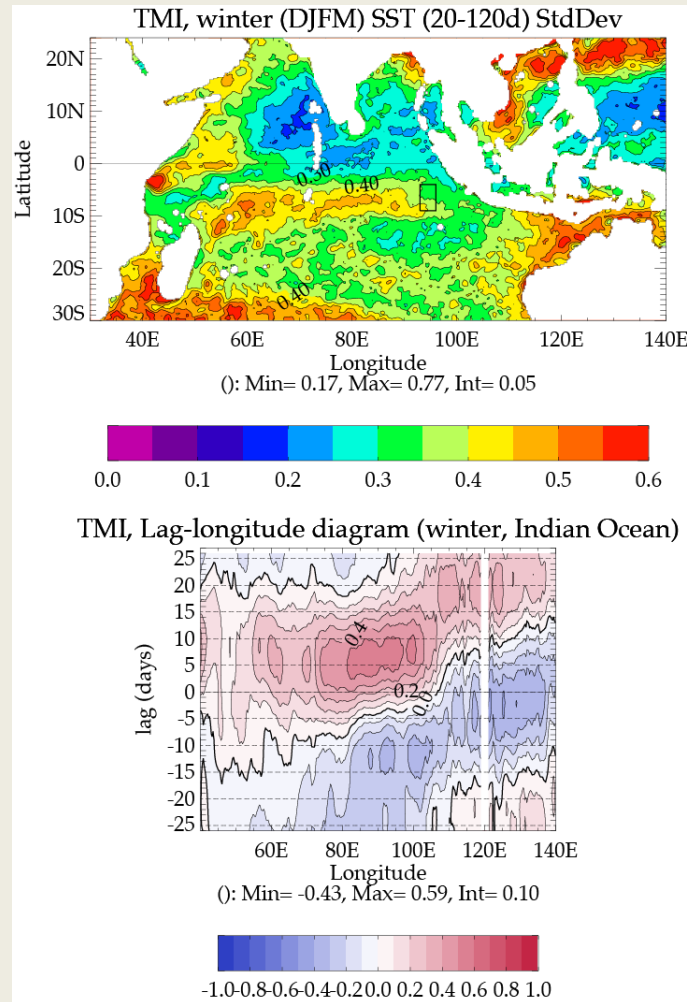


# **Preliminary results from CINDY2011**

**Kelvin Richards**

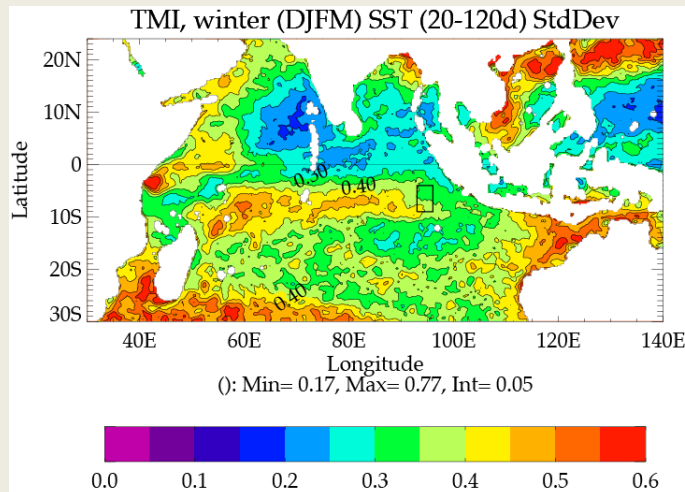
**International Pacific Research Center  
University of Hawai`i at Mānoa**

# Indian Ocean SST Variability (20-120 days)

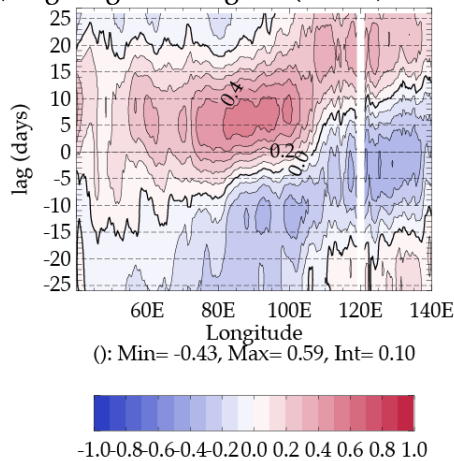


Observations

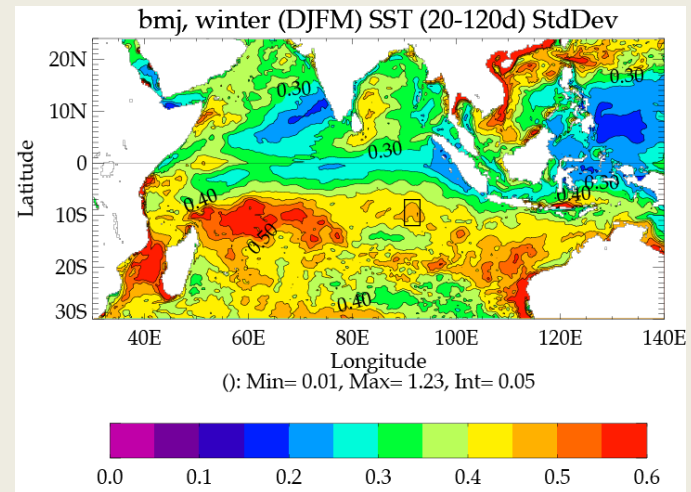
# Indian Ocean SST Variability (20-120 days)



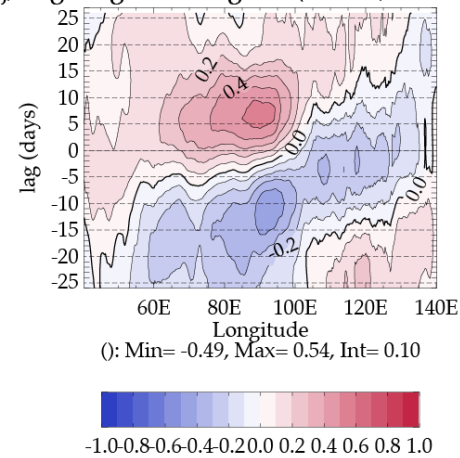
TMI, Lag-longitude diagram (winter, Indian Ocean)



Observations



bmj, Lag-longitude diagram (winter, Indian Ocean)



Model

## Questions to address:

### **What controls the SST and upper ocean heat content before, during and after an MJO event?**

Processes affecting SST include surface fluxes, ocean vertical mixing, the diurnal cycle, advection of heat and Ekman pumping, seasonal cycle, ENSO, IOD.

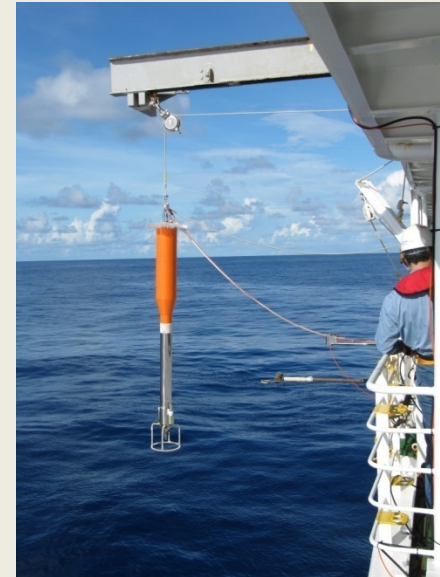
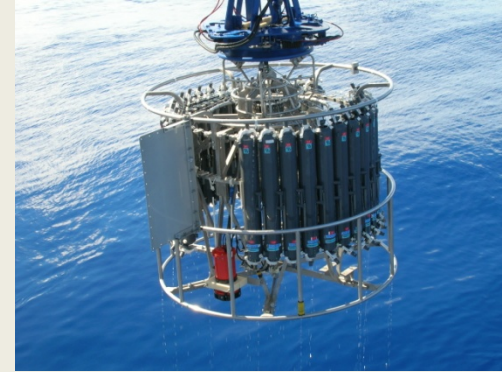
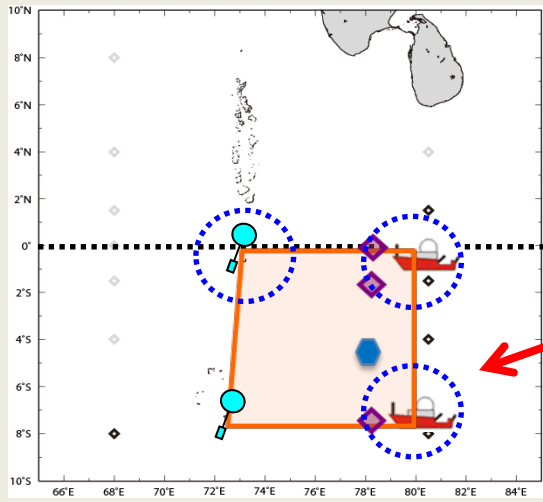
### **How representative are the measurements taken during CINDY2011?**

