

ISSUES RELATED TO WINTER MONSOON IN MALAYSIA

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Malaysian Meteorological Department**

1ST MAHASRI ISSC Meeting, 19-20 Oct 2006, Bangkok, Thailand

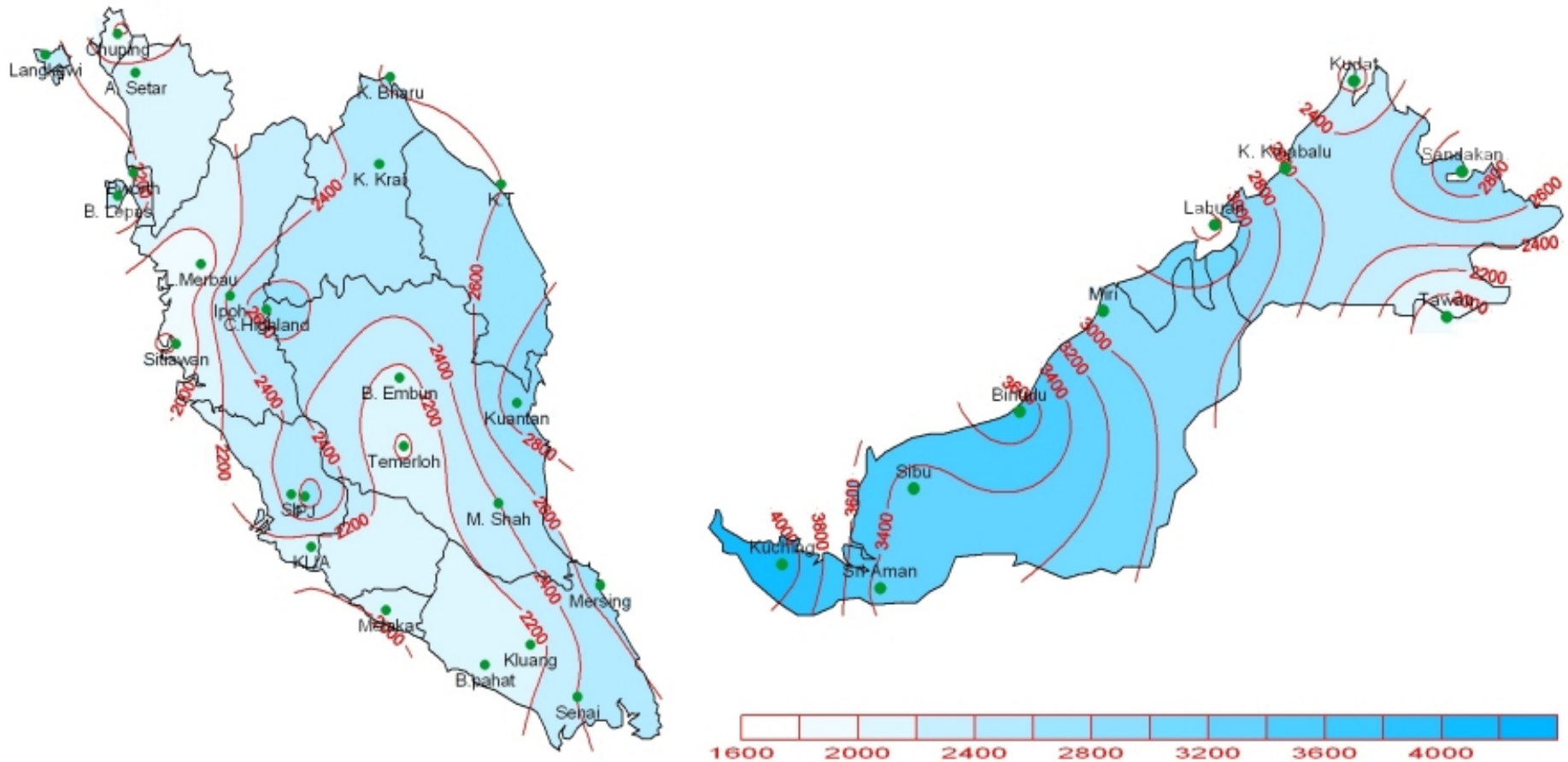
OUTLINE

Rainfall characteristics

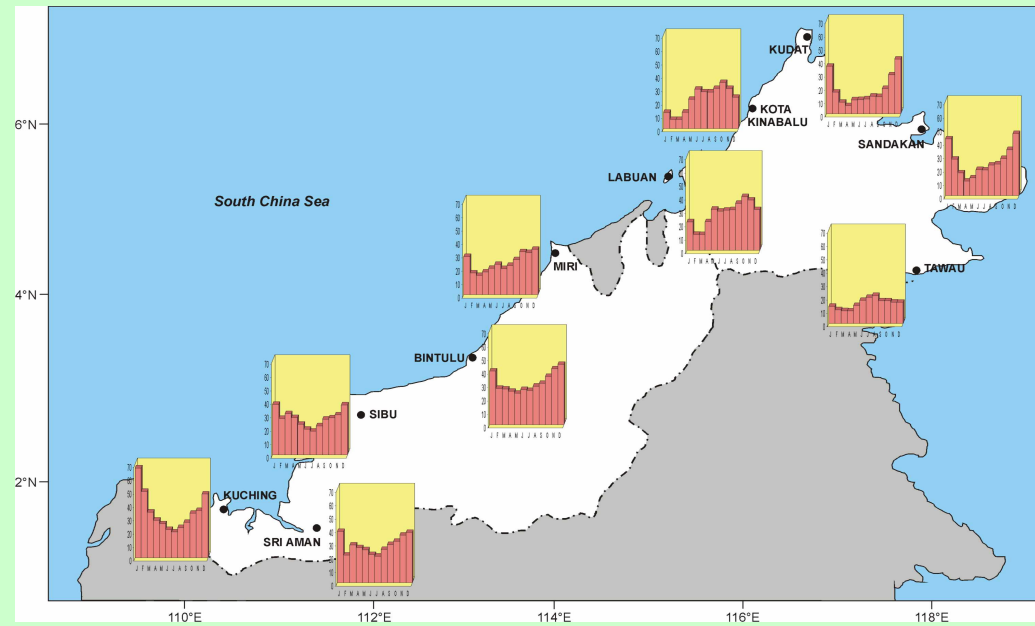
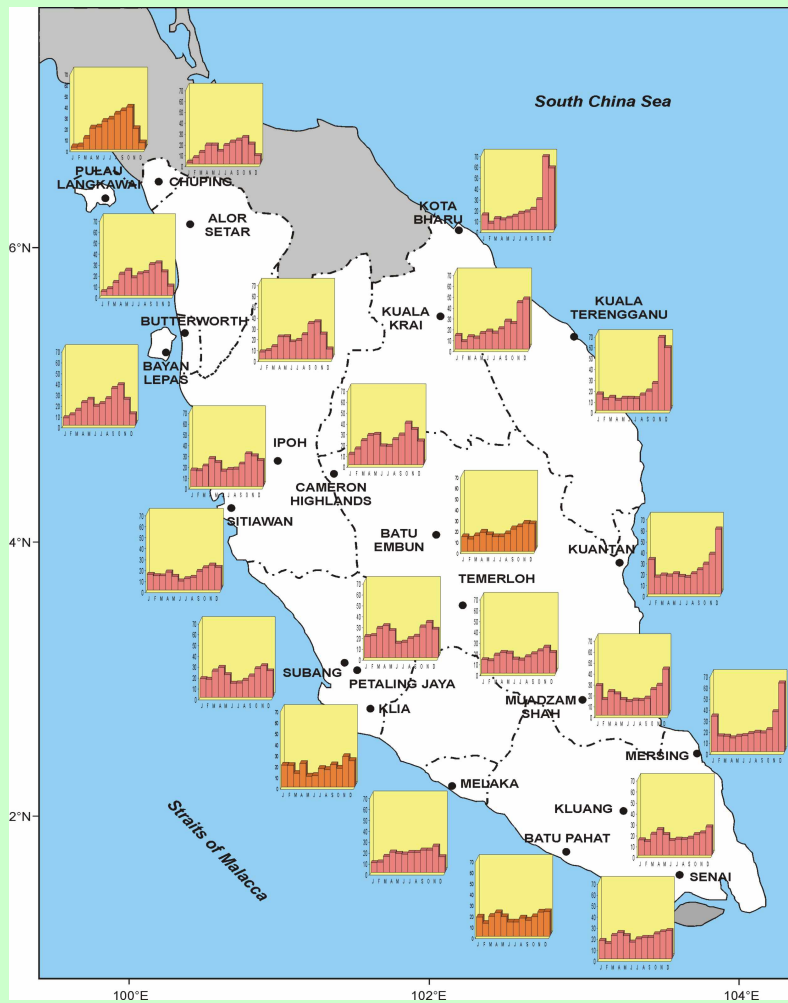
Synoptic features

