Influence of Changjiang discharge, resuspension of sediment and eutrophication to chlorophyll variability in the Yellow Sea and East China Sea: Results from new satellite data set

2nd Int. Sympo. Effects of Climate Change on the World's Ocean
(May 16, 2012)

Ishizaka, Joji
Xu Yongjiu
Yamaguchi, Hisashi
Eko Siswanto

Problems in YECS and possible causes

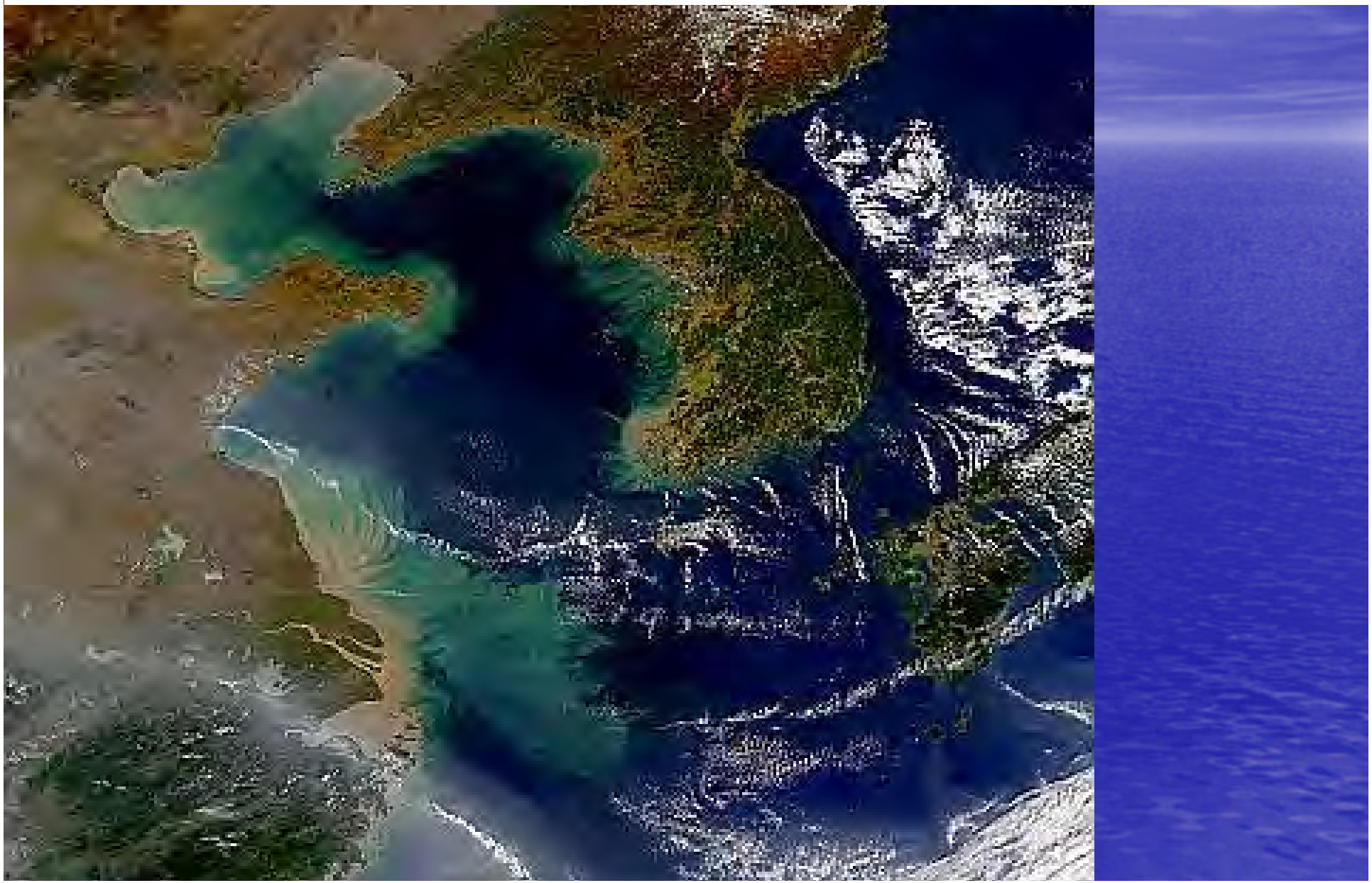
- Giant Jellyfish (N. nomurai) 2002-2007, 2009
- Red tide (C. polykrikoides) 1988-2005
- Red tide (Prorocentram) 2000-
- Green tide (Enteromorpha prolifera) 2008-

- Eutrophication (River, Atmos.)
- Climate Change
- Dam Construction
- Overfishing
- More

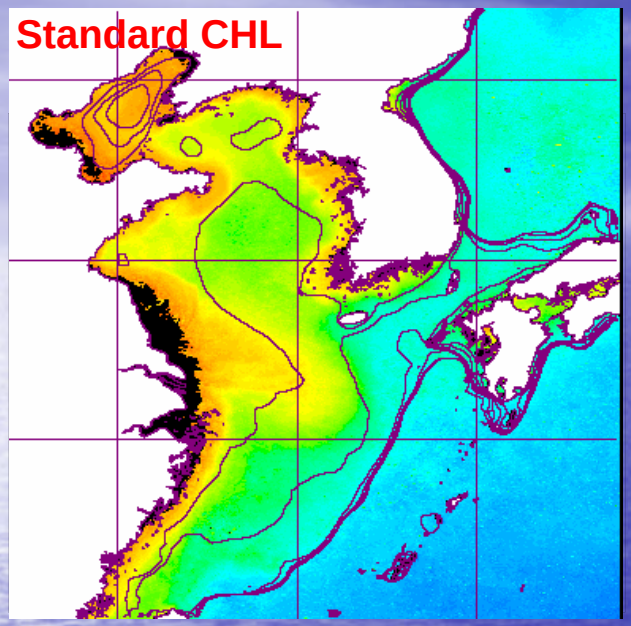

Iwataki

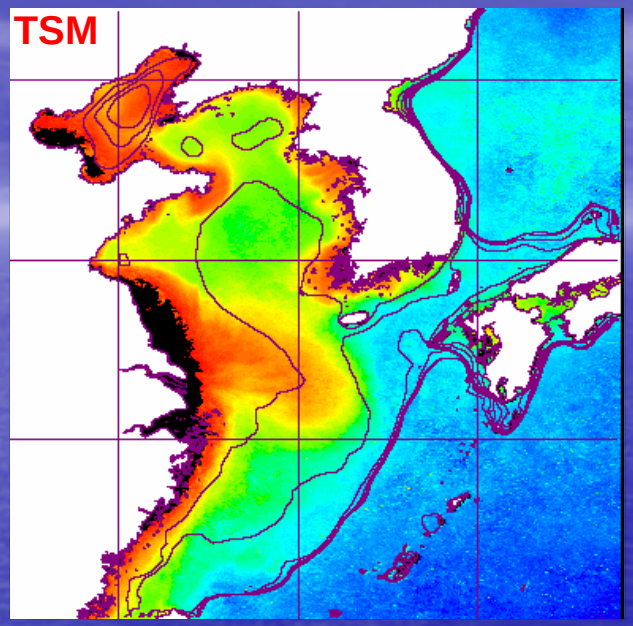

Chugoku News

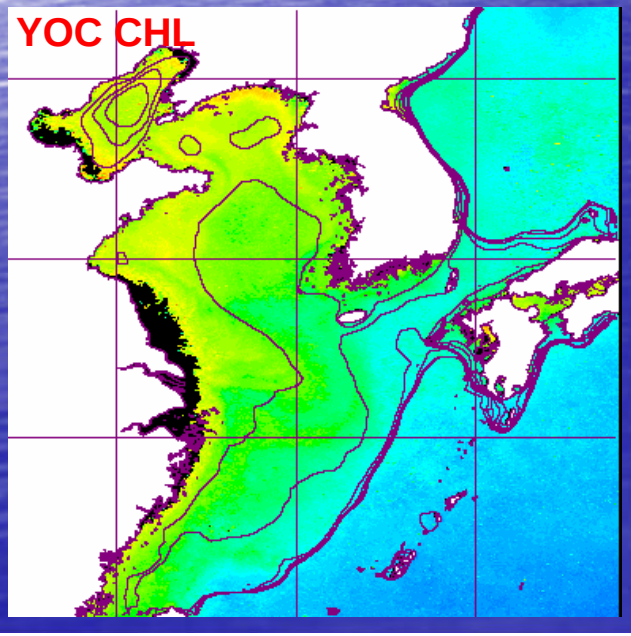
Ocean Color Remote Sensing – Useful Tool
However, problem of Turbidity