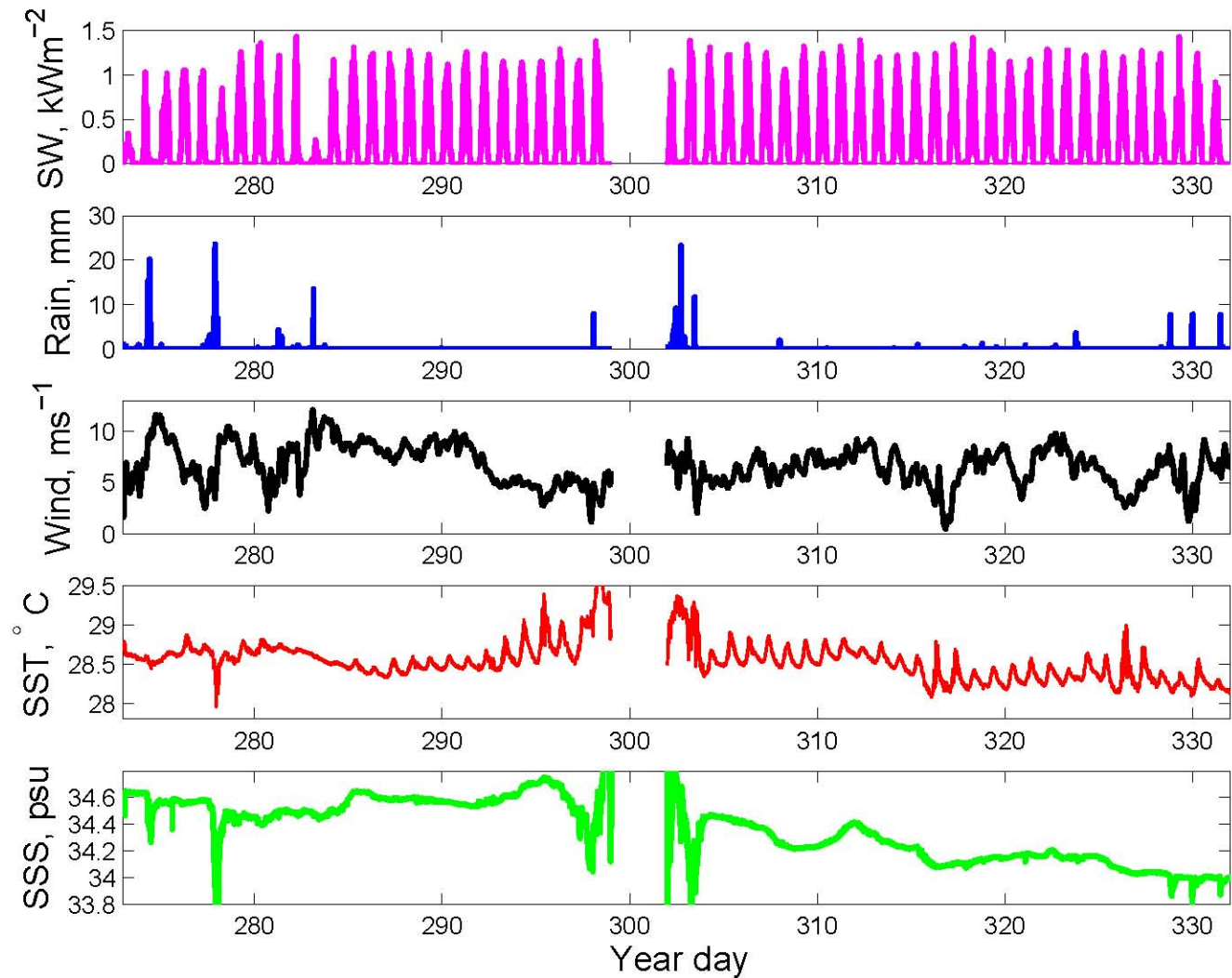
Need to know how the observed ocean response at 8S, 80E compares with other locations and MJO events.

### **What is the impact of the presence of the thermocline ridge and associated upper ocean variability on the initiation and development of MJO events?**

Requires numerical experimentation with a regional coupled model.