Characteristics of SST over the SC sea

MEAN ANNUAL RAINFALL (mm) FOR MALAYSIA

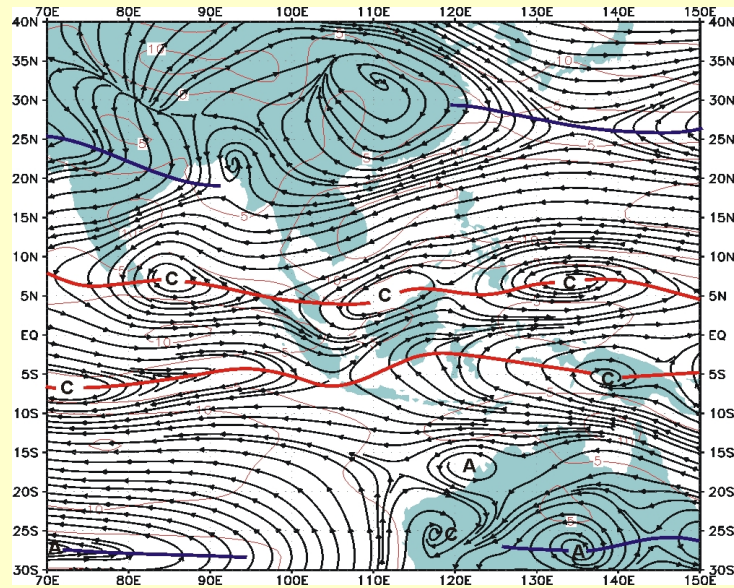


Mean Monthly Rainfall (cm)

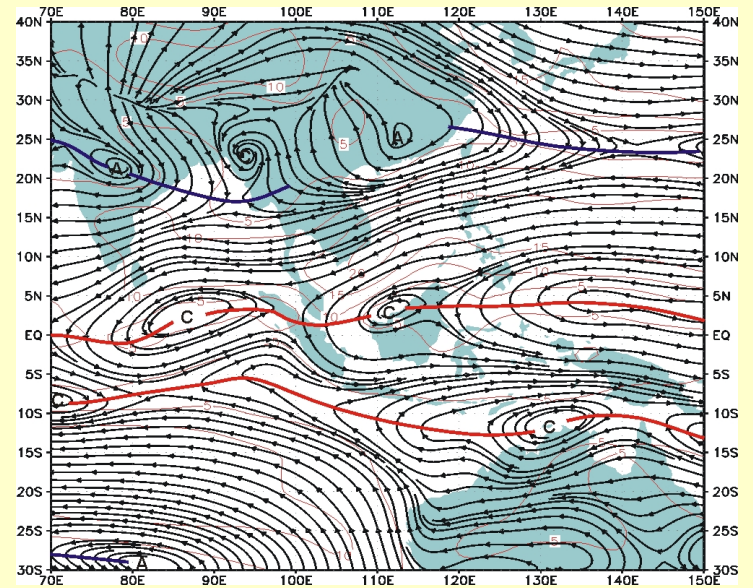


STEAMLINE ANALYSIS AT 850 hPa LEVEL

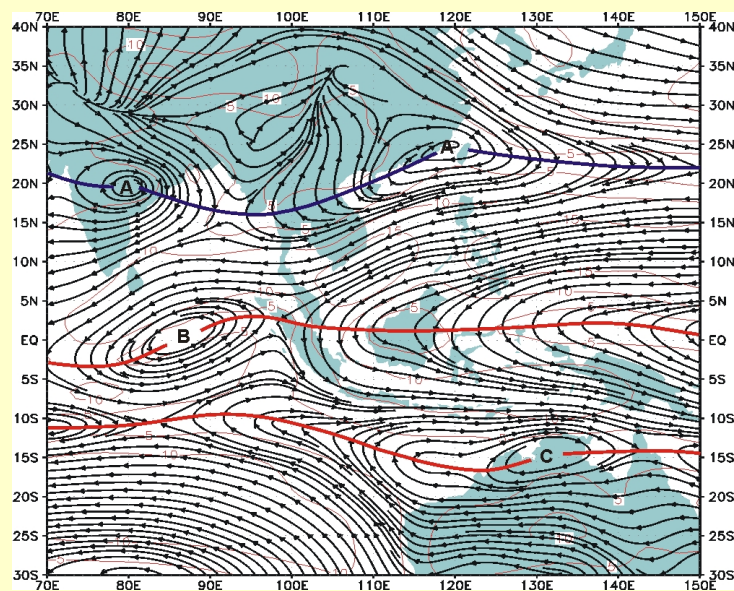
NOVEMBER



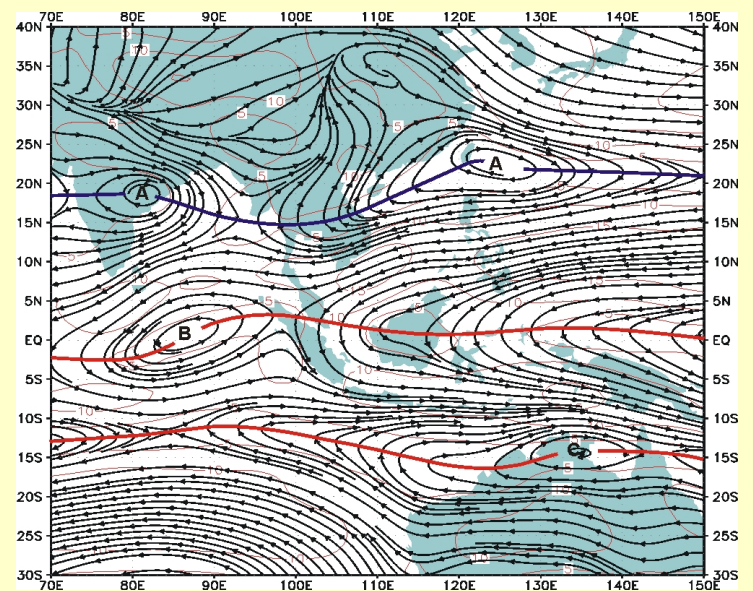
DECEMBER



JANUARY



FEBRUARY



1951/12 to 2002/02 all vortex centers

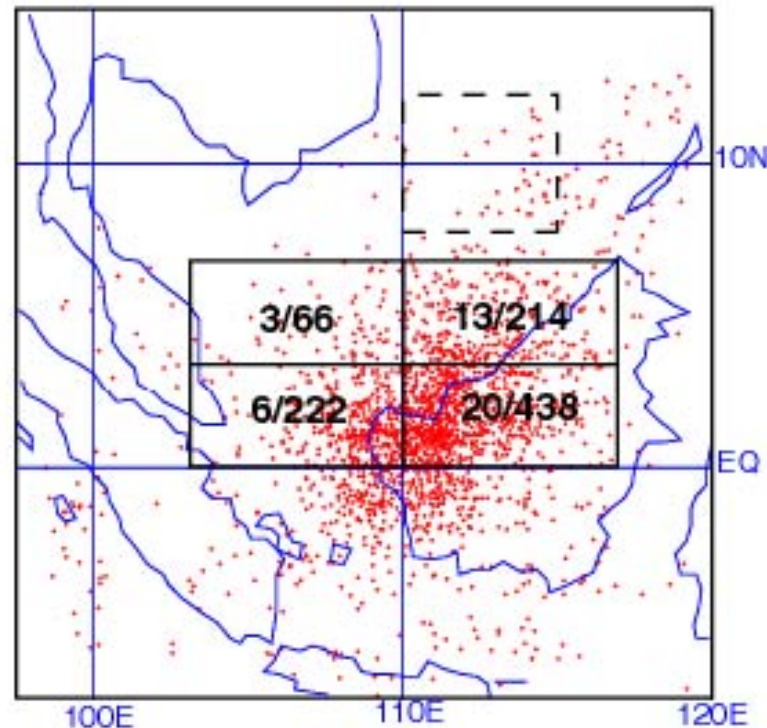
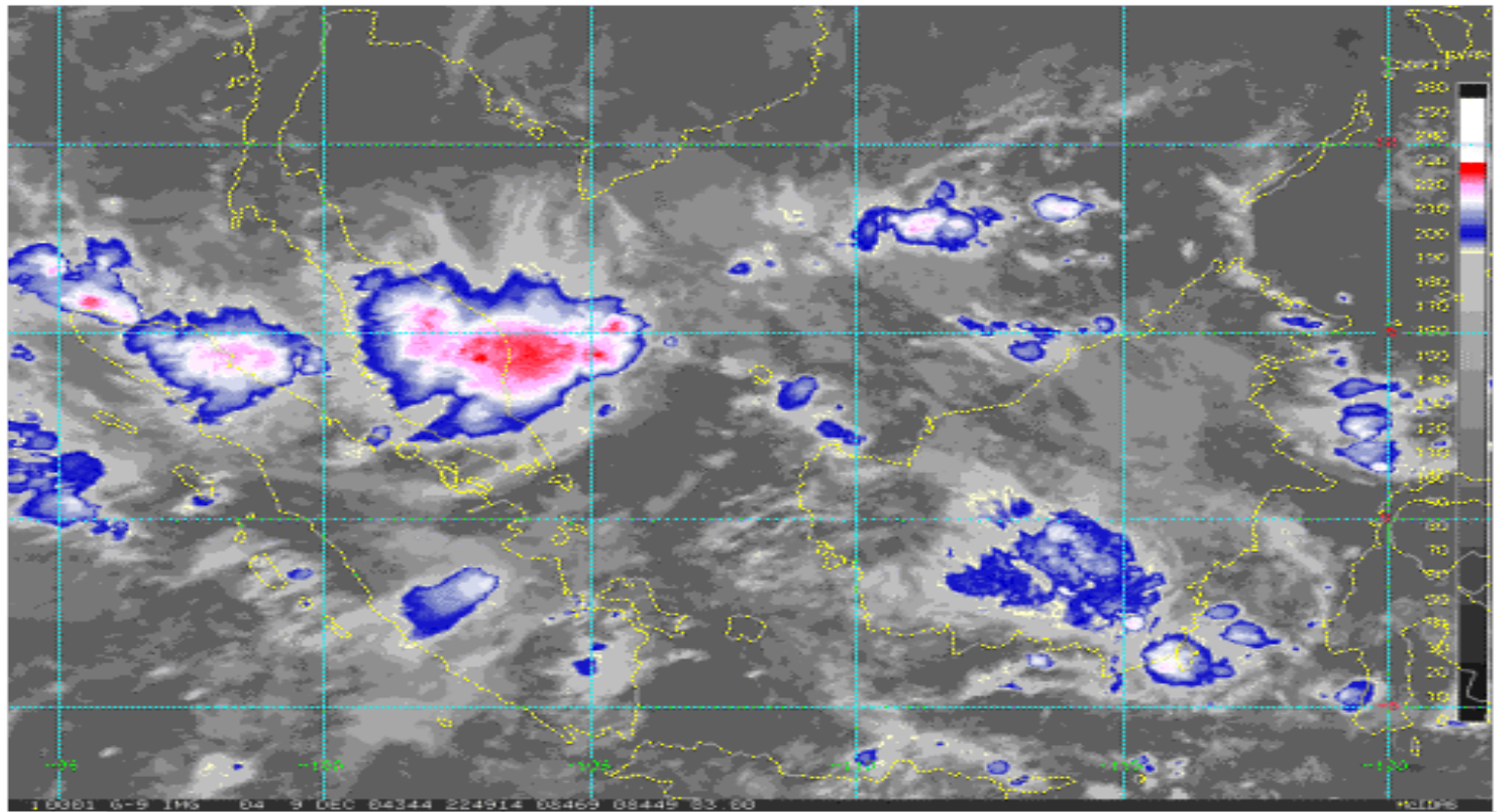