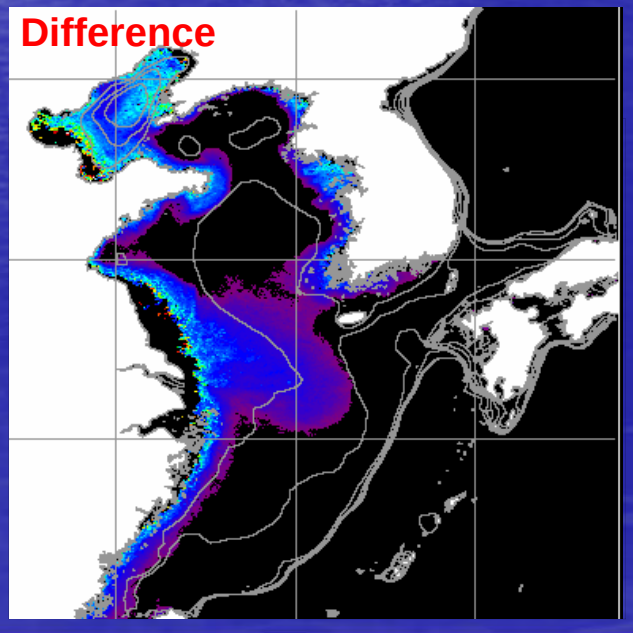


1998-2008 Average in January



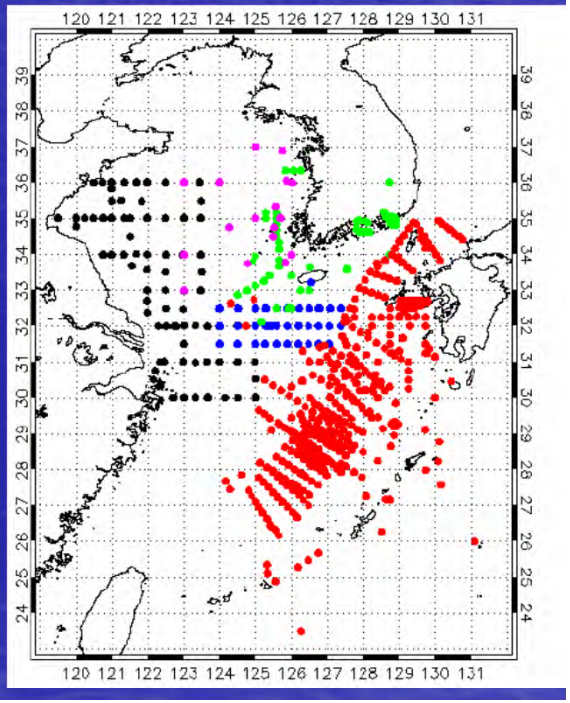




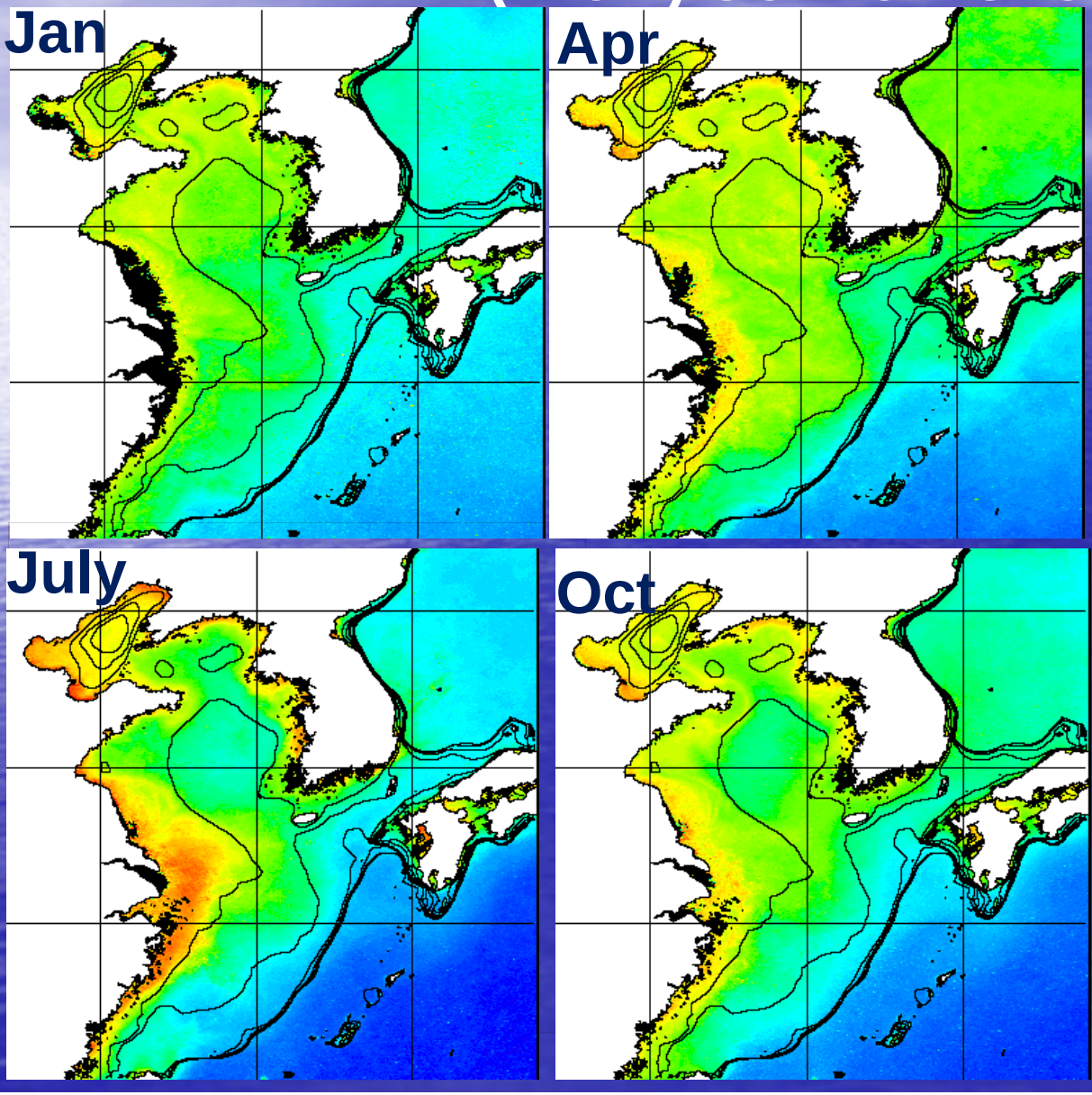


(Yamaguchi et al. Submitted)

New Algorithm Developed by Yellow Sea Large Marine Ecosystem (YSLME) Ocean Color Project (Siswanto et al. 2011)

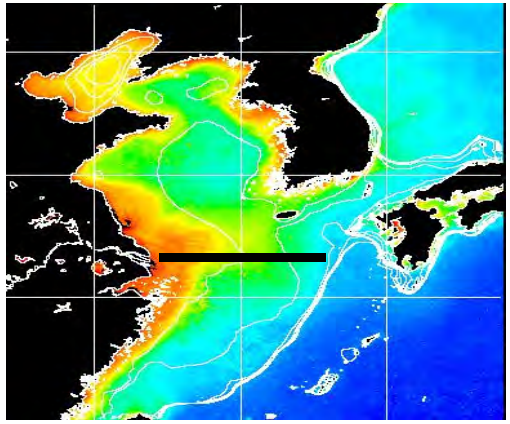


Seasonal Change of New Chl-a (10 year average)

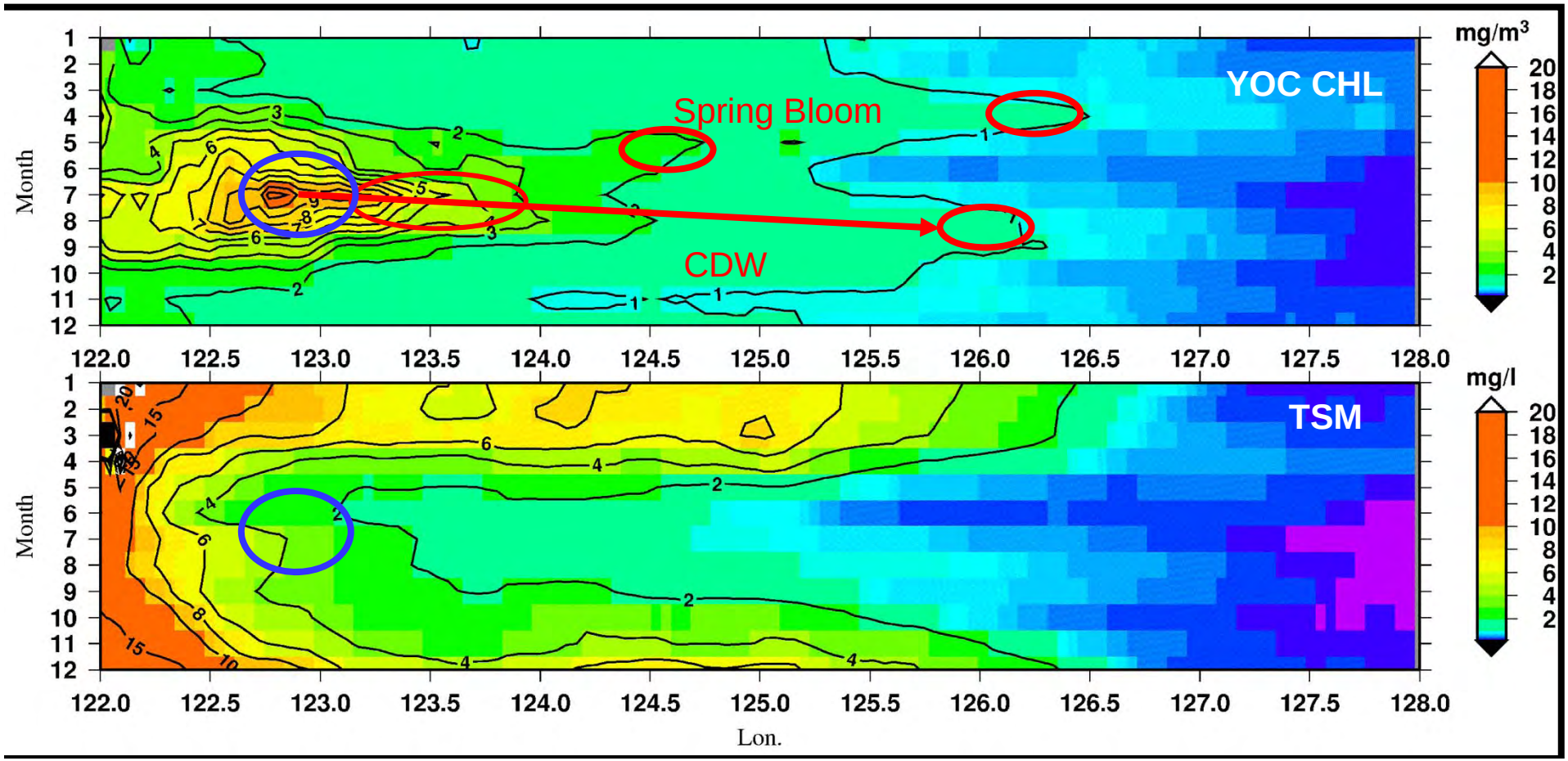


(Yamaguchi et al. Submitted)