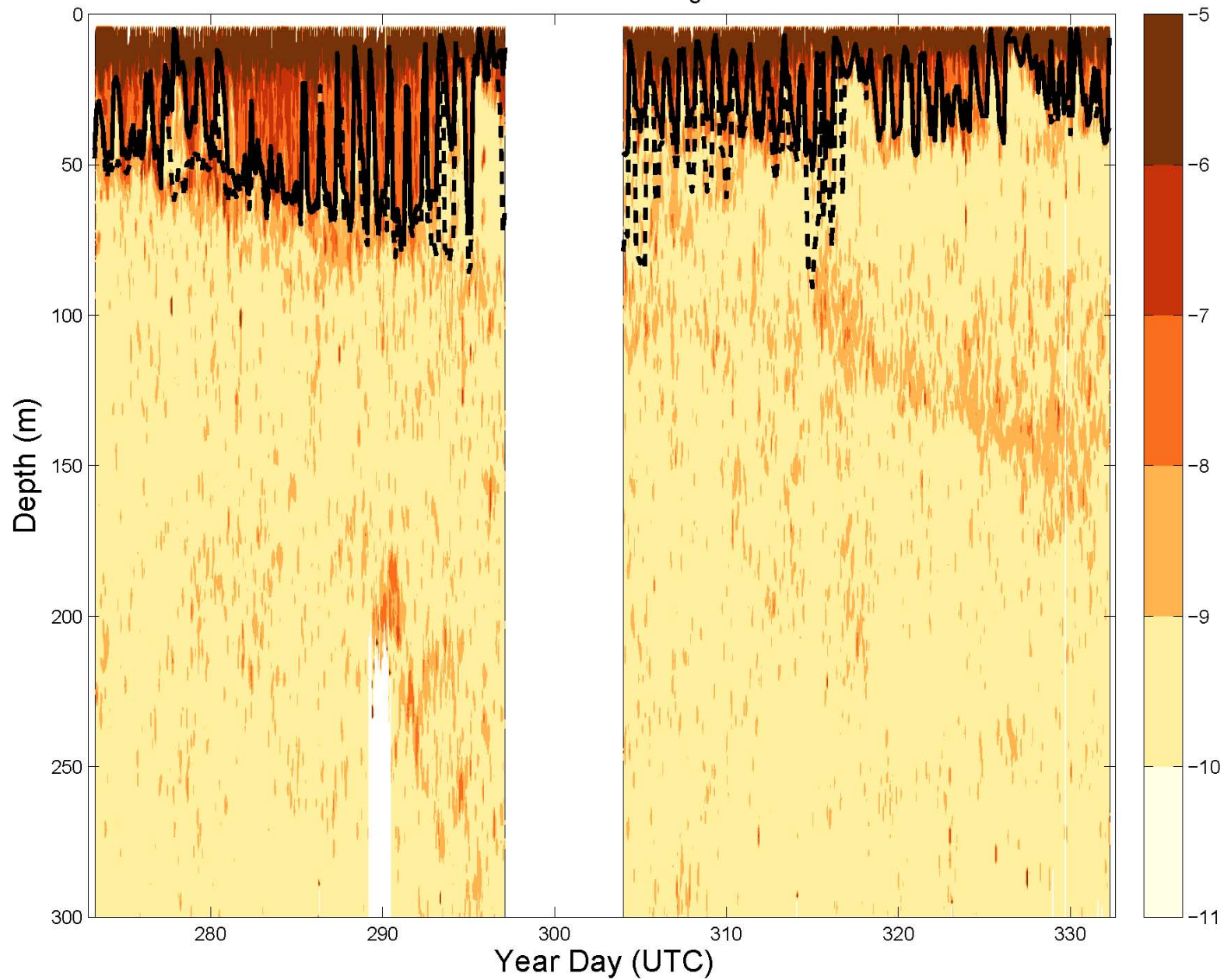
# CINDY/DYNAMO

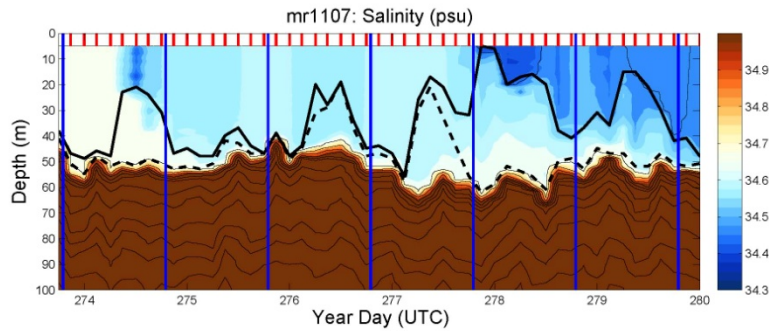




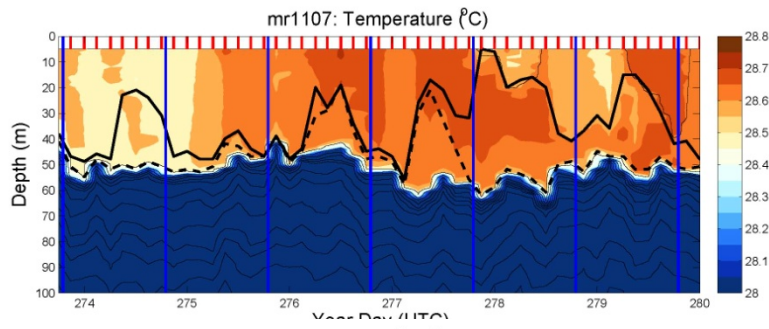


mr1107:  $\log_{10}(\epsilon_{gc})$

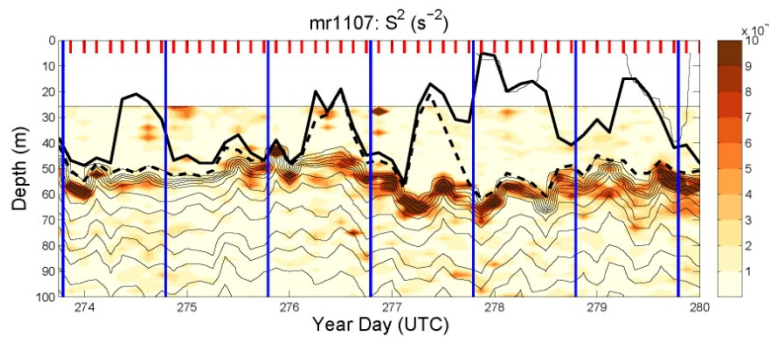




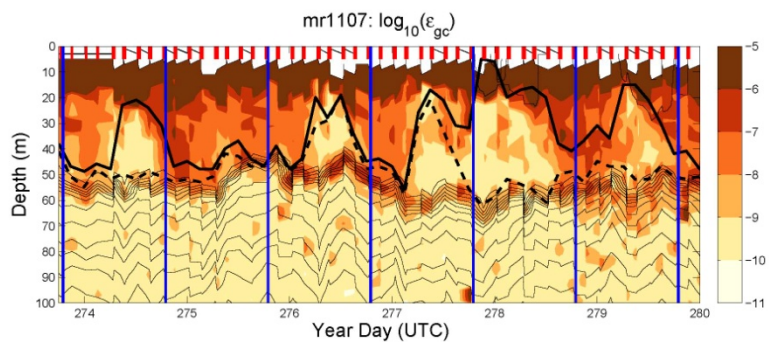
Salinity



Temperature

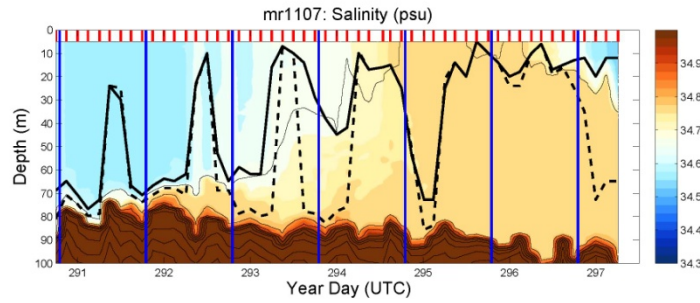


Shear