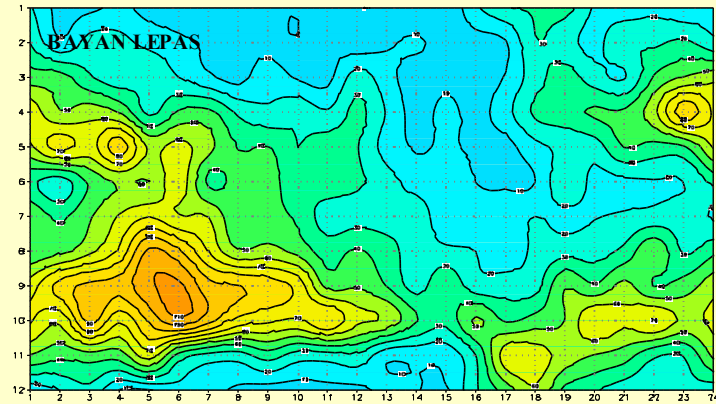
Figure 3. Location of NCEP/NCAR 925 hPa counterclockwise circulation centers during the 51 boreal winters. The four sub-regional boxes are enclosed by equator - 7°N, and 103°E - 117°E. The internal partitions are 3°N and 110°E. The first number in each box indicates the frequency of persistent 925 hPa cyclonic circulation center that lasted for 96 h or more, based on the 1951/52-2001/02 DJF NCEP/NCAR 2.5 x 2.5° reanalysis. The second number is total number of days a center is identified. The heavy dashed box indicates the area in which the northeasterly component of QuikSCAT winds is averaged to produce the surge index.

C.P. Chang et al, 2002

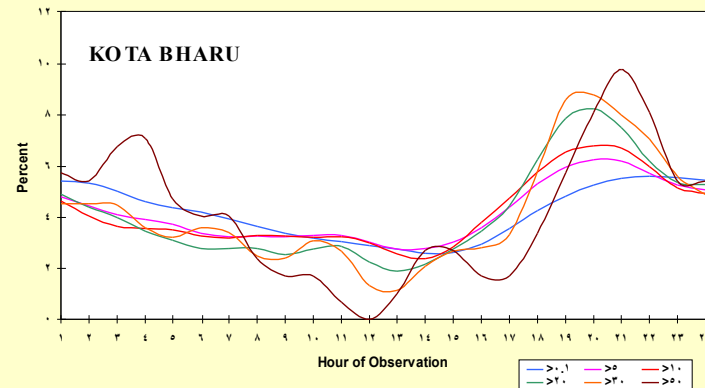
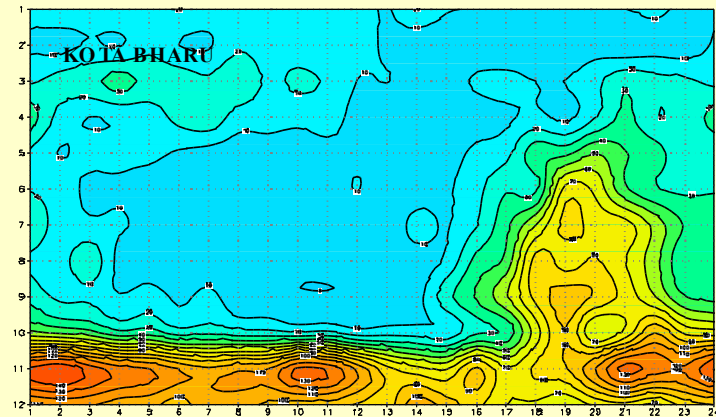
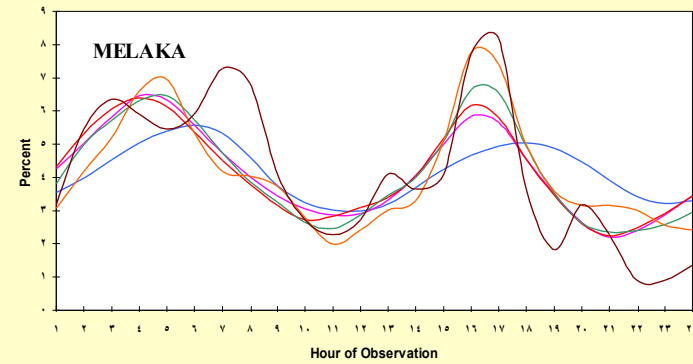
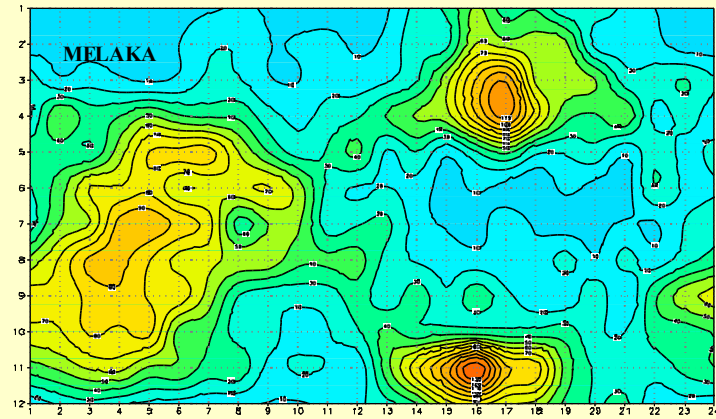
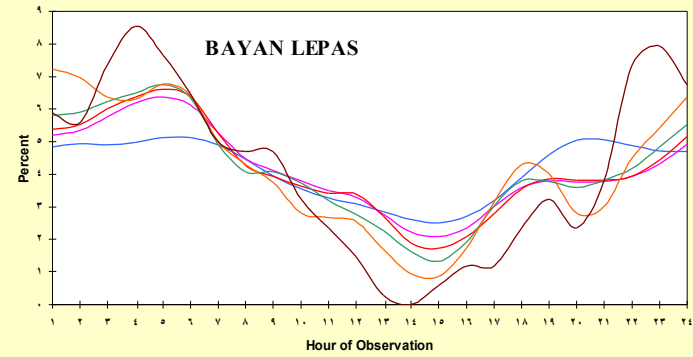


Massive cloud clusters over the East Coast of Peninsular Malaysia are evident on this satellite imagery taken on 9th Dec 2004