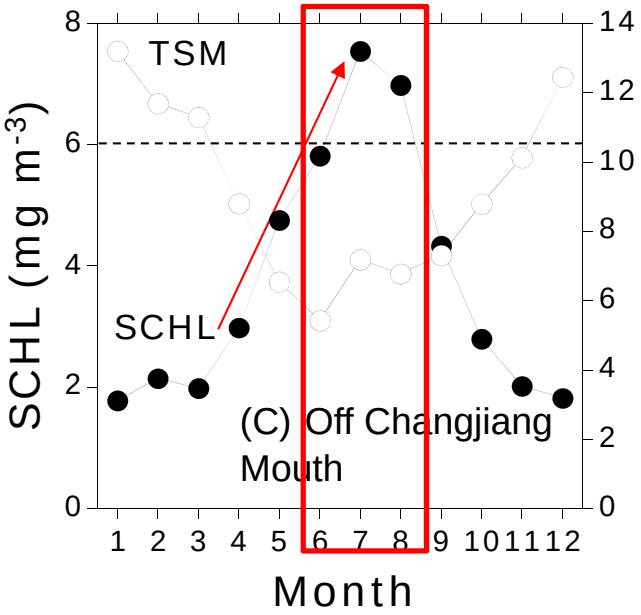
Seasonal Variation of Chl-a and TSM

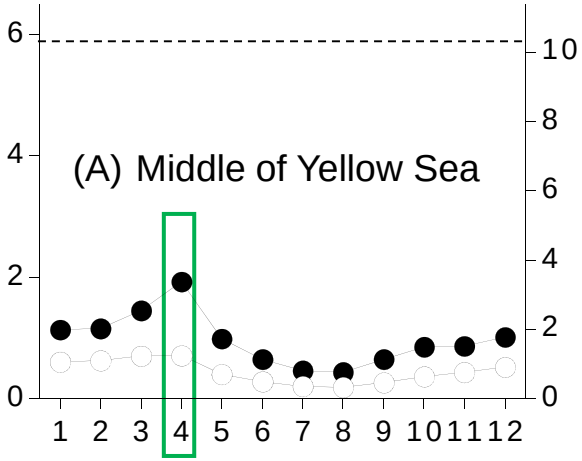


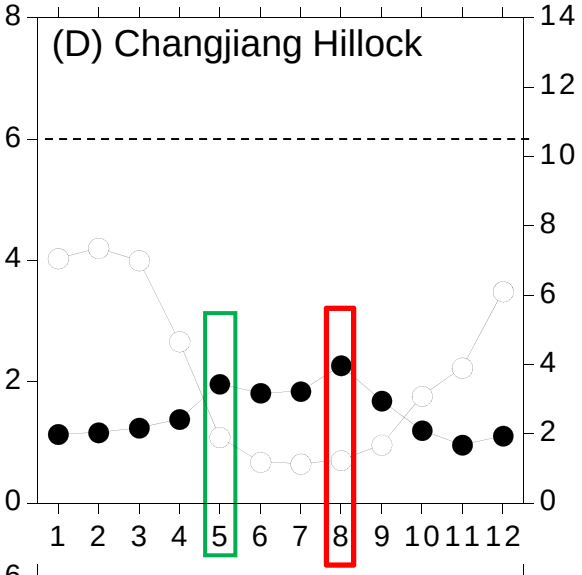
(Yamaguchi et al. Submitted)