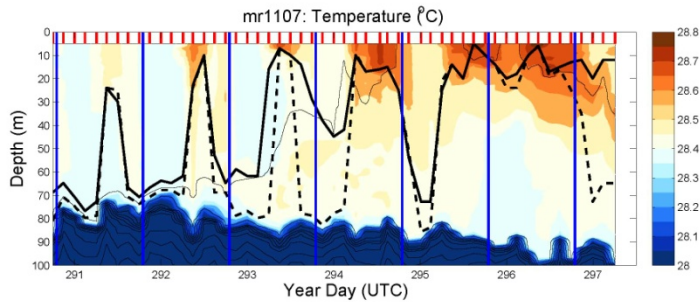


Turbulence

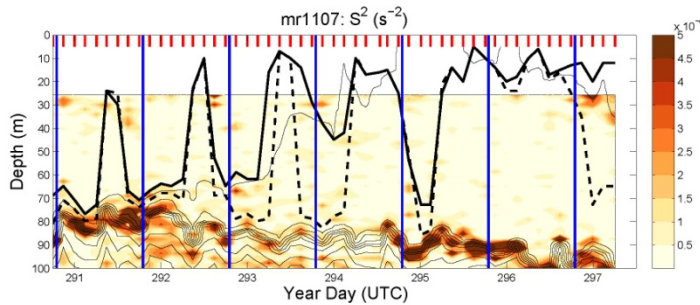




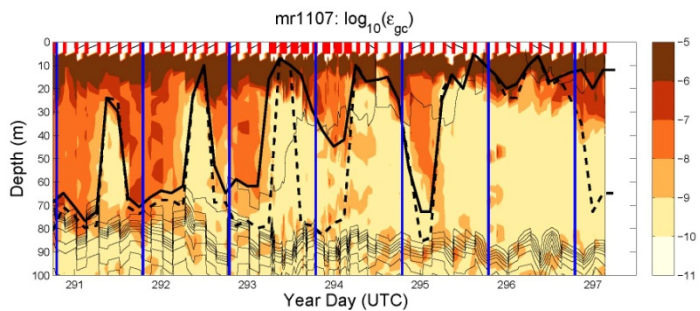
Salinity



Temperature

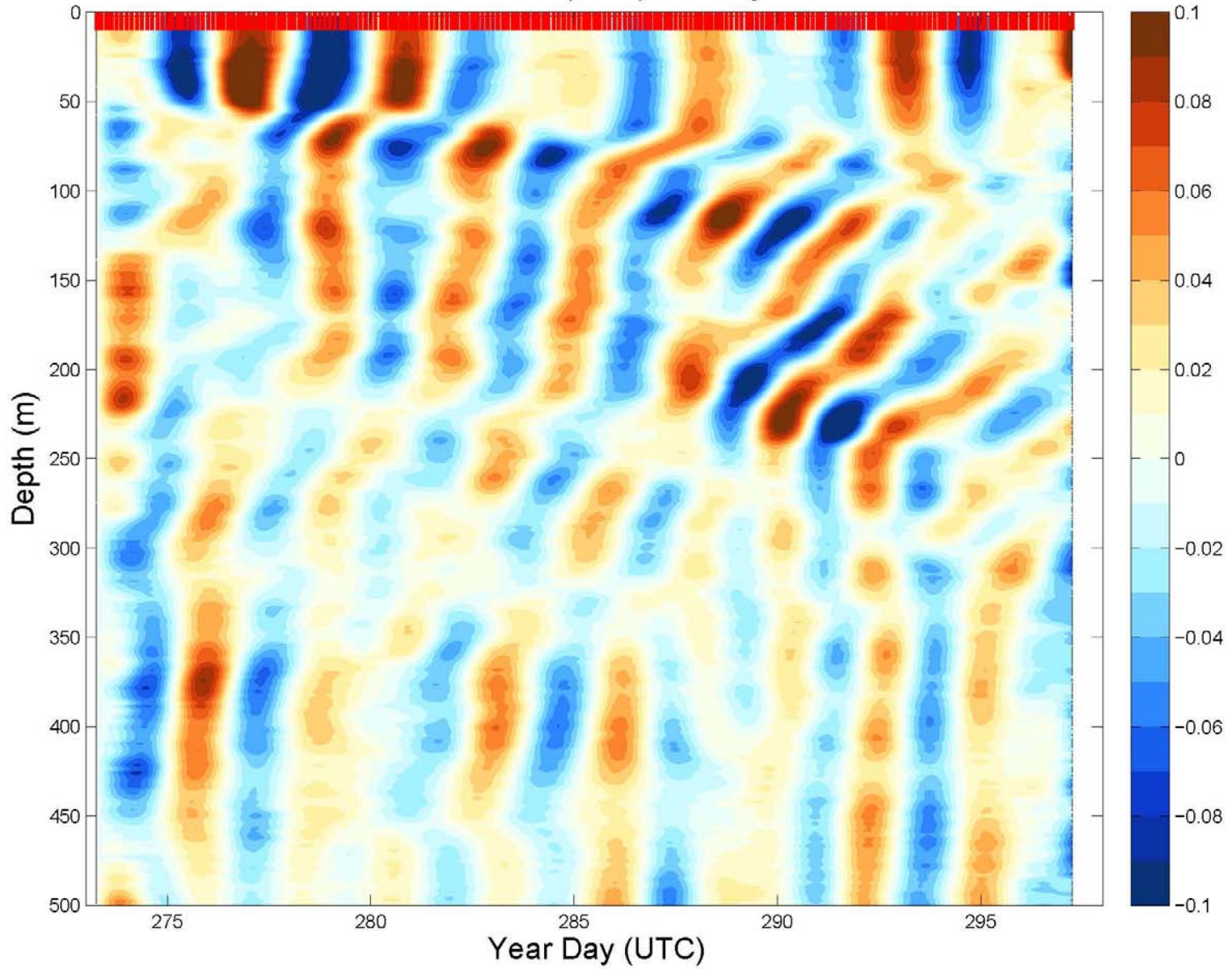


Shear



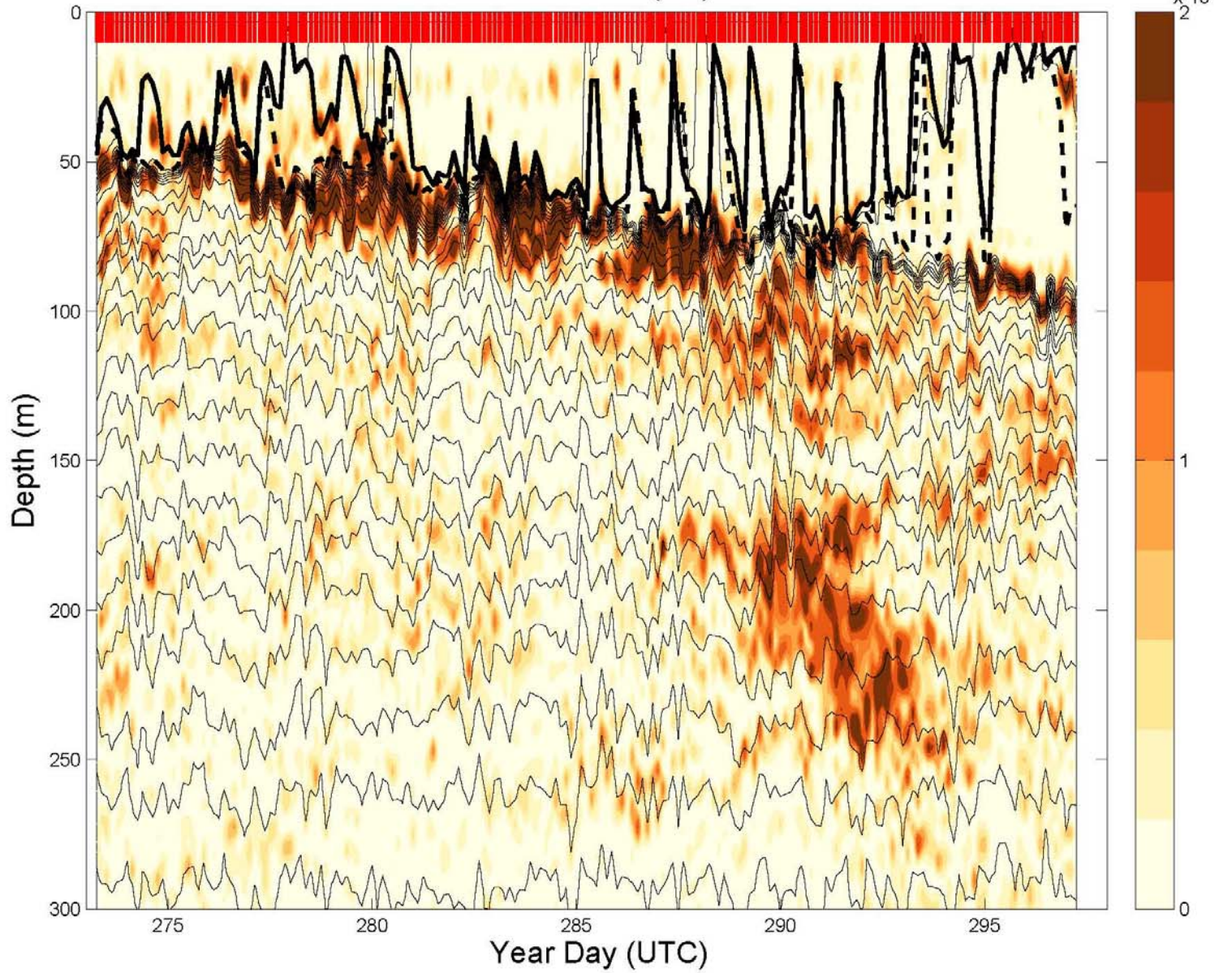
Turbulence

mr1107: uf (ms<sup>-1</sup>) 2-6 days

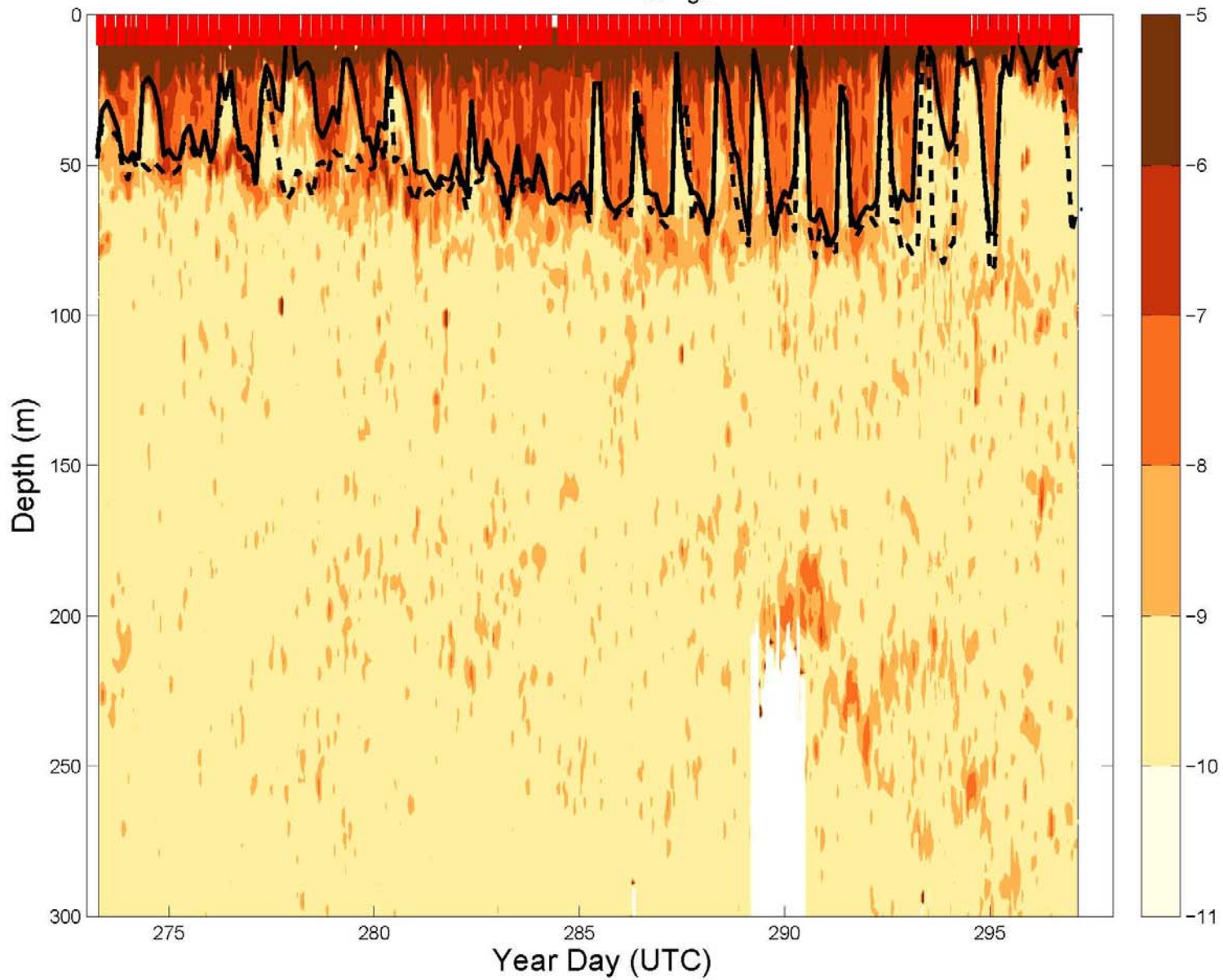




mr1107:  $Sf^2$  ( $s^{-2}$ )