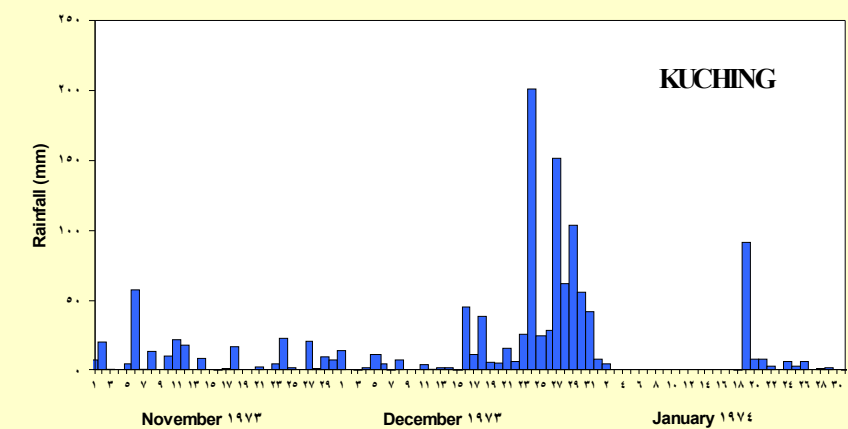
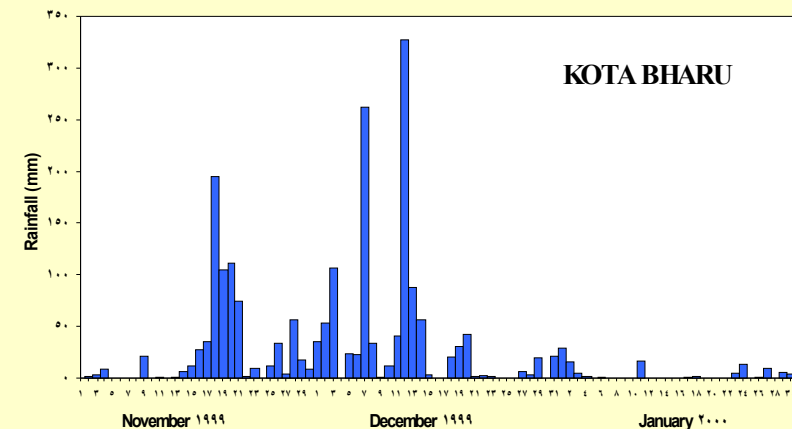
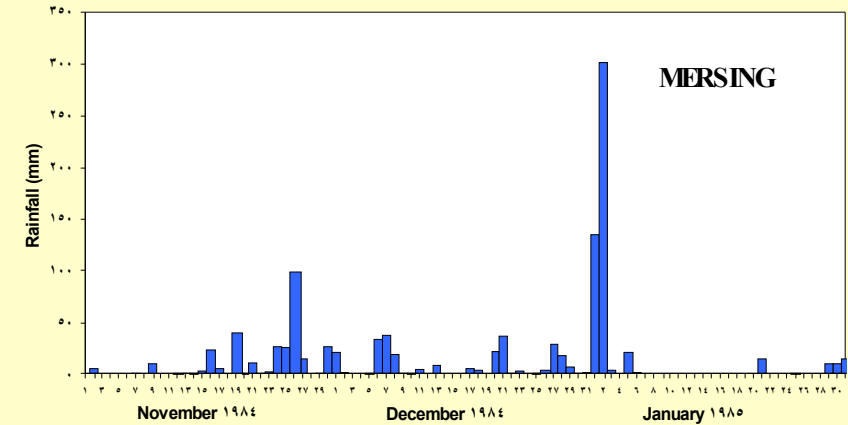
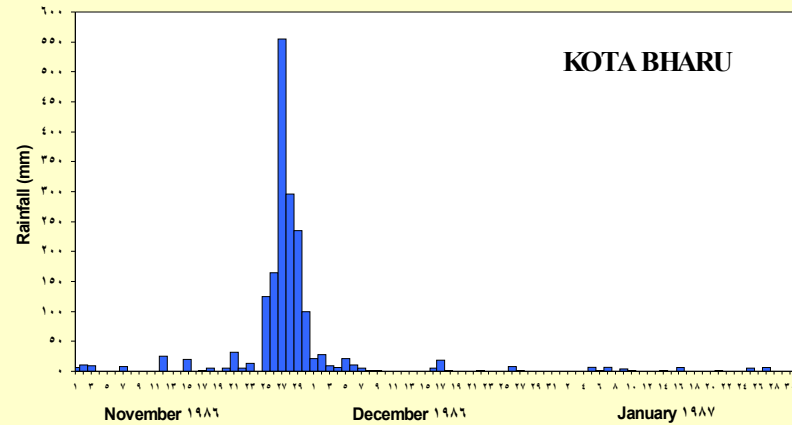
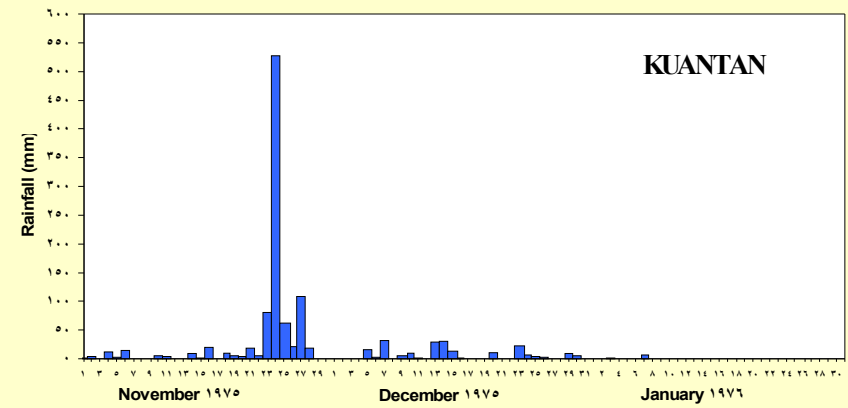
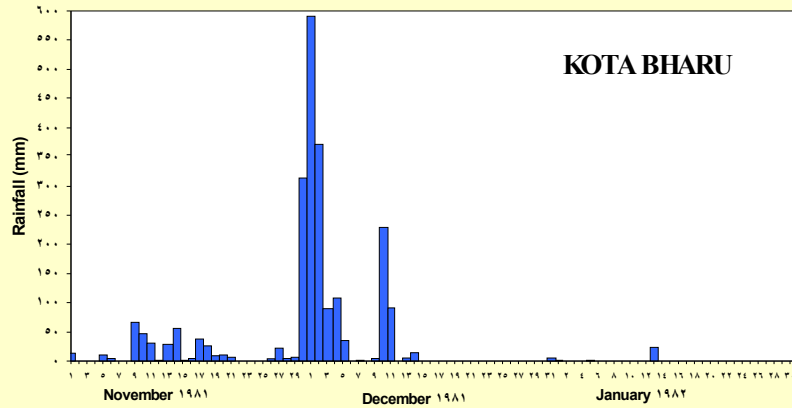
RAINFALL FREQUENCY



