## SST: Sea Surface Temperature & Wavelets

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Source: http://www.cpc.ncep.noaa.gov/data/indices/sstoi.indices

YR MON	N	NINO1+2	ANOM	NINO3	ANOM	NINO4	ANOM NINO3.4		ANOM
1982	1	24.29	-0.17	25.87	0.24	28.30	0.00	26.72	0.15
1982	2	25.49	-0.58	26.38	0.01	28.21	0.11	26.70	-0.02
1982	3	25.21	-1.31	26.98	-0.16	28.41	0.22	27.20	-0.02
1982	4	24.50	-0.97	27.68	0.18	28.92	0.42	28.02	0.24
1982	5	23.97	-0.23	27.79	0.71	29.49	0.70	28.54	0.69
1982	6	22.89	0.07	27.46	1.03	29.76	0.92	28.75	1.10
1982	7	22.47	0.87	26.44	0.82	29.38	0.58	28.10	0.88
1982	8	21.75	1.10	26.15	1.16	29.04	0.36	27.93	1.11
1982	9	21.80	1.44	26.52	1.67	29.16	0.47	28.11	1.39
1982	10	22.94	2.12	27.11	2.19	29.38	0.72	28.64	1.95
1982	11	24.59	3.00	27.62	2.64	29.23	0.60	28.81	2.16
1982	12	26.13	3.34	28.39	3.25	29.15	0.66	29.21	2.64
1983	1	27.42	2.96	28.92	3.29	29.00	0.70	29.36	2.79
1983	2	28.09	2.02	28.92	2.55	28.79	0.69	29.13	2.41
1983	3	28.68	2.16	29.10	1.96	28.76	0.57	29.03	1.81

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Daubechies Wavelet [4] used to denoise the data, it is rendered as Red curve. All wavelet transforms are padded with exptrapolation.

Refinement Index:



Energy Function shows {0, 0, 0} has most contribution to the original signal i.e. there is only 1 Trend:

 $\left\{ \begin{array}{l} \{1\} \rightarrow 4.633 \times 10^{-6} \,, \, \{0, \, 1\} \rightarrow 0.0000221133 \,, \, \{0, \, 0, \, 1\} \rightarrow 0.000074498 \,, \\ \{0, \, 0, \, 0, \, 1\} \rightarrow 0.000113909 \,, \, \{0, \, 0, \, 0, \, 0\} \rightarrow 0.999785 \right\}$ 

The x-axis is past 400 months of SST temperature, the most recent measurement at the right-most of the x-axis, the origin is the first measurement.

NINO1+2













Color Scheme: Blue Min, Red Max

The scalograms below show periodicity between 1.5 years to 6 years for SST index.

DGaussian Wavelet [4] was used for scalograms. Y-axis shows periodicty in place of frequency to ease

the understanding. X-axis is time in past number of months.

NINO1+2

NINO3



NINO4



Time (Month)