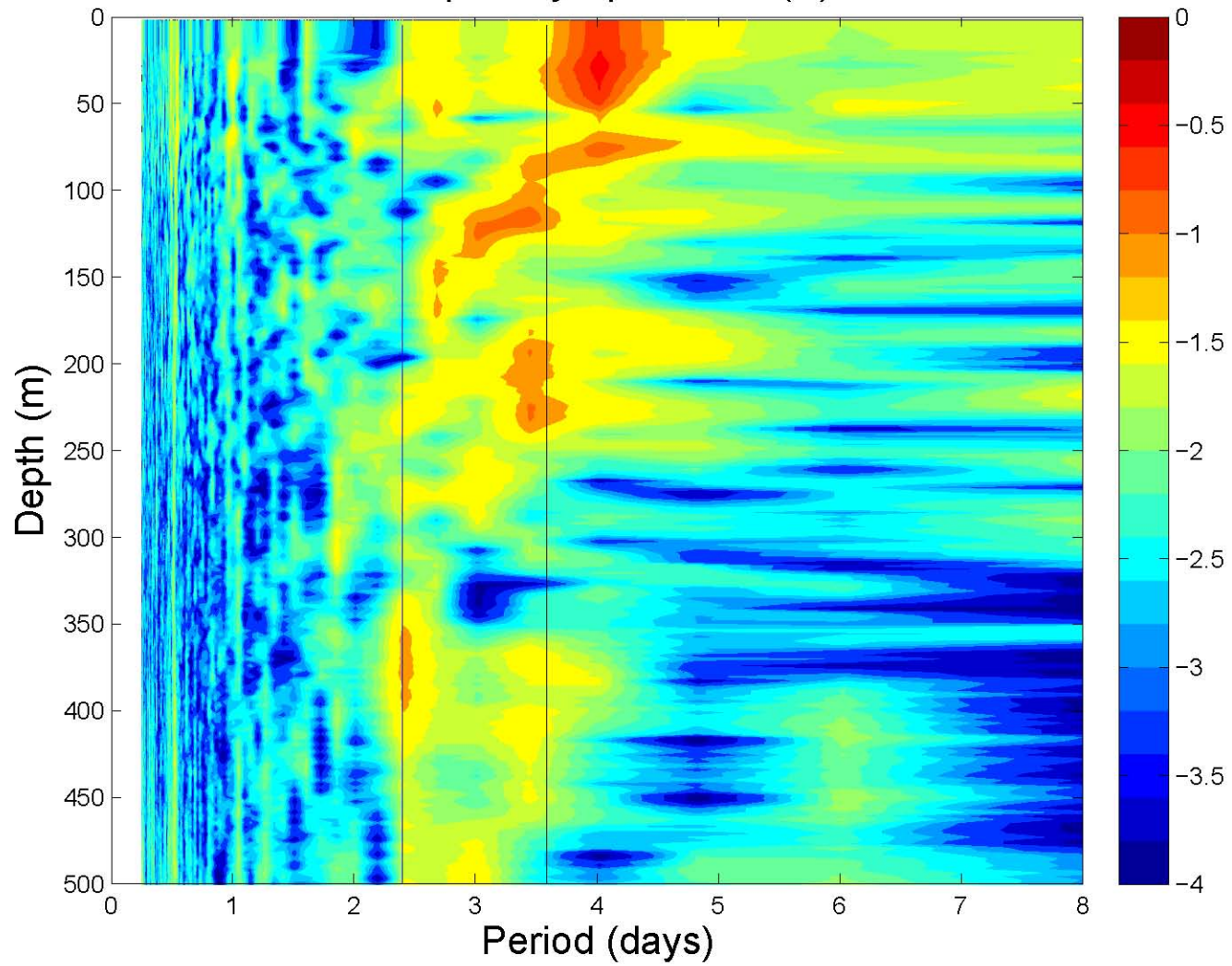


mr1107:  $\log_{10}(\epsilon_{gc})$





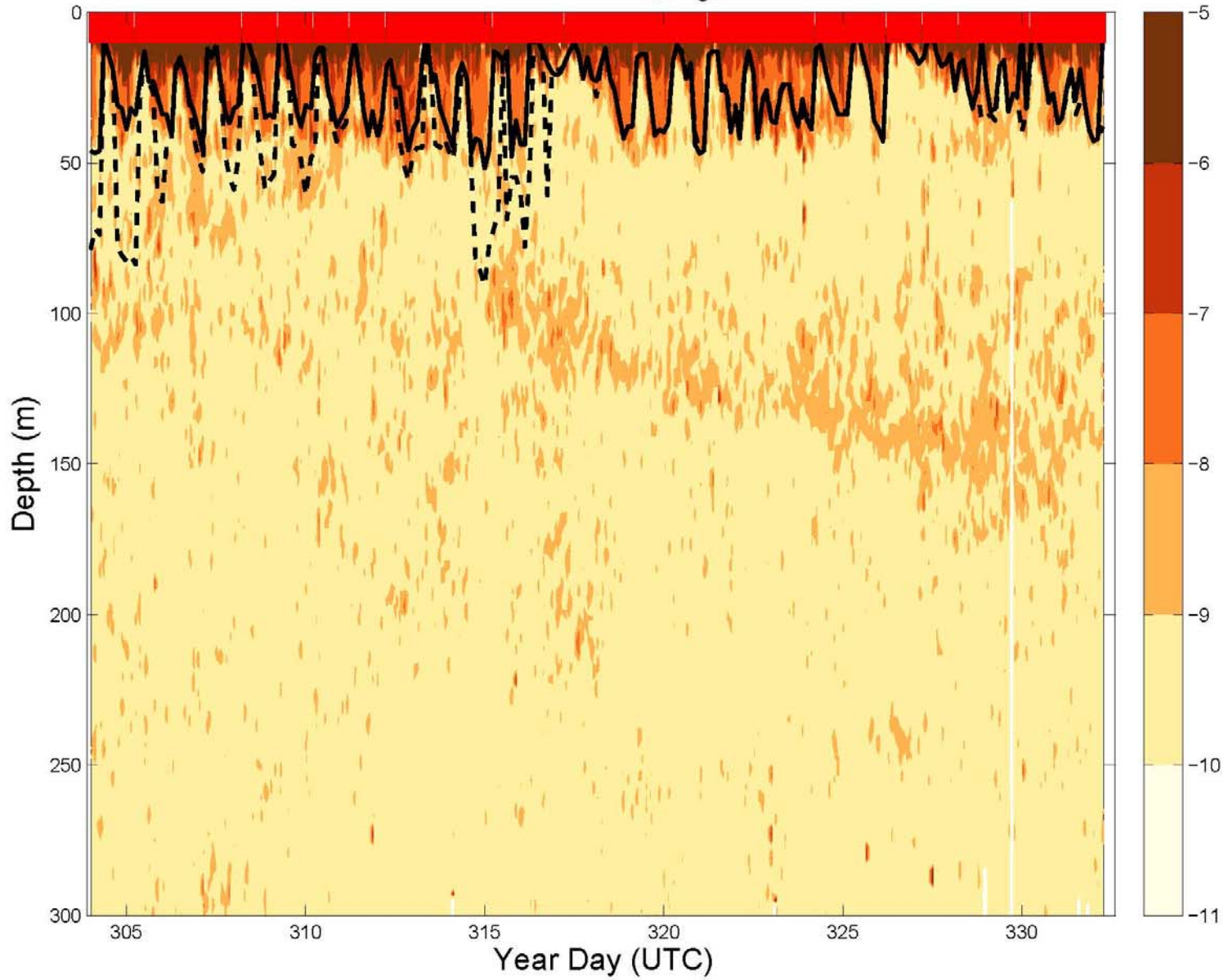
Frequency spectrum (u)