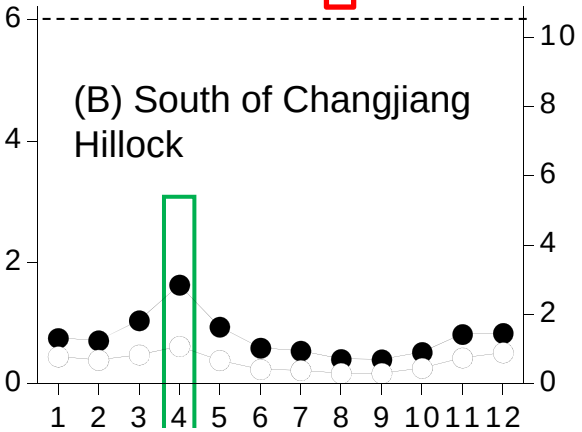


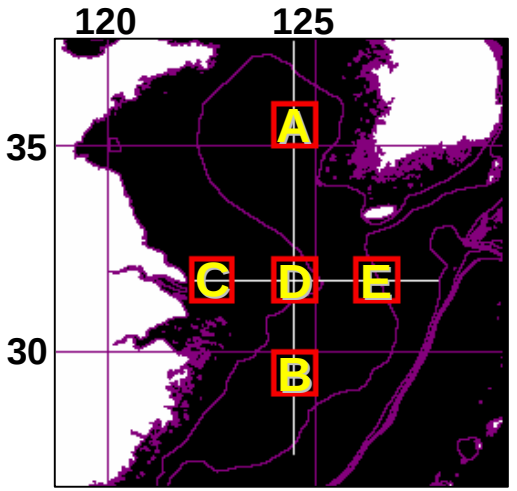
Seasonal Variation of Chl-a and TSM

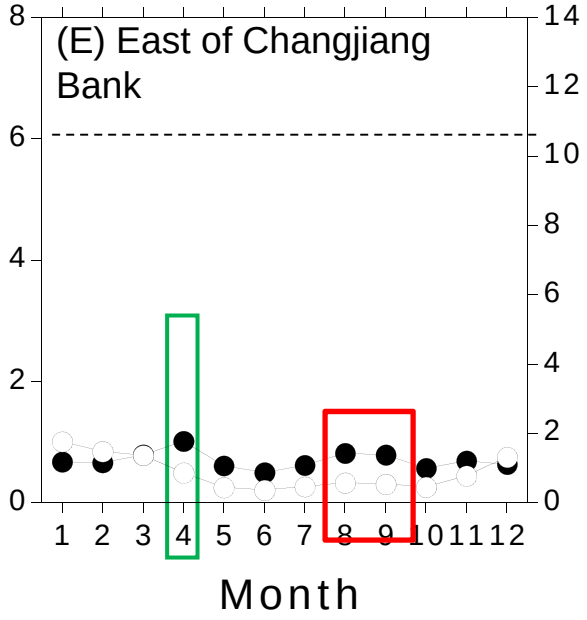






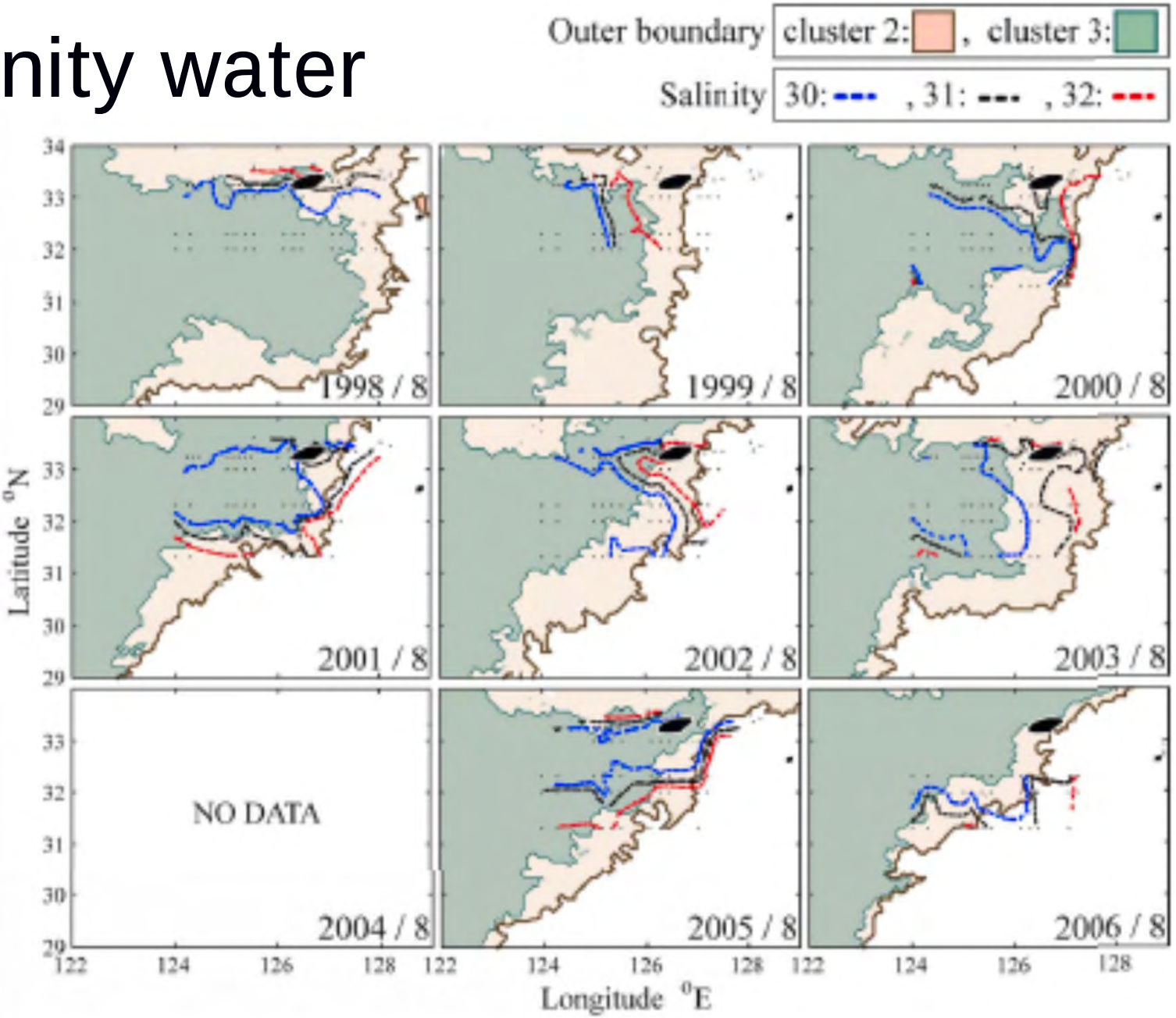






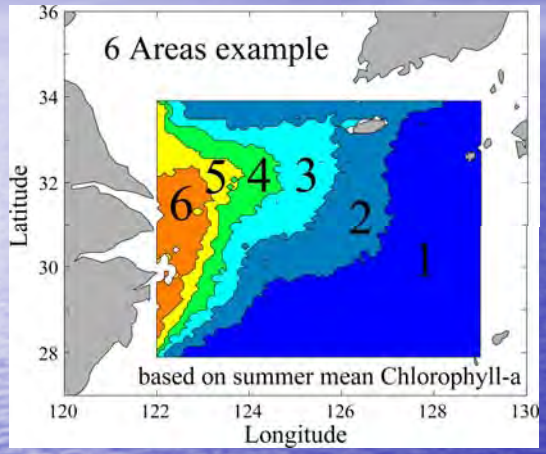
(Yamaguchi et al., Submitted)

High chl.a area and low salinity water

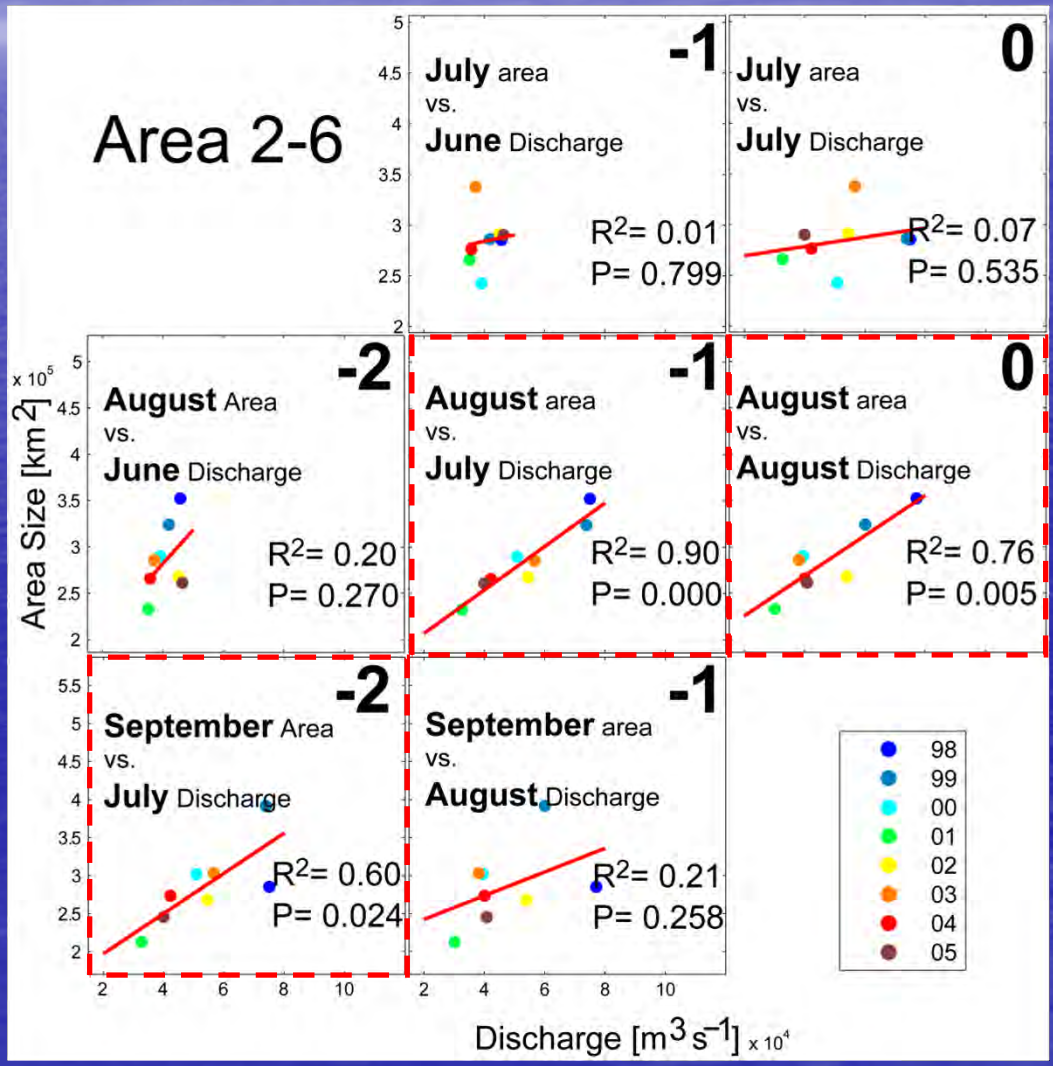


(Kim et al., 2009)

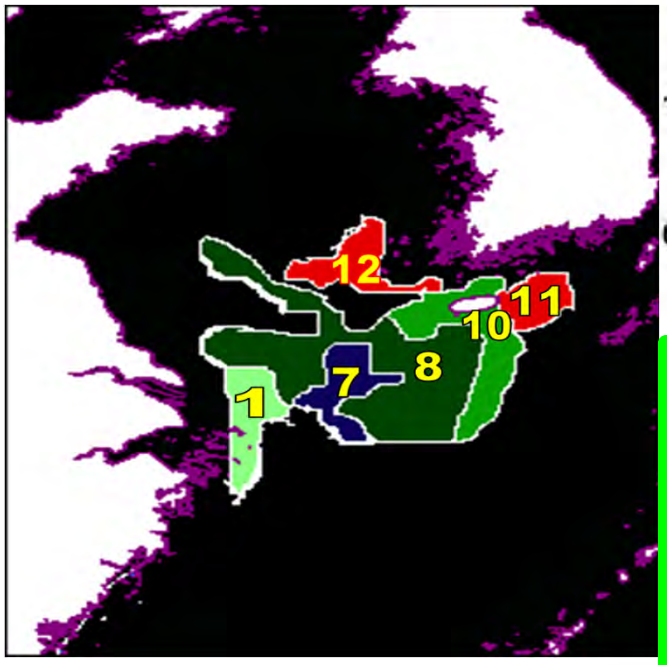
High Chl-a areas to Changjiang discharge with time lag

