum of  $\sqrt{PC1^2 + PC2^2 + PC3^2}$   
178 is shown in (d.). Panel (e.) represents the time series of the intra seasonal anomalies of the  
179 isotherm 20°C averaged in region TC (delineated by the thick dashed line in (a)) and  
180 reconstructed from the first three CEOF modes. The results are presented for the central to  
181 eastern Northern Pacific but the CEOF decomposition is performed over the entire tropical  
182 Pacific (120°E-60°W; 25°N-25°S).

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a. Summer time series of ACE /  $\sqrt{PC_1^2 + PC_2^2 + PC_3^2}$  CEOF intraseasonal variability Thermocline depth



b. Summer time series of INTENSITY /  $\sqrt{PC_1^2 + PC_2^2 + PC_3^2}$  CEOF intraseasonal variability Thermocline depth



186 **Figure S7.** Hurricane season (May–November) time series of the standardized Accumulated  
 187 Cyclone Energy (ACE, panel a) and Tropical Cyclone Intensity (TCI, panel b) averaged in the  
 188 same region as Figure 6e at different temporal resolution (5-days average in green, 2-weeks  
 189 average in black and monthly average in red) and hurricane season time series,  $\sqrt{PC_1^2 +$   
 190  $PC_2^2 + PC_3^2}$ , of the Principal Component (PC) amplitude from the first three CEOF modes  
 191 of intraseasonal TDA (thick blue) for the period January 1<sup>st</sup> 2012 until October 13<sup>th</sup> 2015.  
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