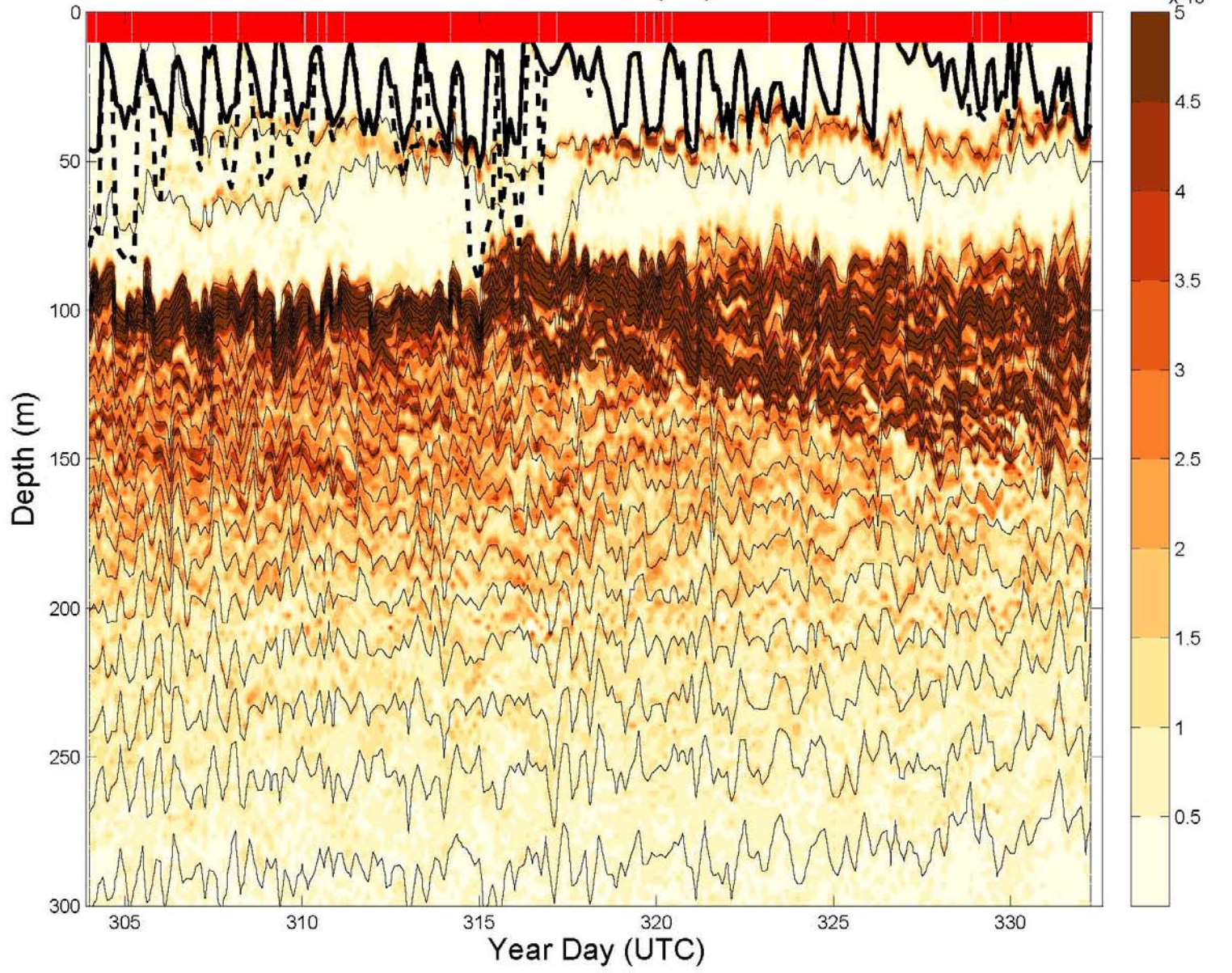




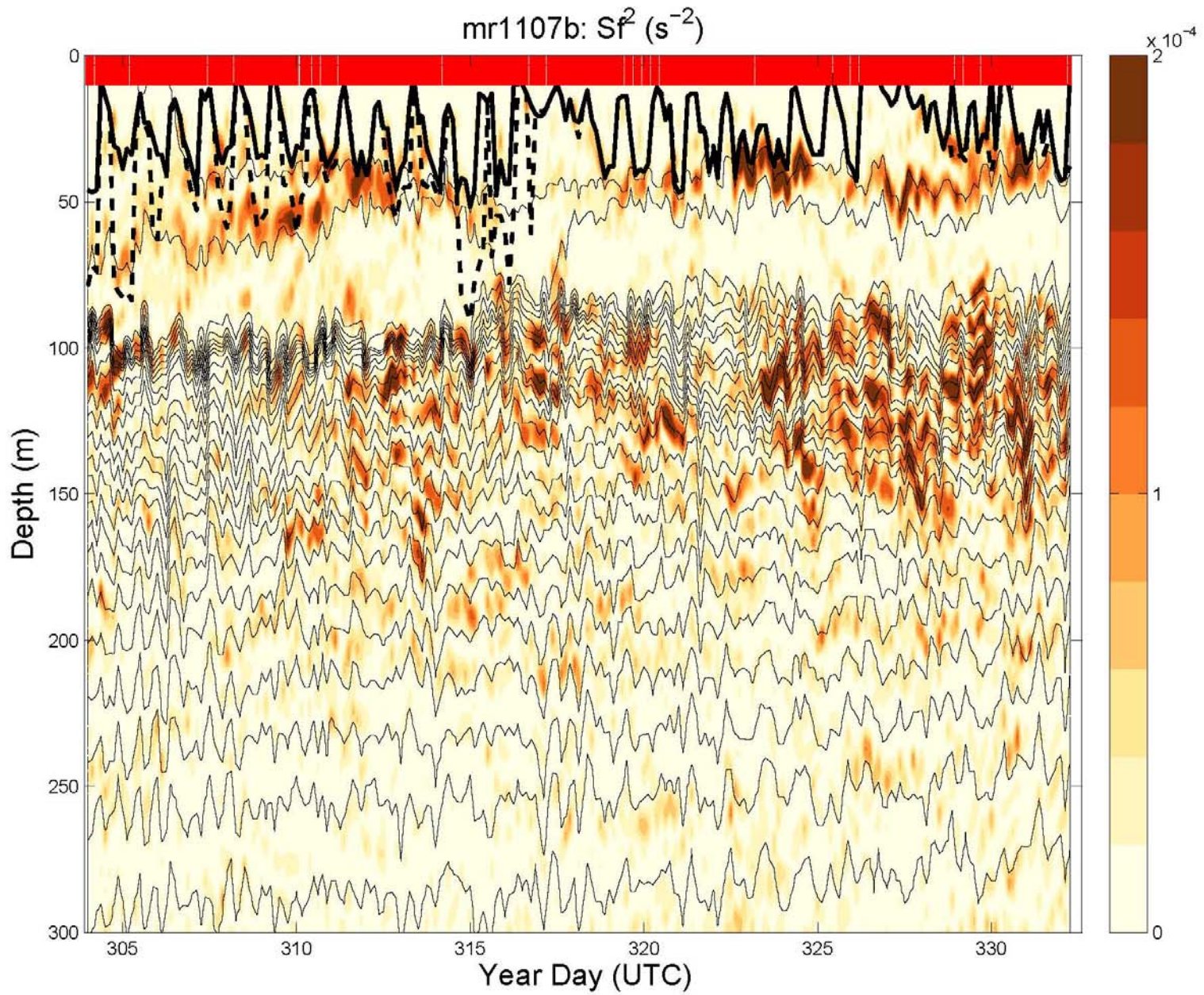
mr1107b:  $\log_{10}(\epsilon_{gc})$



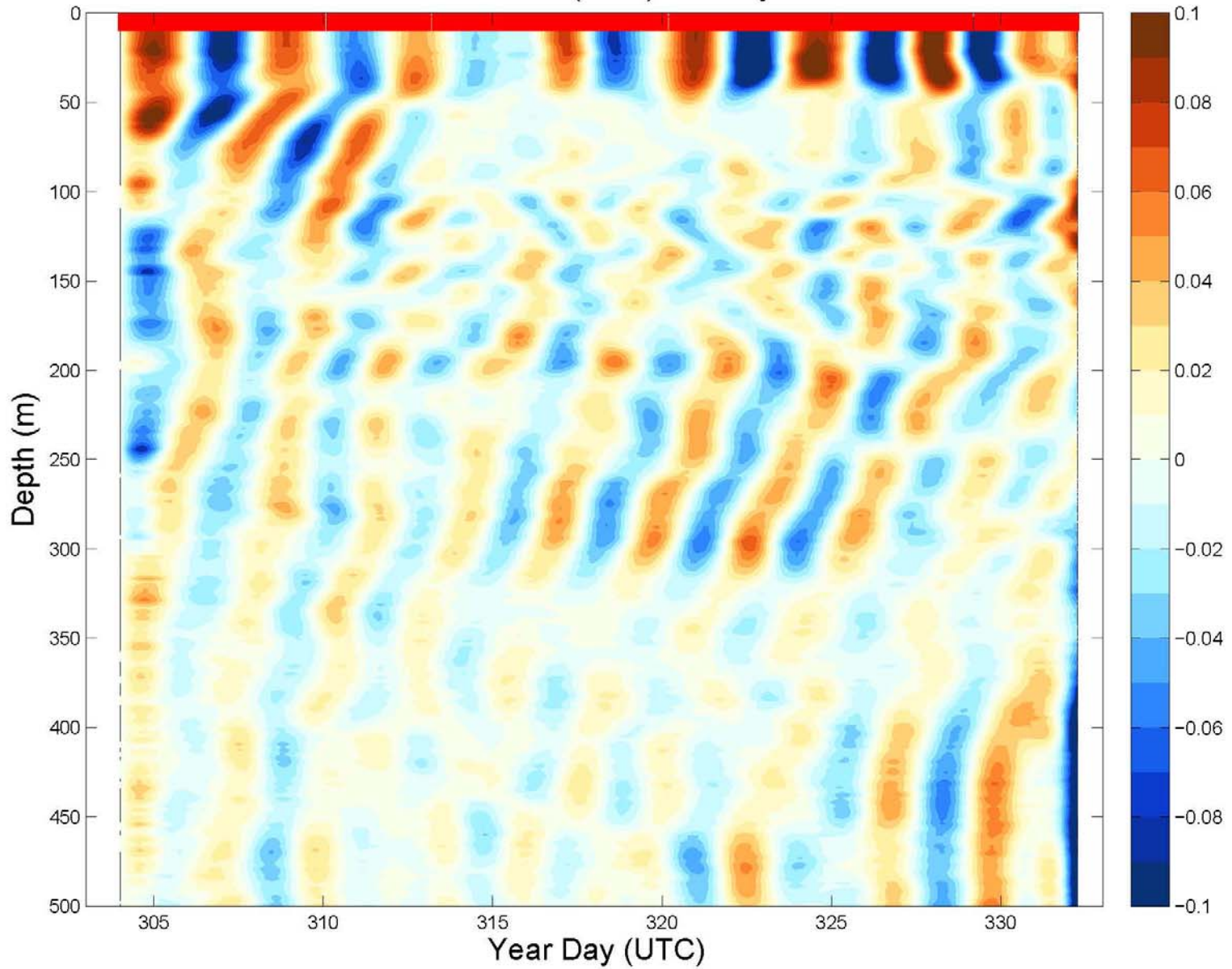
mr1107b:  $N^2$  ( $s^{-2}$ )