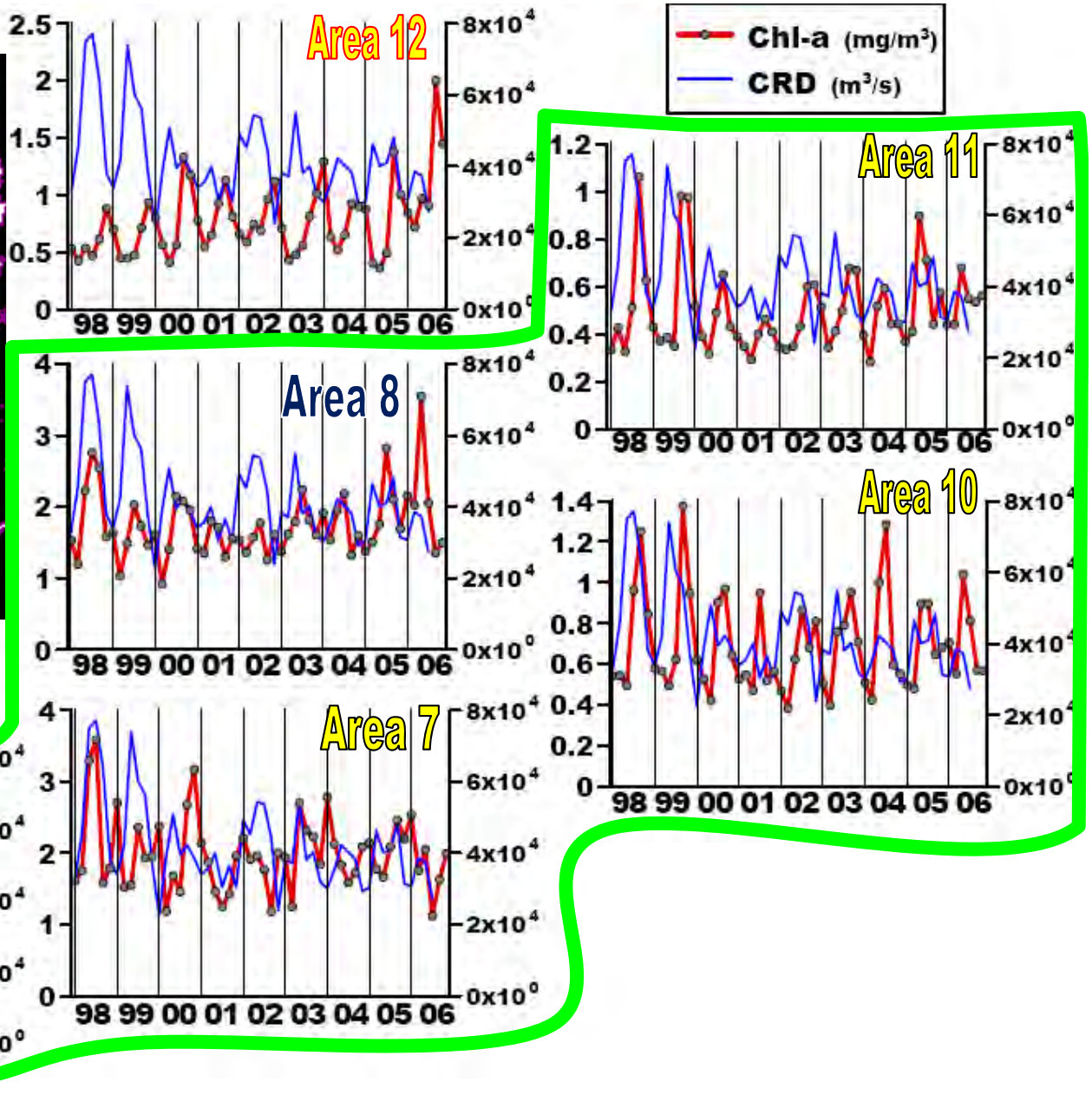


(Kim et al., 2009)



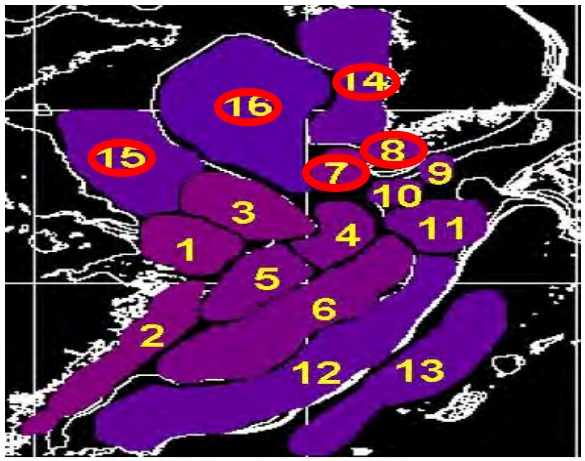
Interannual Variability of Chl-a and Changjiang Discharge on May-Oct.

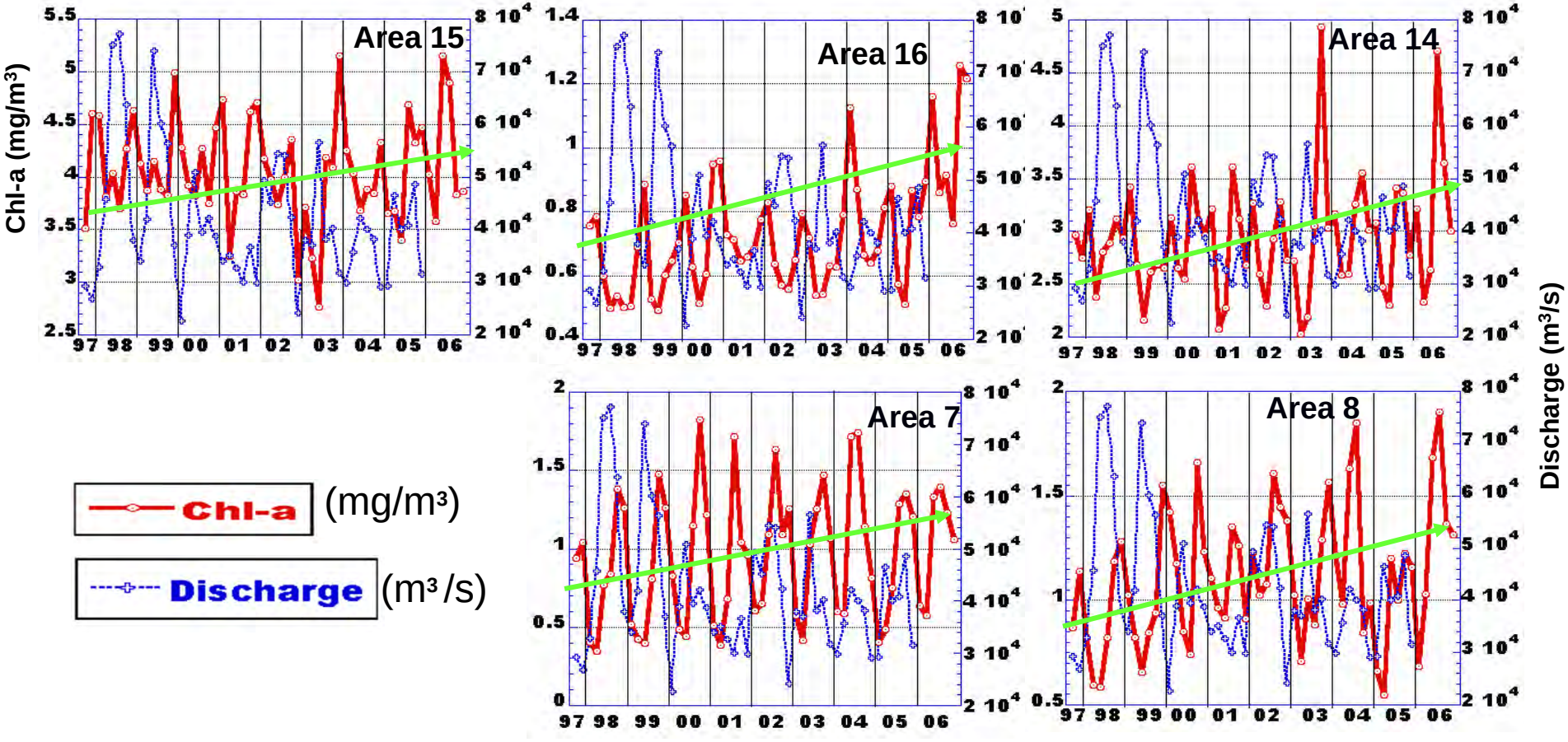




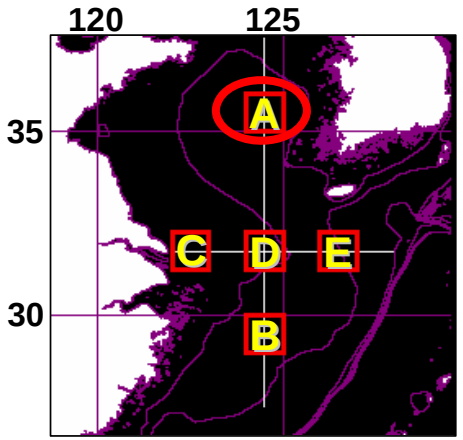
Interannual Changes of Summer Chl-a in Yellow Sea and Changjiang Discharge

(Yamaguchi et al., PO, 2012)