RAINFALL FREQ FOR DIFF INTENSITIES

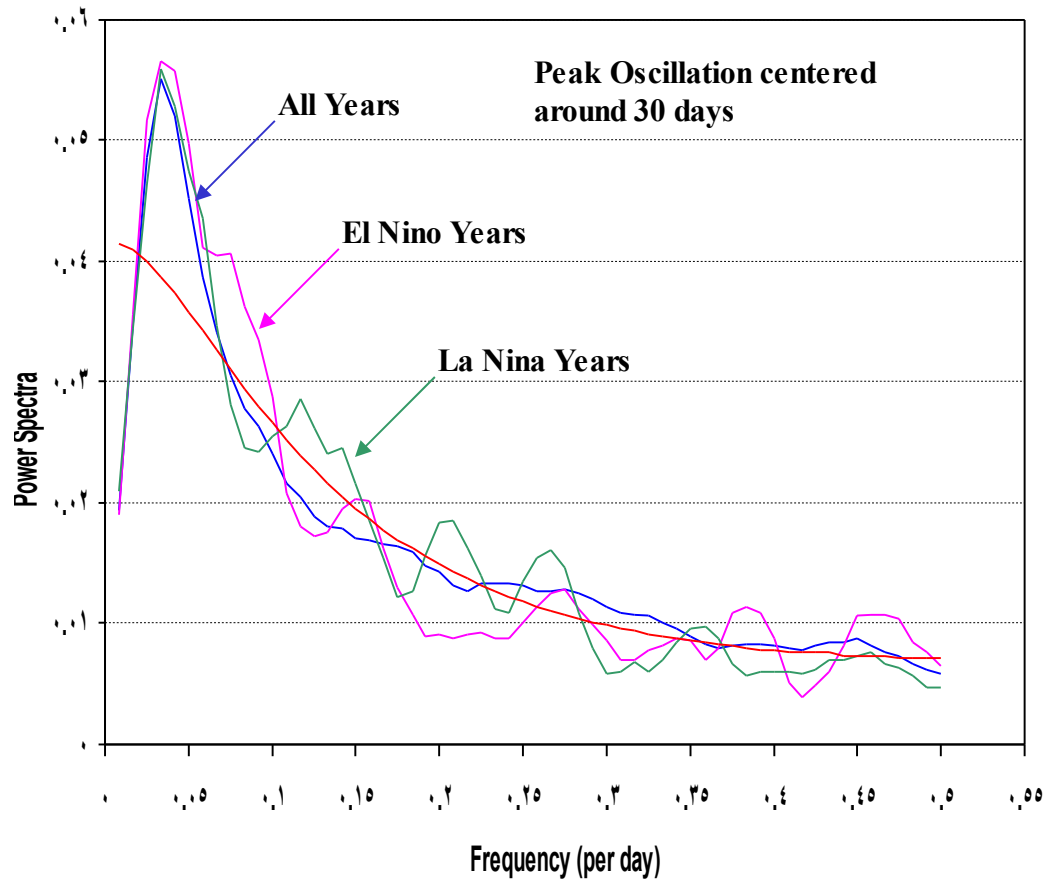


DAILY RAINFALL

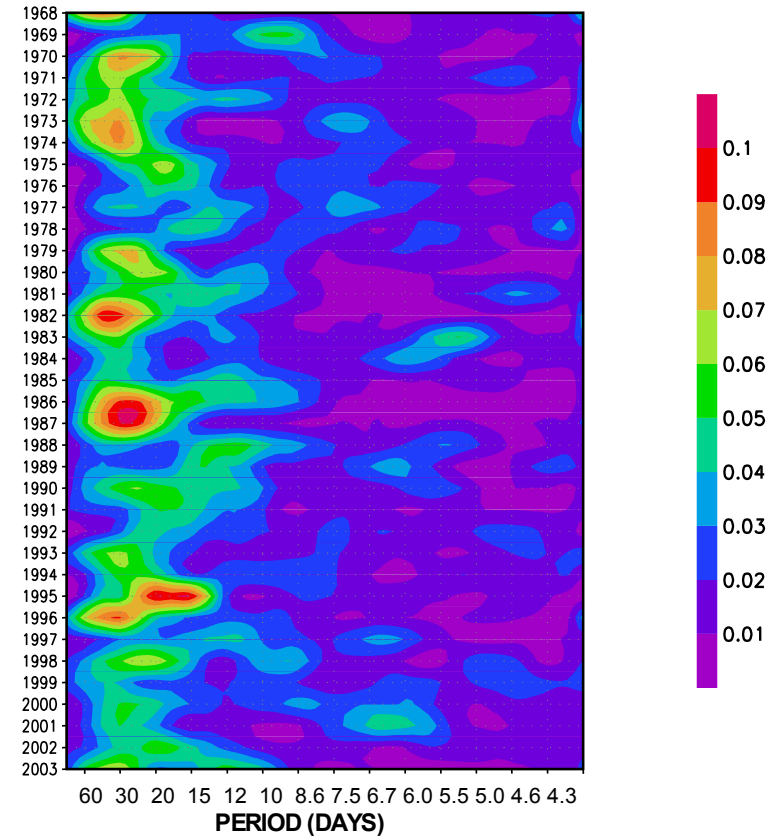




Spectra of Monsoon Rainfall (Nov – Feb)

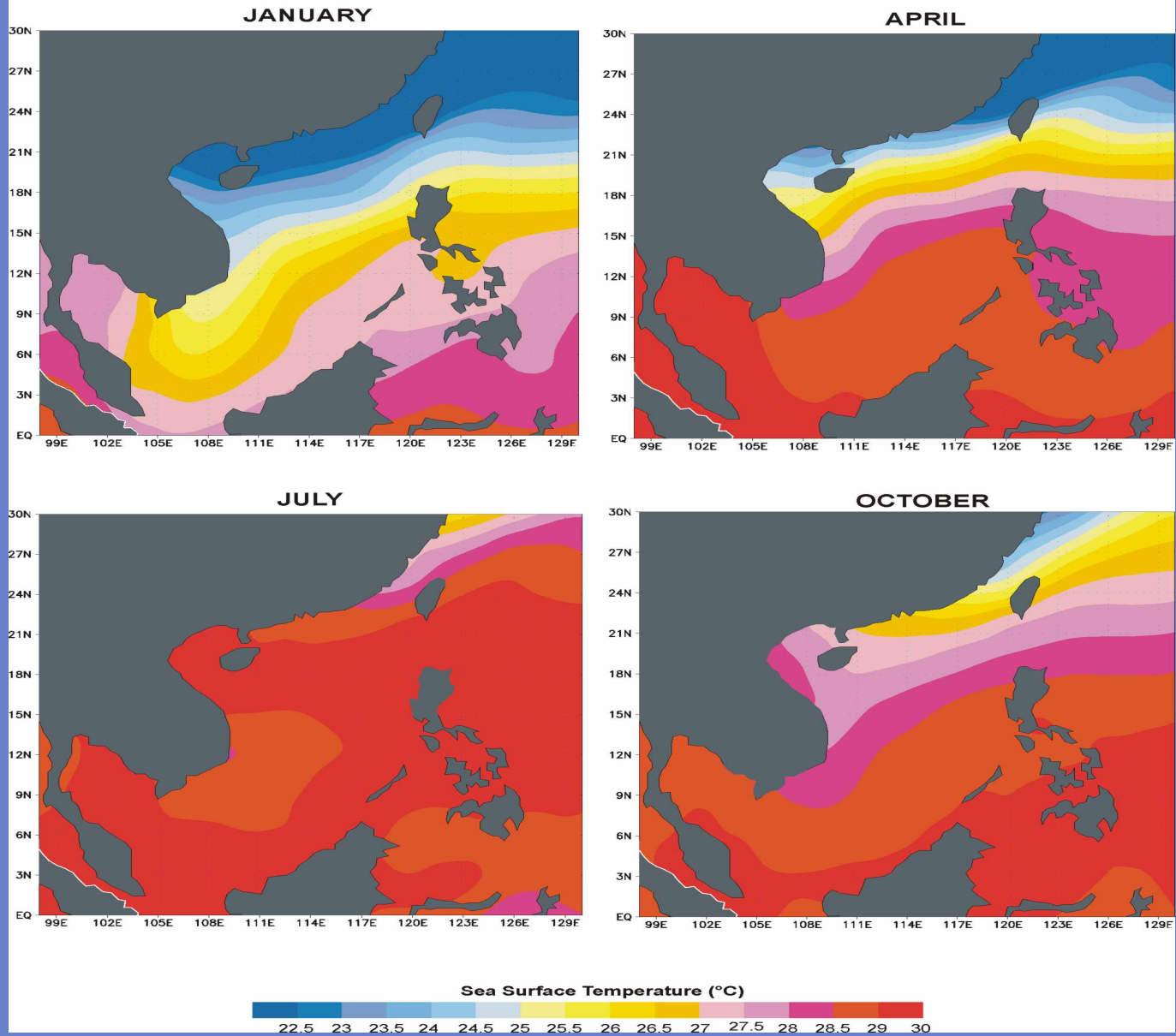


Spectra of Monsoon Rainfall (Nov – Feb)