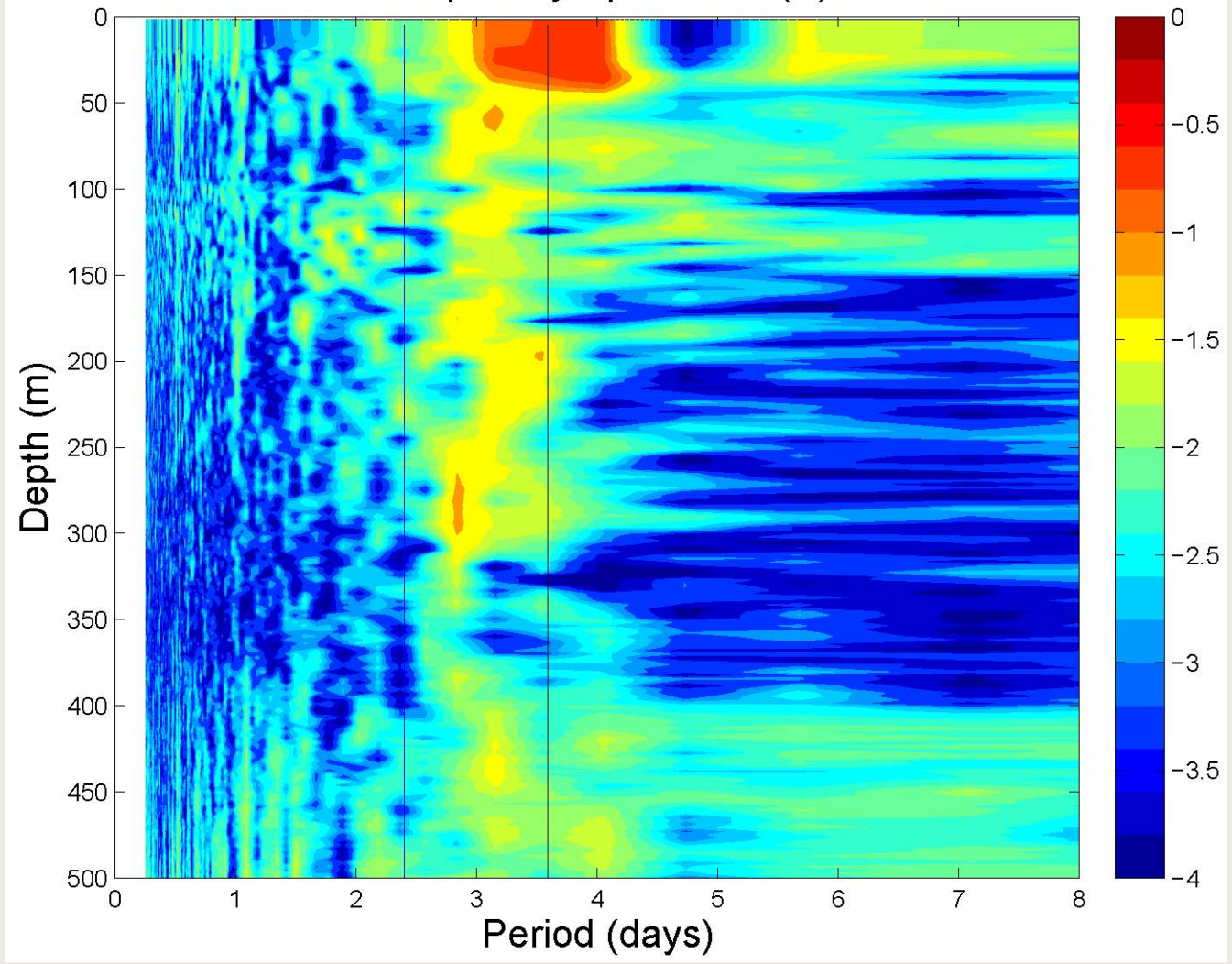


mr1107b: uf ( $\text{ms}^{-1}$ ) 2-6 days

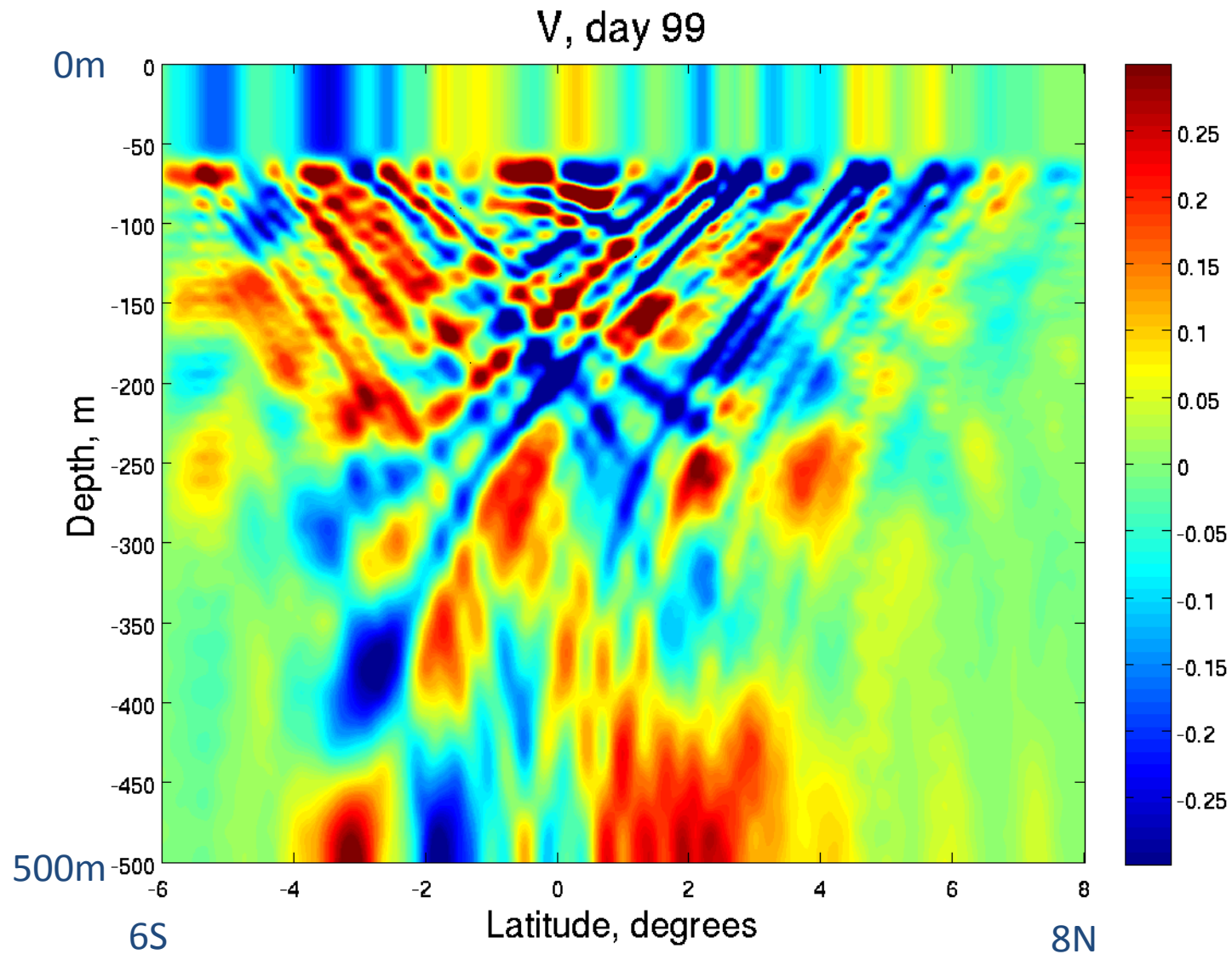




Frequency spectrum (u)