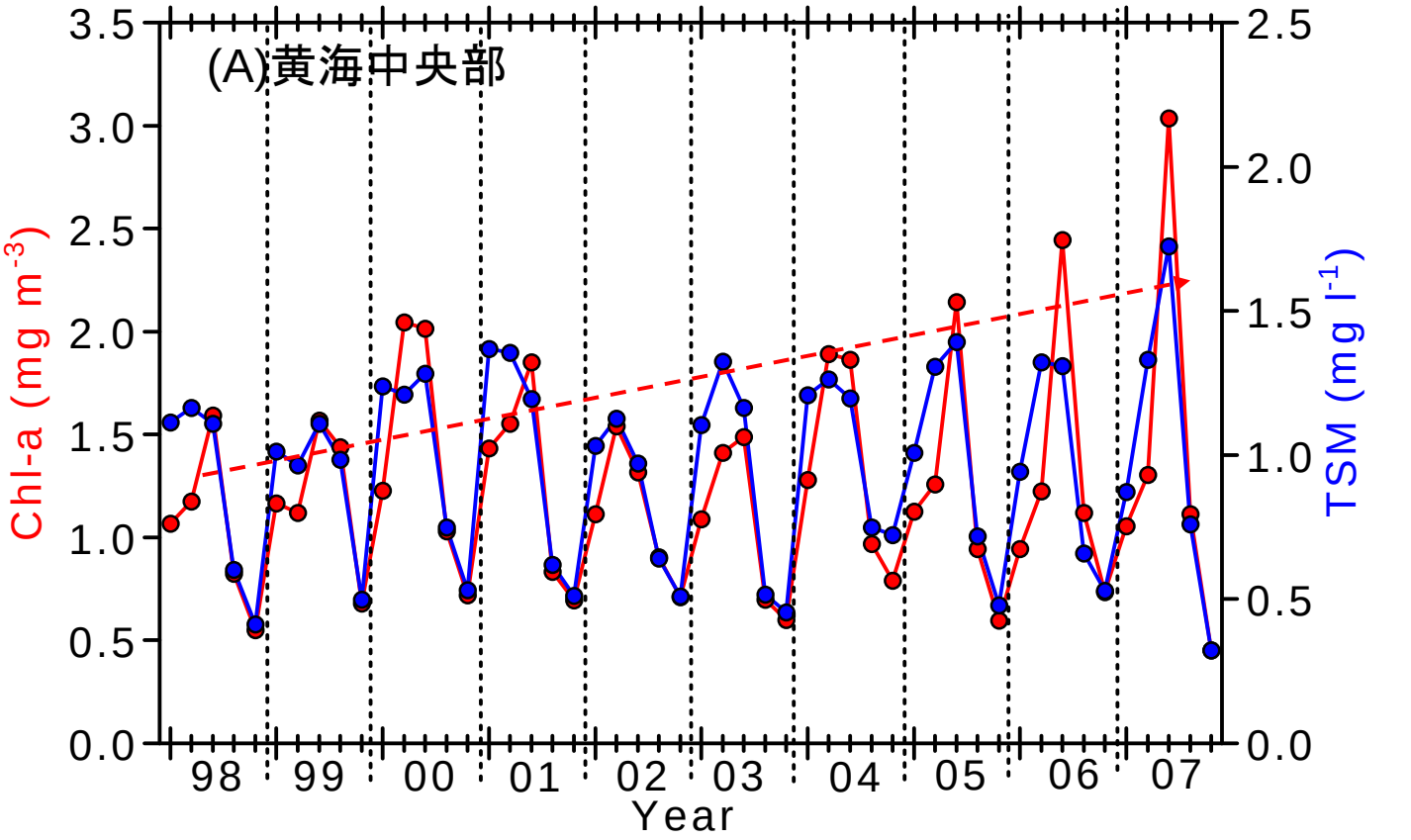




Interannual Variation of Chl-a and TSM on Feb.-June（Middle of Yellow Sea）



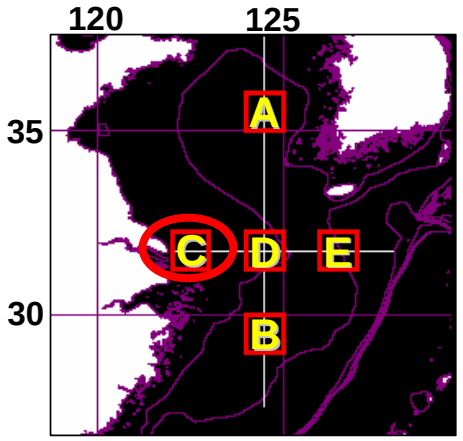
(Yamaguchi et al., Submitted)



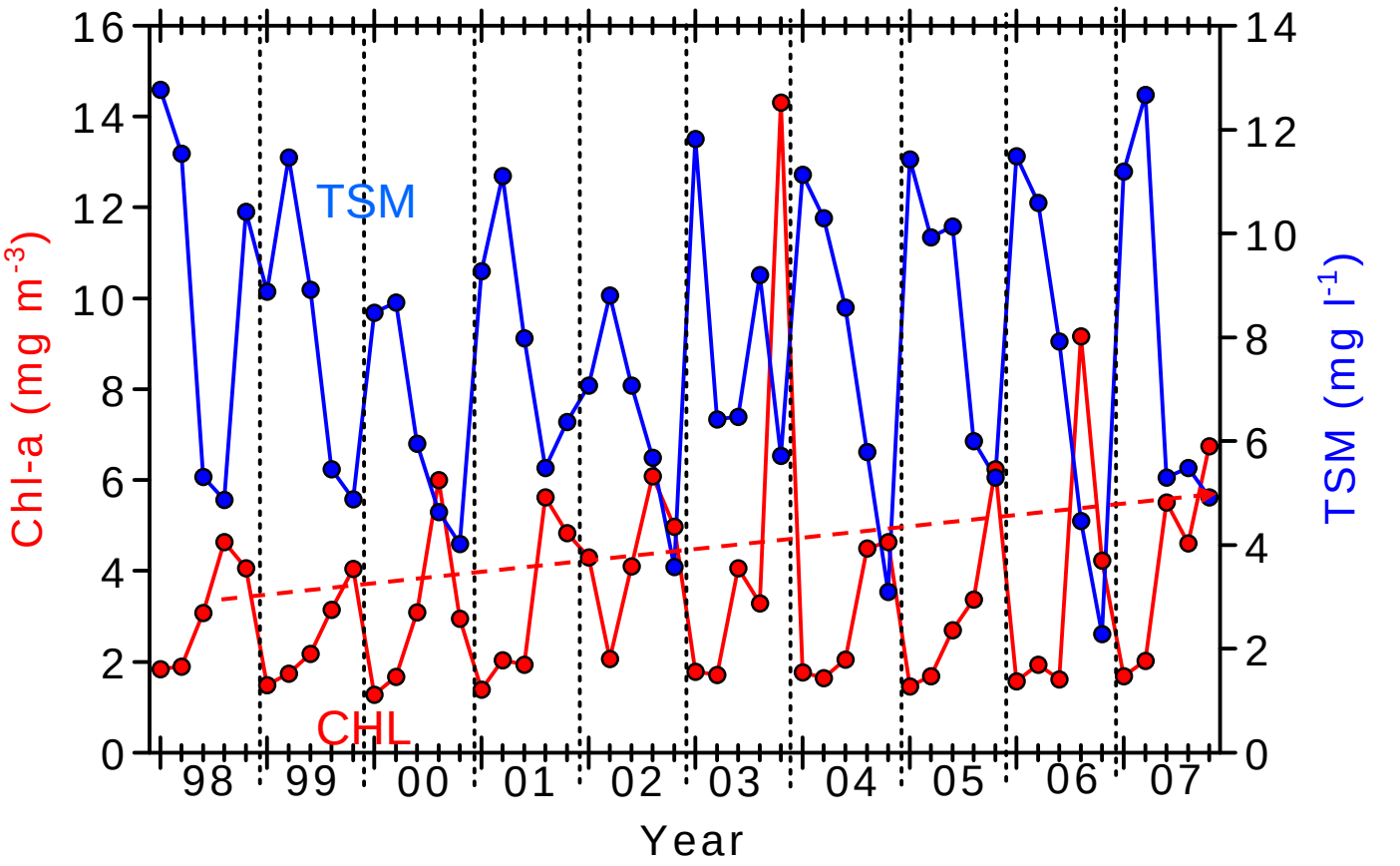
Increase of Spring Maximum YOC SCHL

Eutrophication of Yellow Sea?