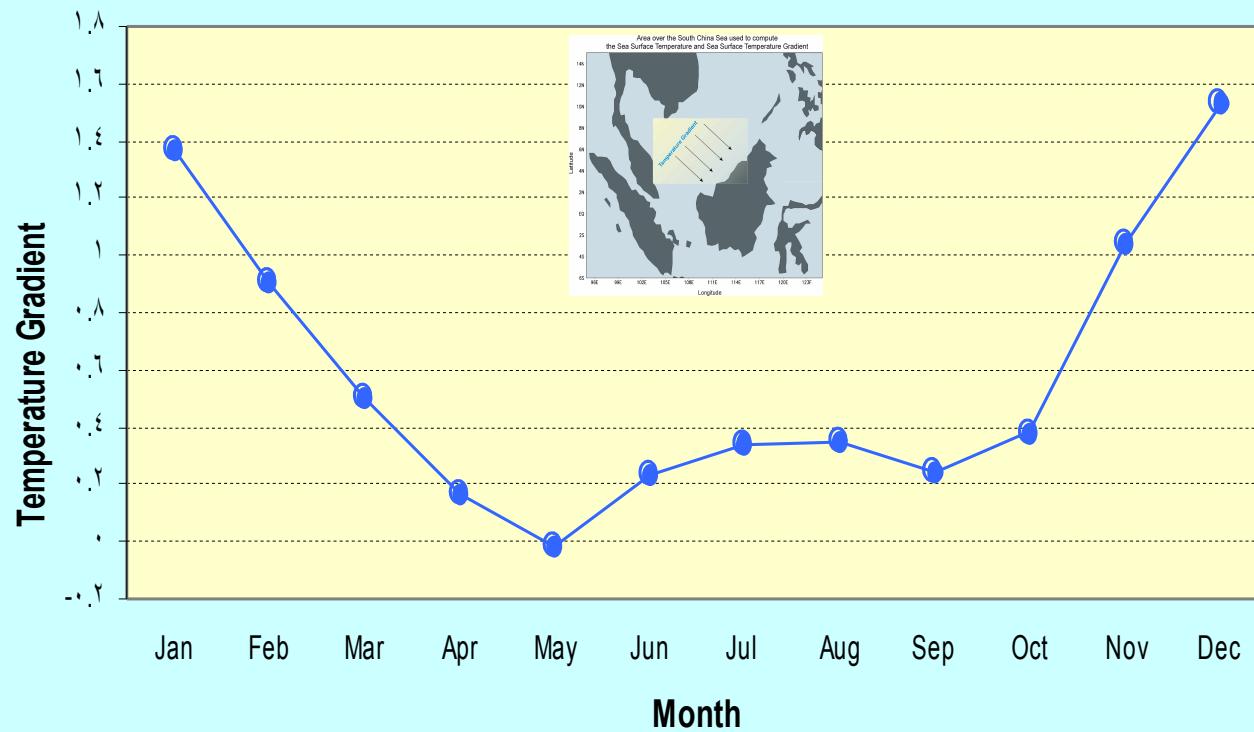


Intraseasonal Oscillation in Monsoon Rainfall

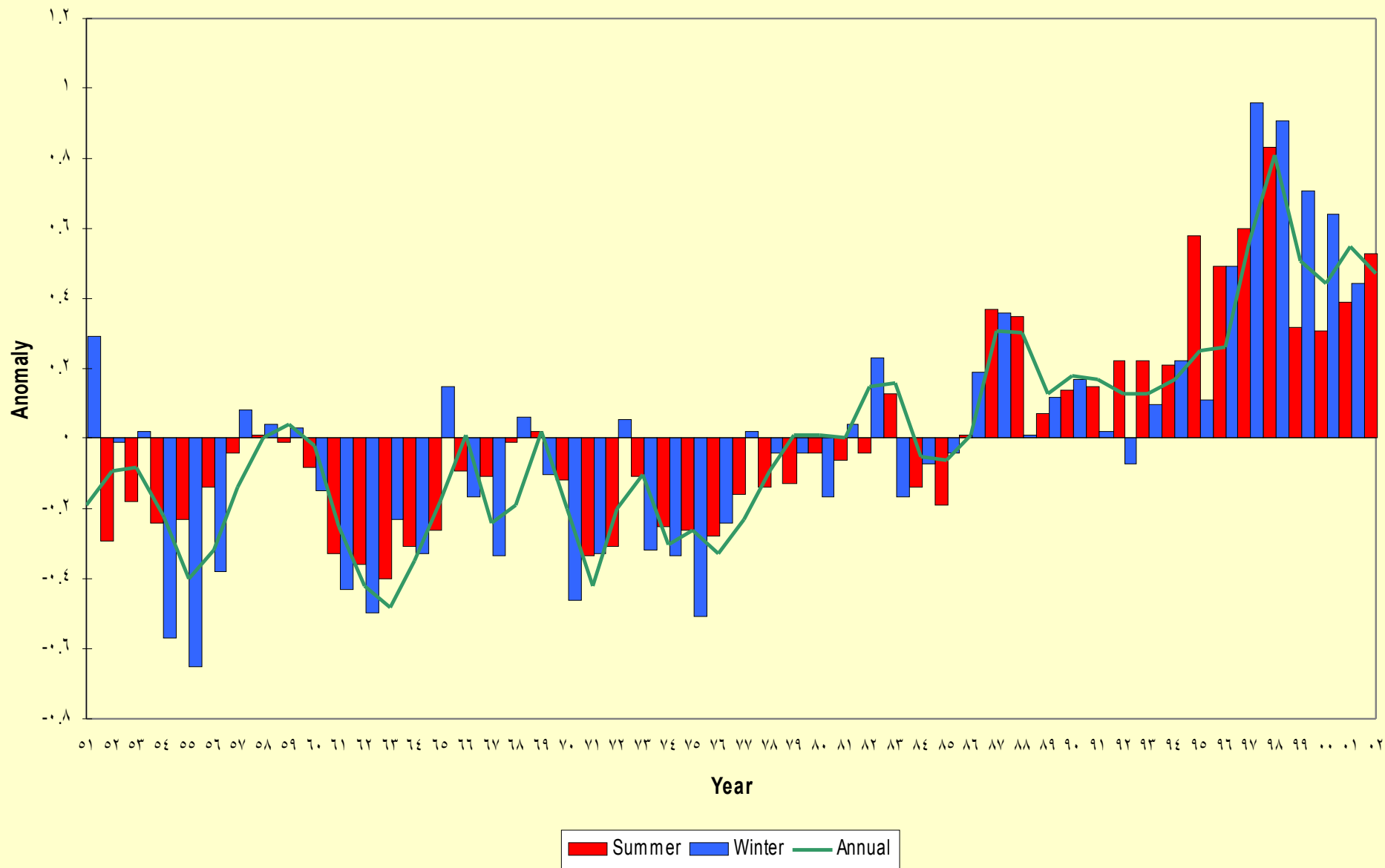
Mean Monthly South China Sea SST - Period (1951 - 2000)



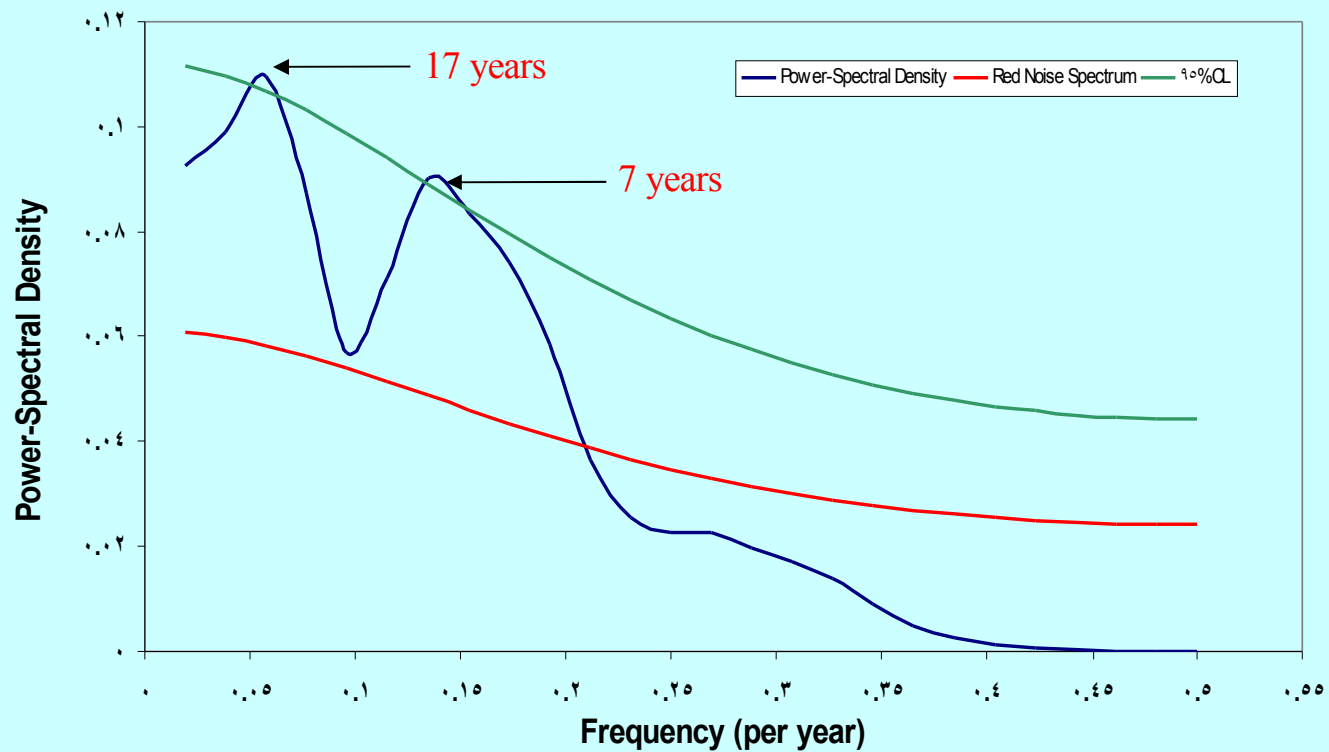
Montly Mean SST Gradient over South China Sea



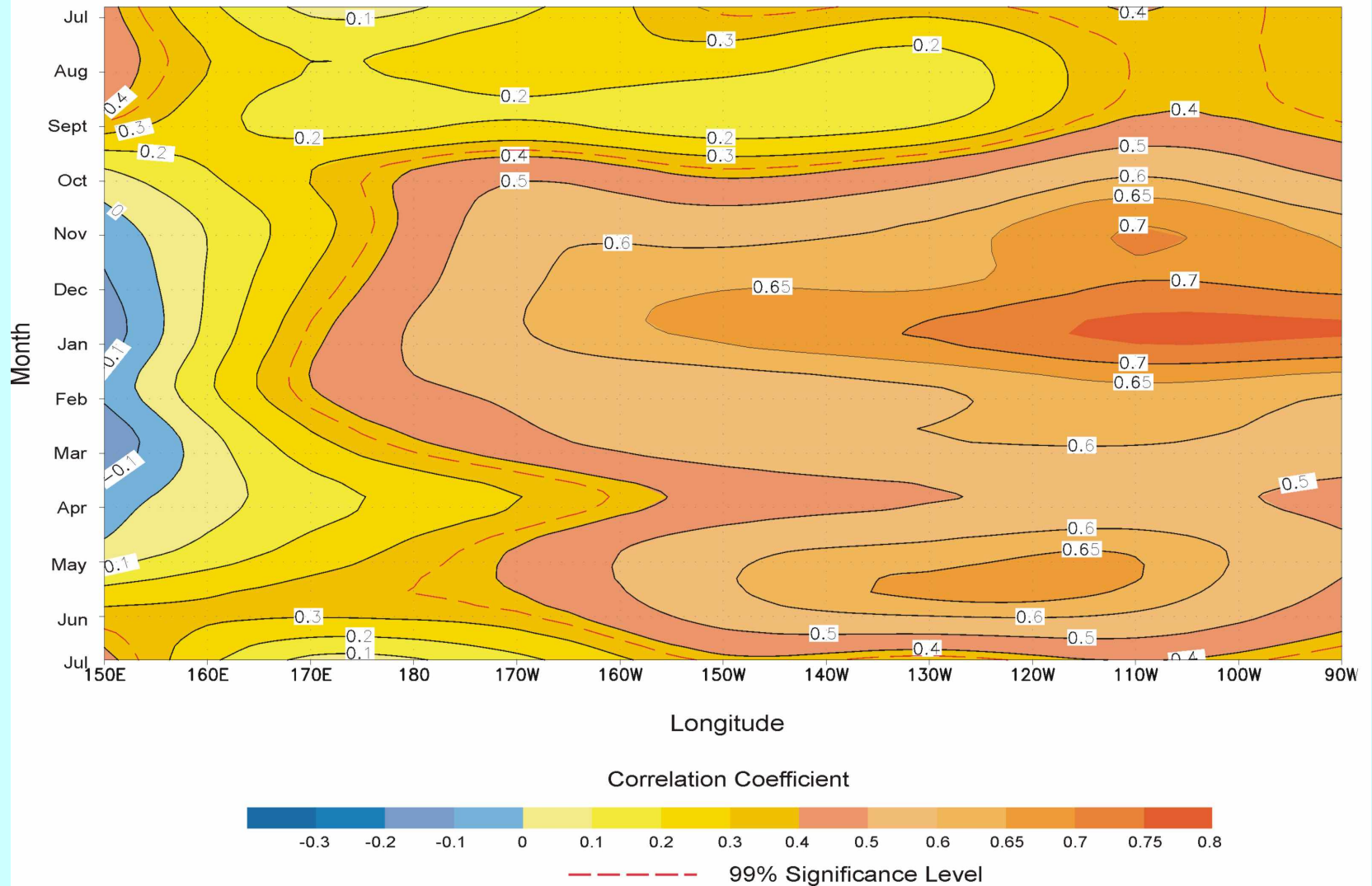
Time Series of Seasonal and Annual SST anomaly over the South China Sea