# Linear model forced with QuikSCAT along 156E

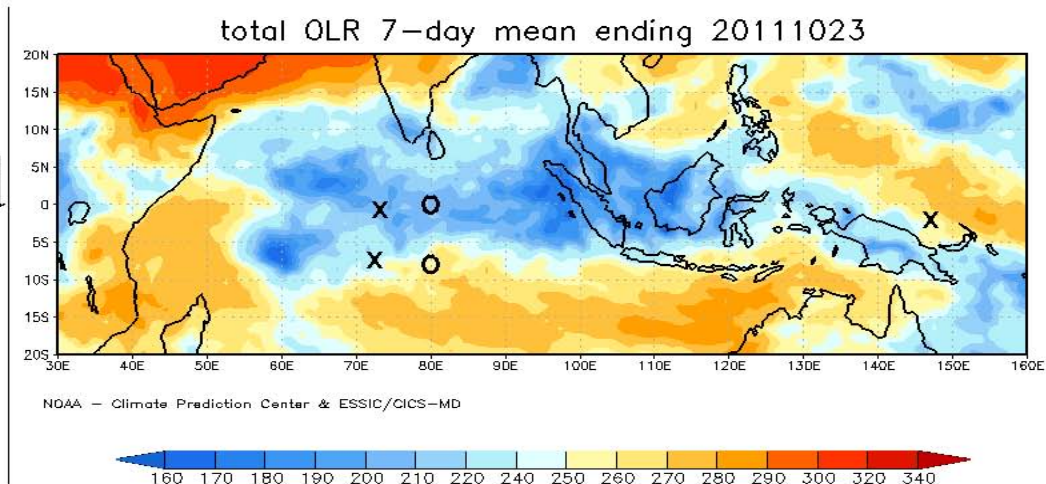




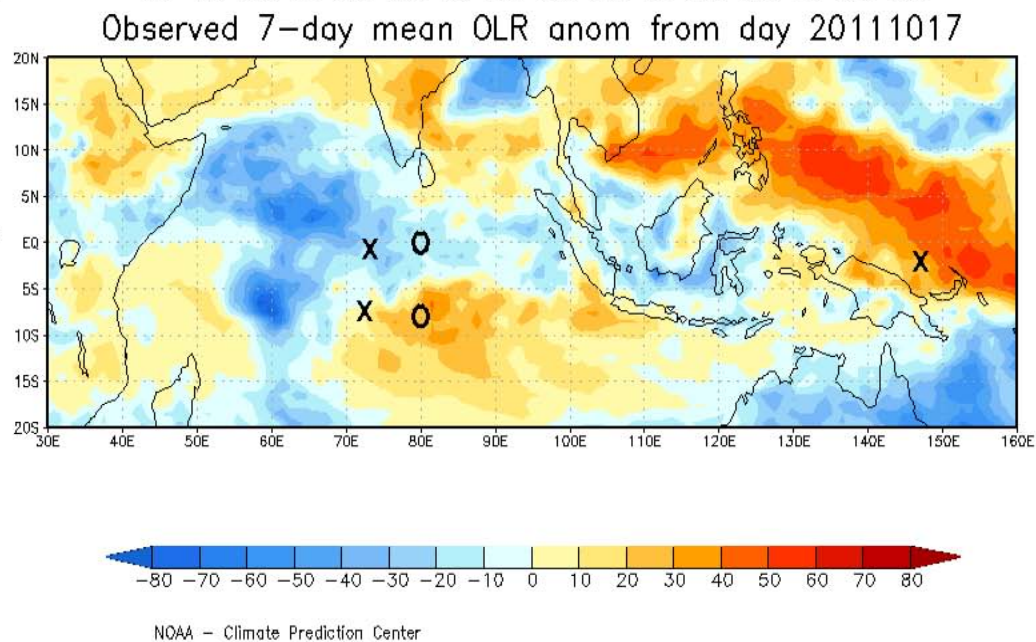


# Weekly Spatial OLR

Total field



Anomalies







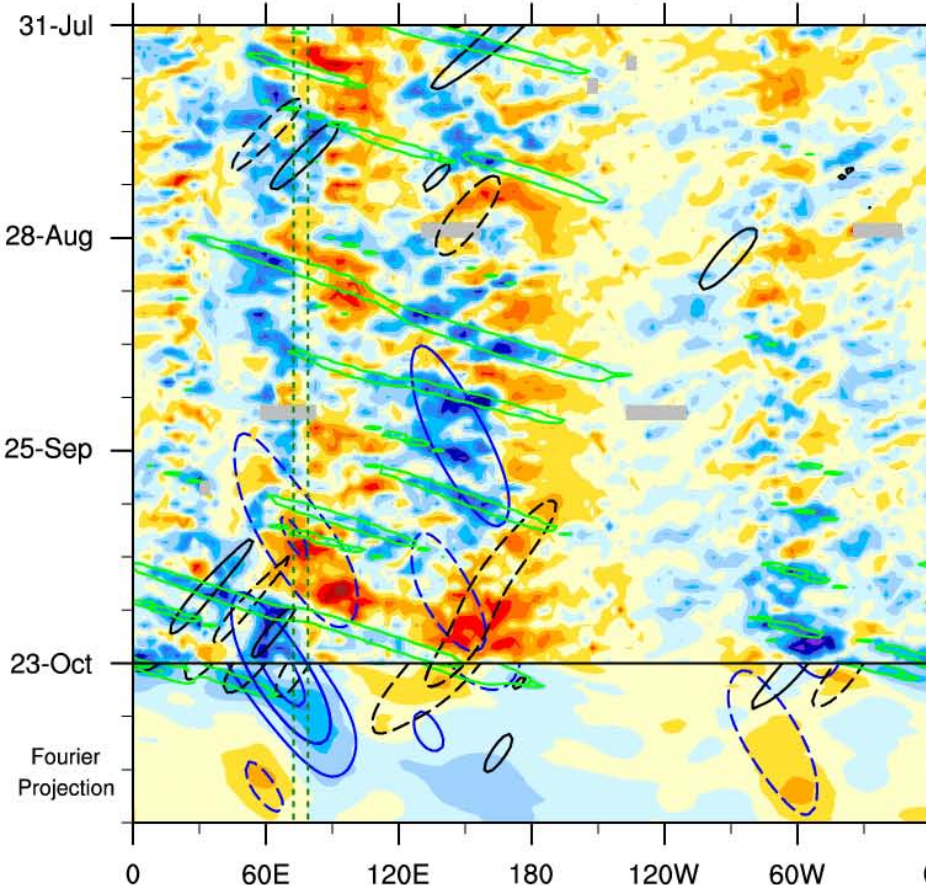
# OLR Time Longitude – Tropical Modes

Ovals are projections of leading modes: MJO (blue), KW (green), ER-1 (black)

Courtesy: Carl Schreck CICS-NC

OLR anomalies: 7.5°S - 7.5°N

31-Jul-2011 to 23-Oct-2011 + 21-day Fourier Projection



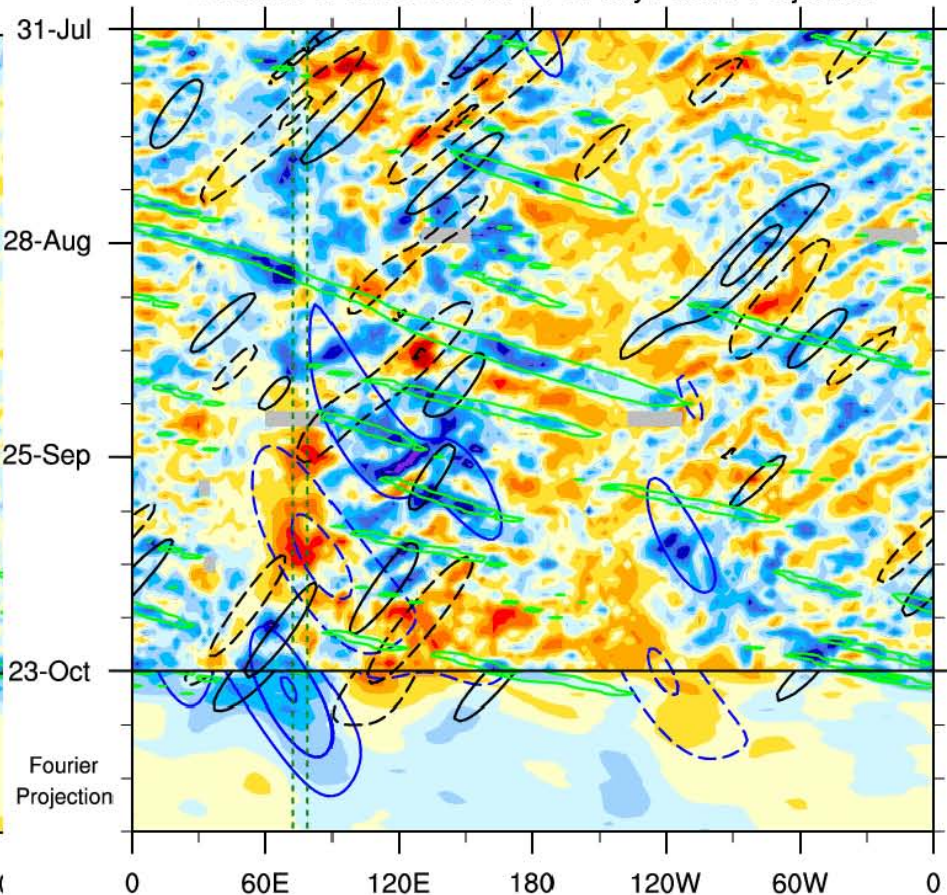
Obs:  $W/m^2$  -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

Sum of Waves:  $W/m^2$  -15 -10 -5 0 5 10 15

MJO (blue, CINT=10); ER (black, CINT=10); Kelvin (green, CINT=10)

OLR anomalies: 2.5°N - 17.5°N

31-Jul-2011 to 23-Oct-2011 + 21-day Fourier Projection



Obs:  $W/m^2$  -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70

Sum of Waves:  $W/m^2$  -15 -10 -5 0 5 10 15

MJO (blue, CINT=10); ER (black, CINT=10); Kelvin (green, CINT=10)





# MJO Index