Interannual Variation of Chl-a and TSM in Feb.-June（off Changjiang Mouth）

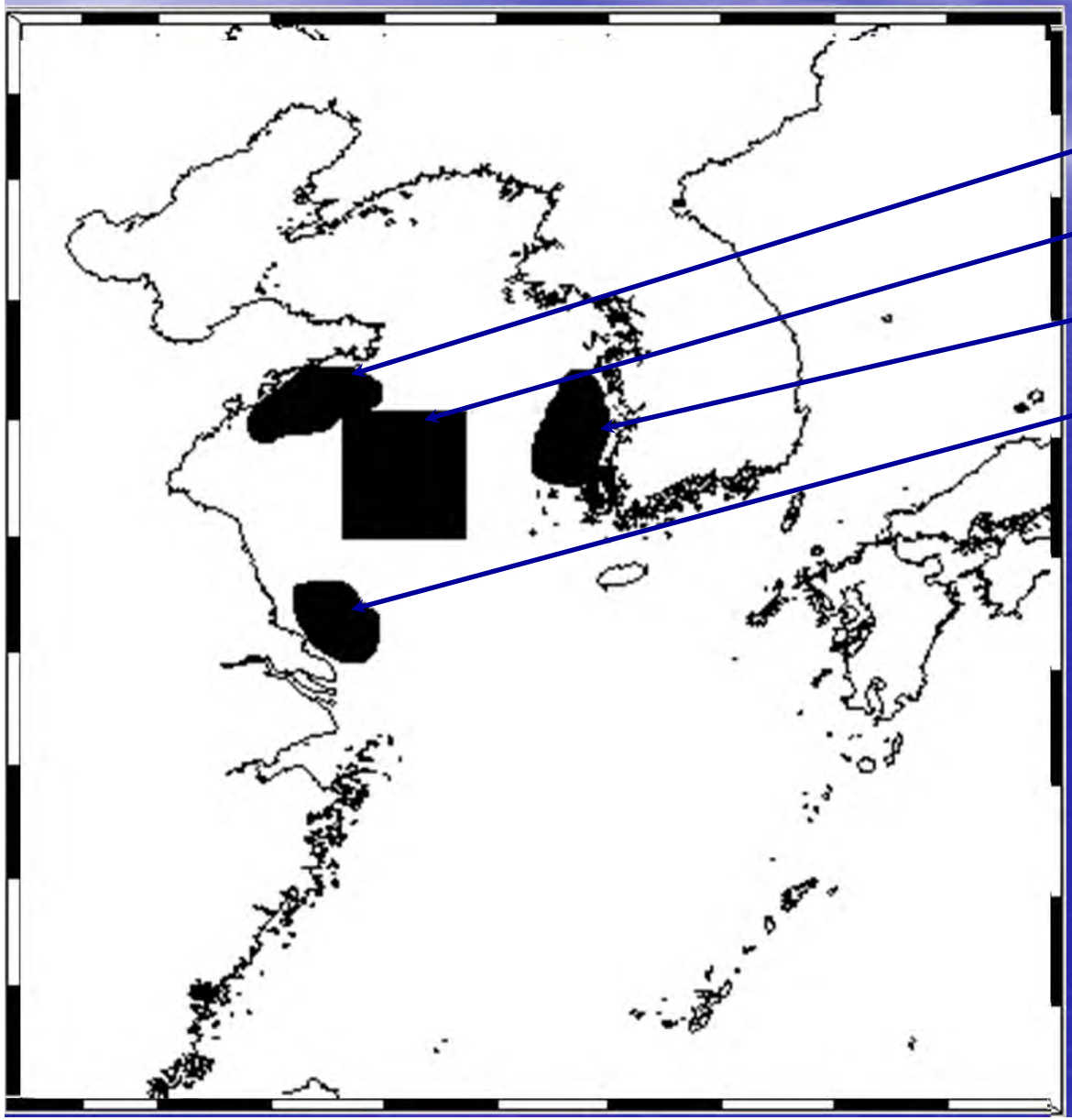


(Yamaguchi et al., Submitted)



Increase of SCHL during May-June

Use for Giant Jellyfish Bloom



YS China

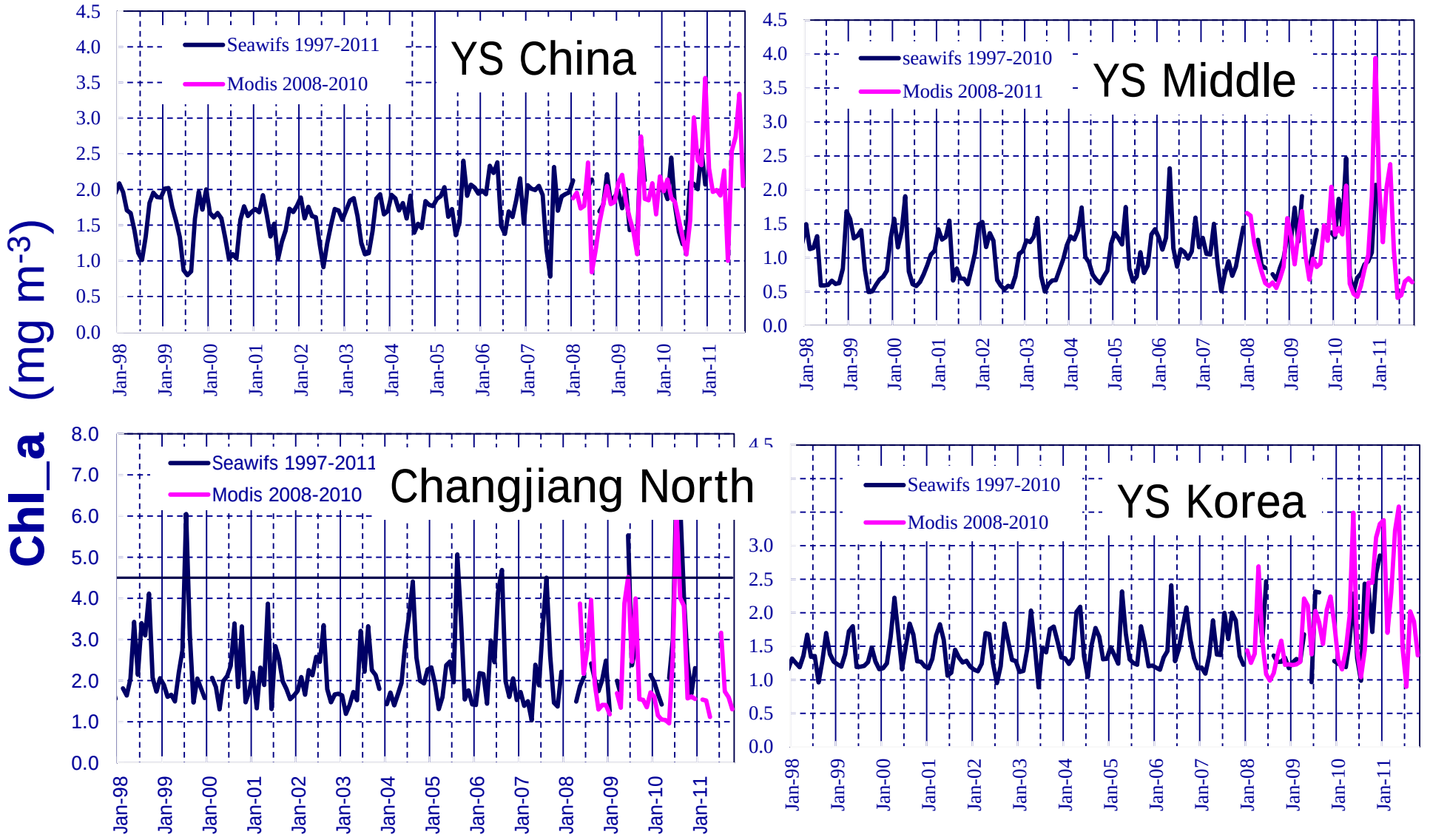
YS Middle

YS Korea

Changjiang North

Possible source areas
of Medusa
of N. nomurai

(Xu et al. In prep.)