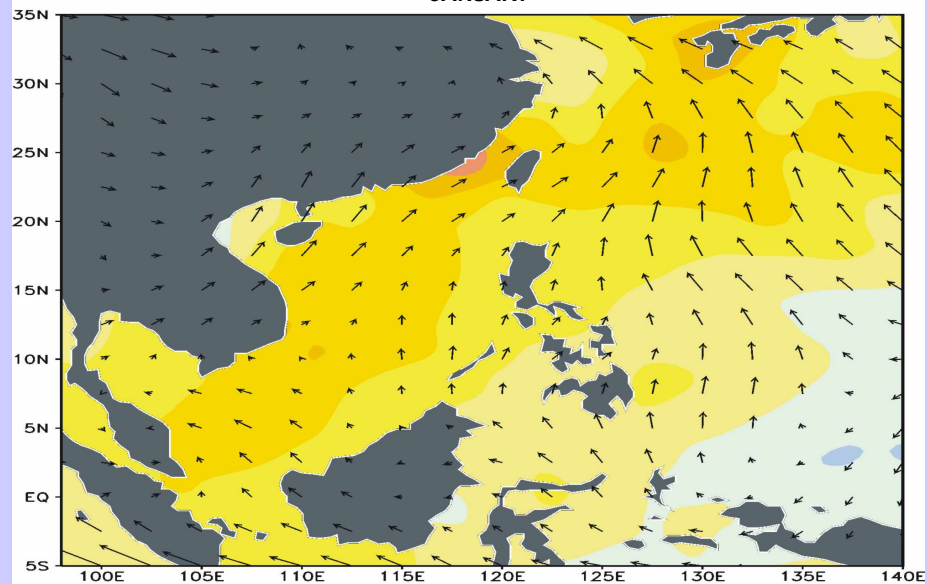
Power Spectrum of Annual SST Over The South China Sea



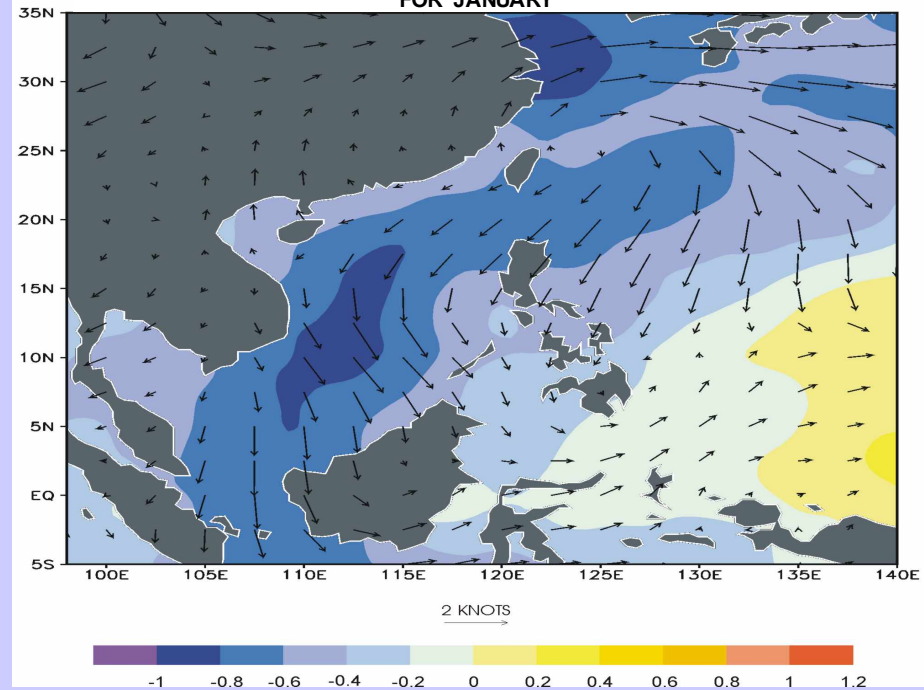
Time-Longitude Section of SST Correlation between South China Sea and Equatorial Pacific at Lag -2



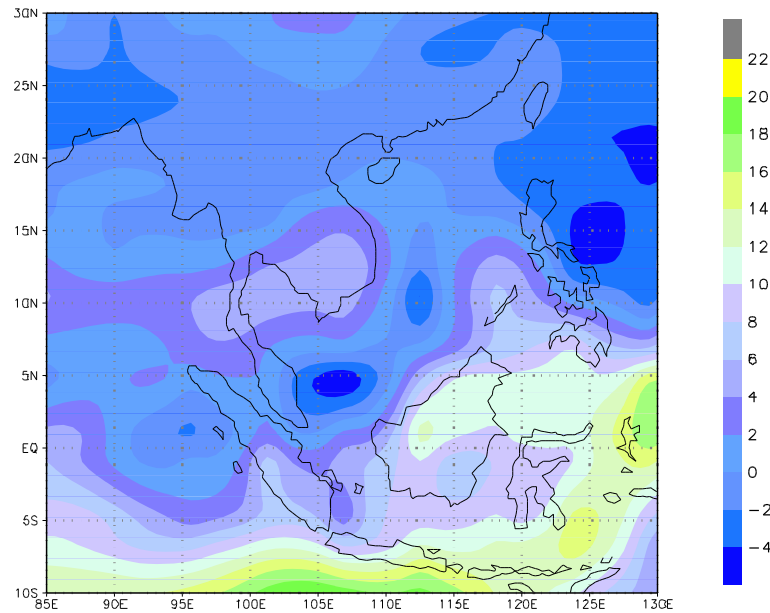
**1000 HPA WIND VECTOR ANOMALY DURING POSITIVE SST ANOMALY FOR
JANUARY**



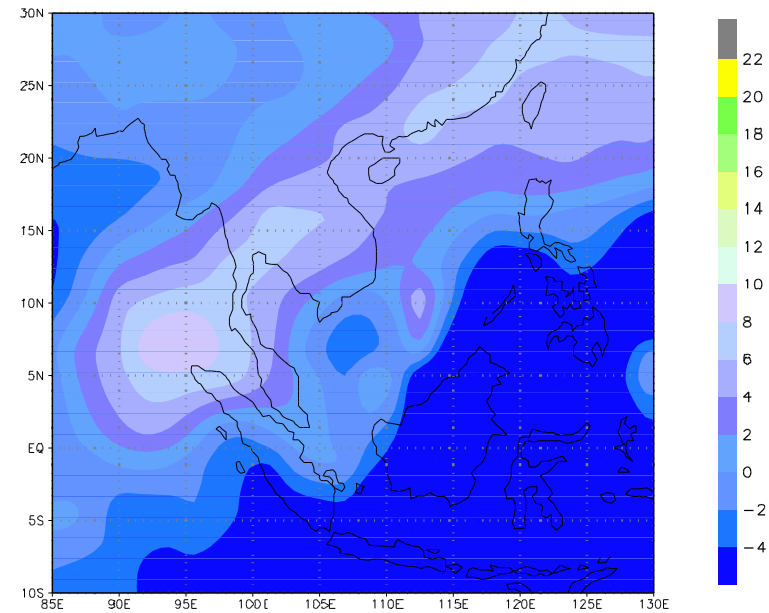
**1000 HPA WIND VECTOR ANOMALY DURING NEGATIVE SST ANOMALY
FOR JANUARY**



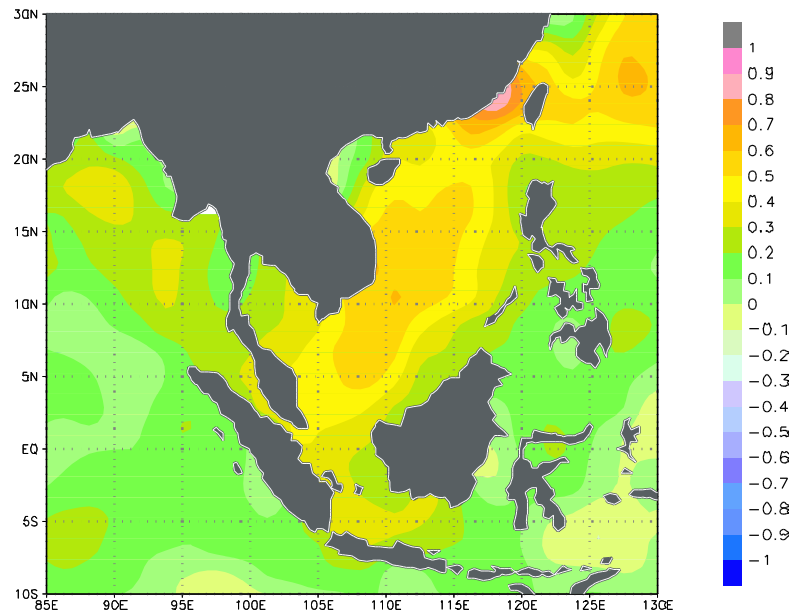
Composite OLR during El Nino (January)