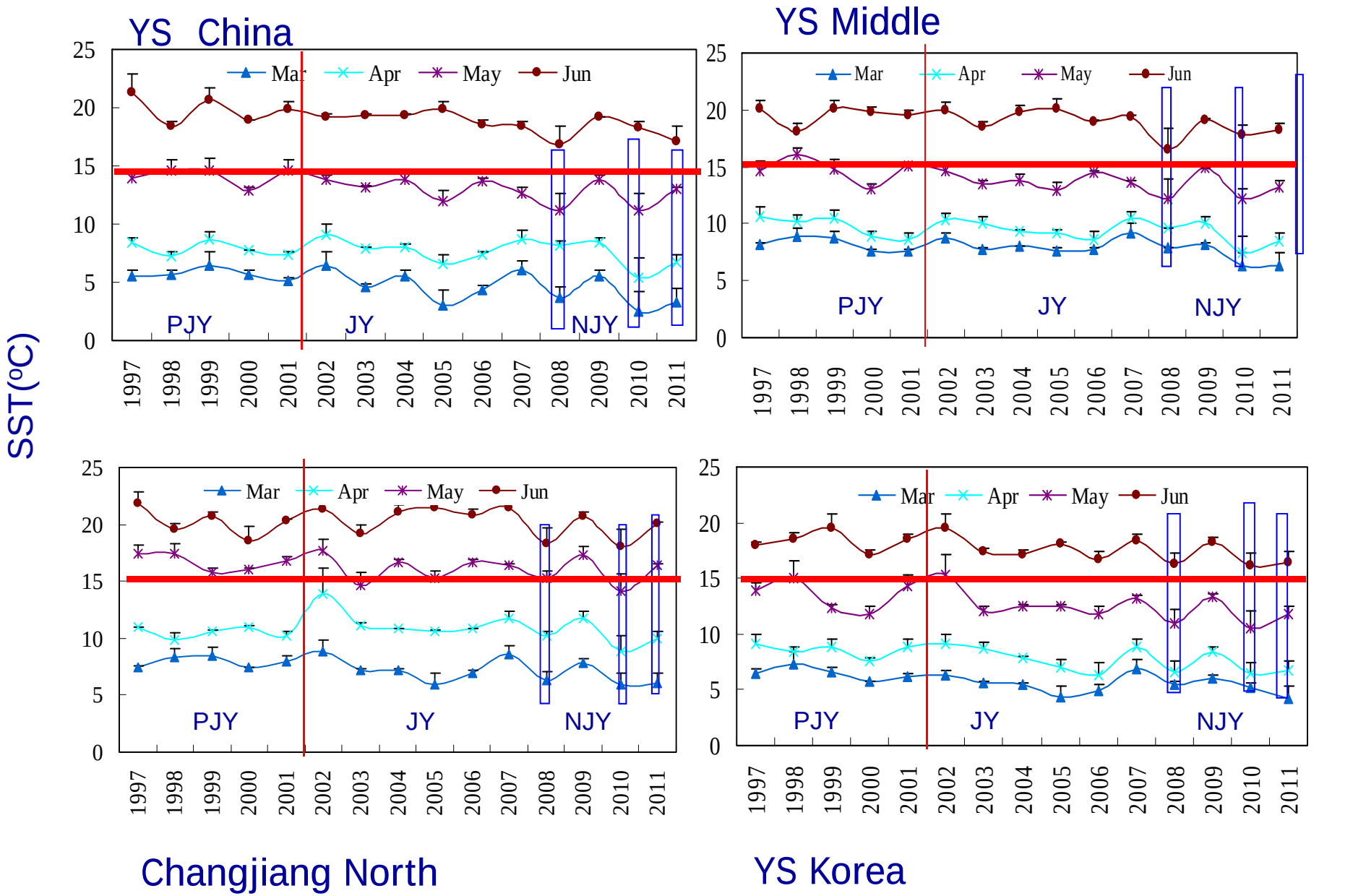


Extension to recent MODIS data

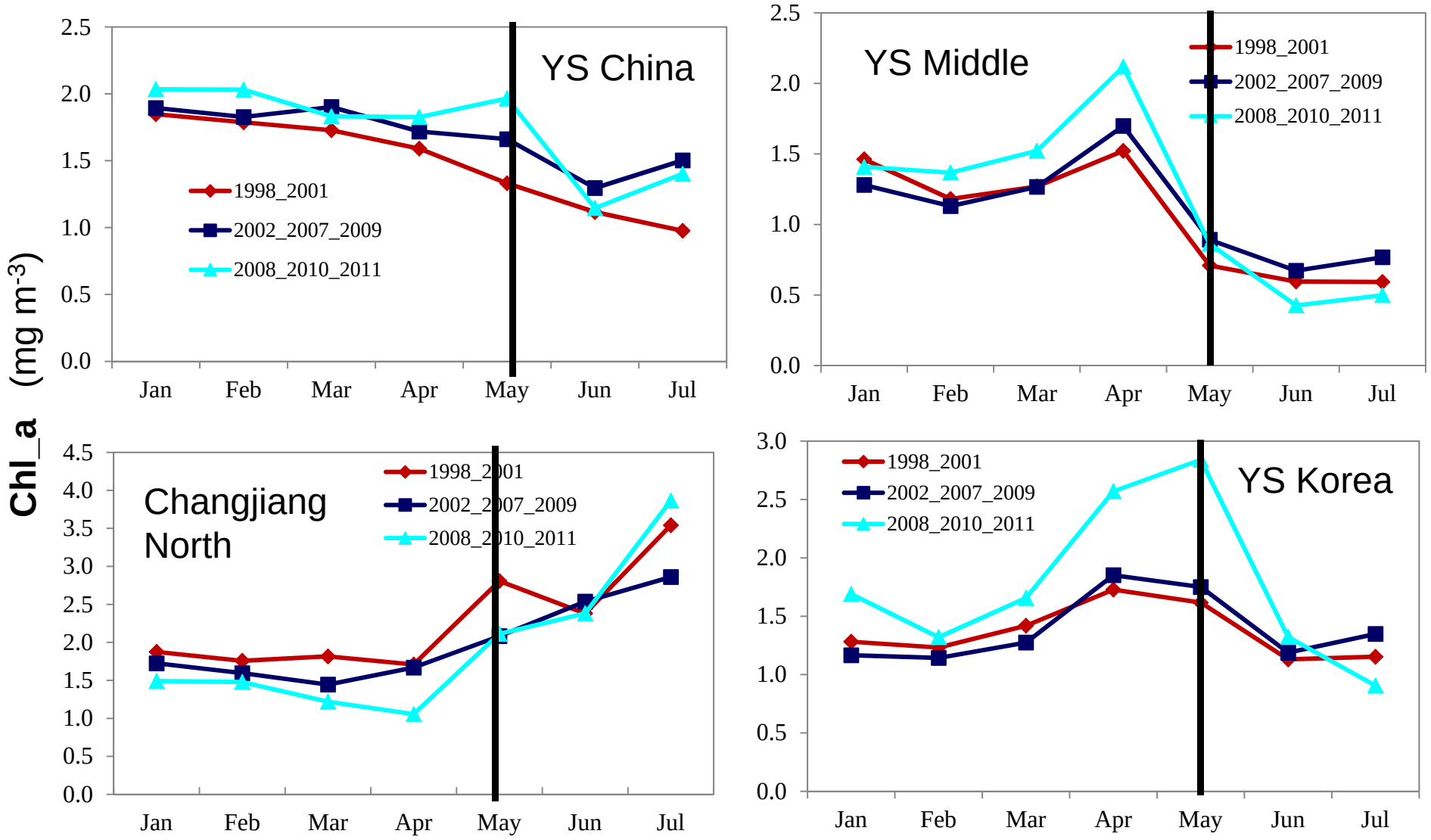
(Xu et al. In prep.)

SST variations in winter/spring months

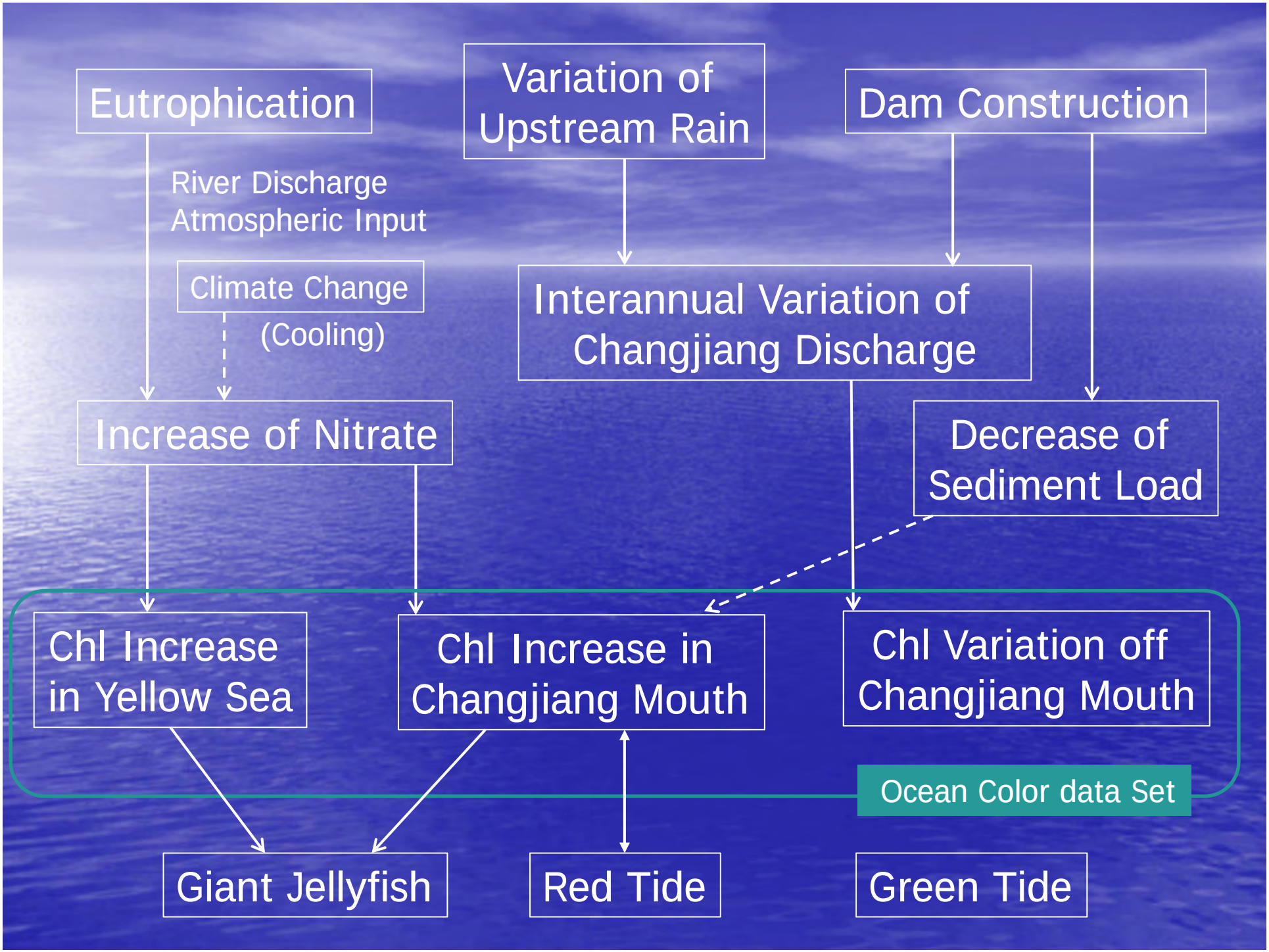
(Xu et al. In prep.)



Monthly Chl_a in spring in PJY, JY, NJY



(Xu et al. In prep.)


Eutrophication
Variation of Upstream Rain
Dam Construction
River Discharge
Atmospheric Input
Climate Change
(Cooling)
Interannual Variation of Changjiang Discharge
Increase of Nitrate
Decrease of Sediment Load
Chl Increase in Yellow Sea
Chl Increase in Changjiang Mouth
Chl Variation off Changjiang Mouth
Ocean Color data Set
Giant Jellyfish
Red Tide
Green Tide

Conclusions

- New ocean color data set (Chl-a and TSM)
- Spring bloom after resuspension ceased
- Bloom caused by summer Changjiang discharge
- Summer Changjiang bloom – Changjiang discharge interannual variation
- Spring bloom/summer Chl-a in Yellow Sea and Changjiang mouth – increasing – eutrophication – good environment for giant jellyfish
- Recent non-giant jellyfish bloom years – high spring bloom but colder
- Strobilation timing may be close to spring/summer blooms but the timing is different in location – detail study of the timing is on-going