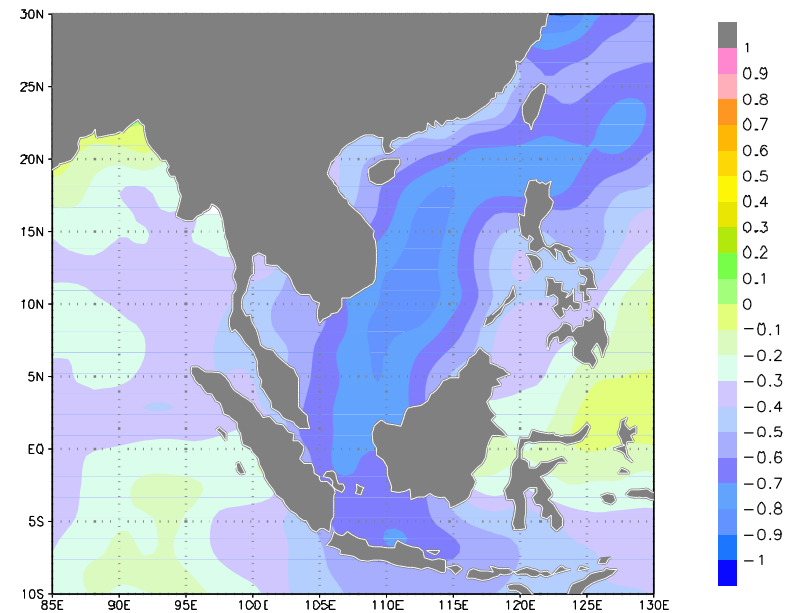
Composite OLR during La Nina (January)



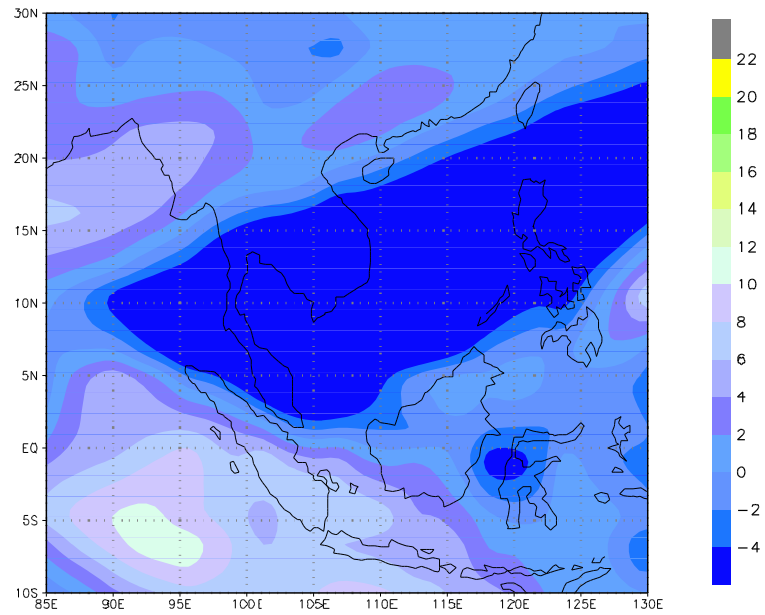
Composite SST during El Nino (January)



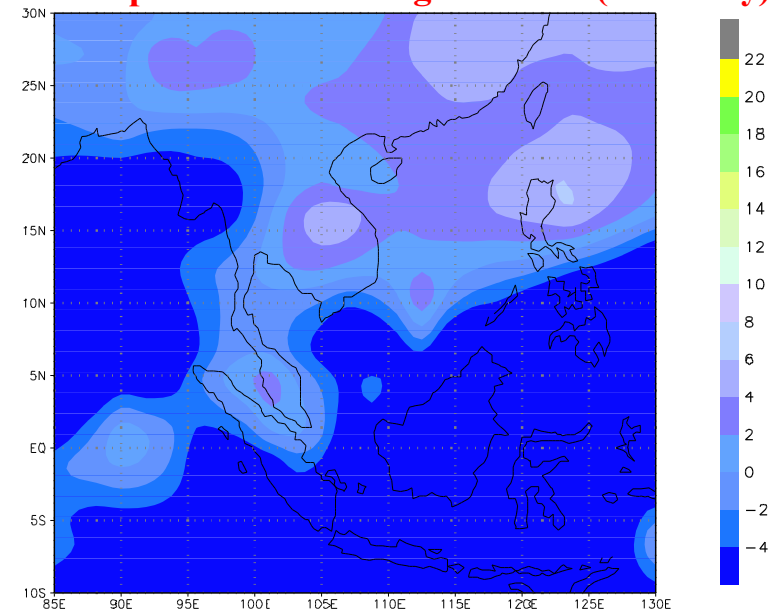
Composite SST during La Nina (January)



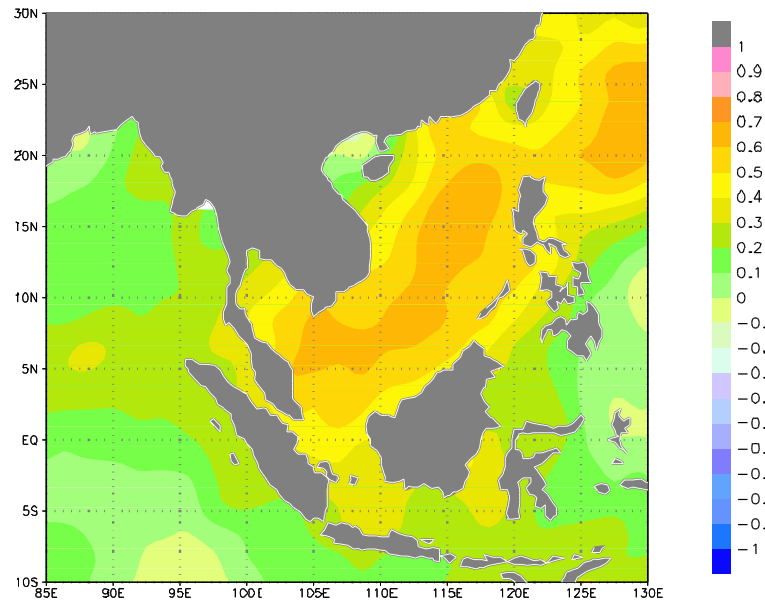
Composite OLR during El Nino (February)



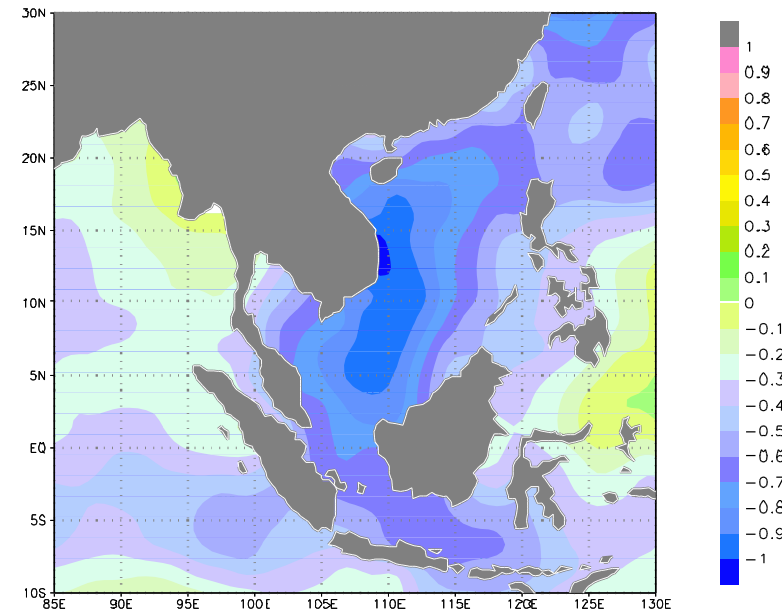
Composite OLR during La Nina (February)



Composite SST during El Nino (February)



Composite SST during La Nina (February)



Issues relevant to winter monsoon

Monsoon Vortex (Borneo Low)

Cold Surges and Heavy rain episodes

Intraseasonal Oscillation

Interannual Variability

SST over the South China Sea

THANK YOU