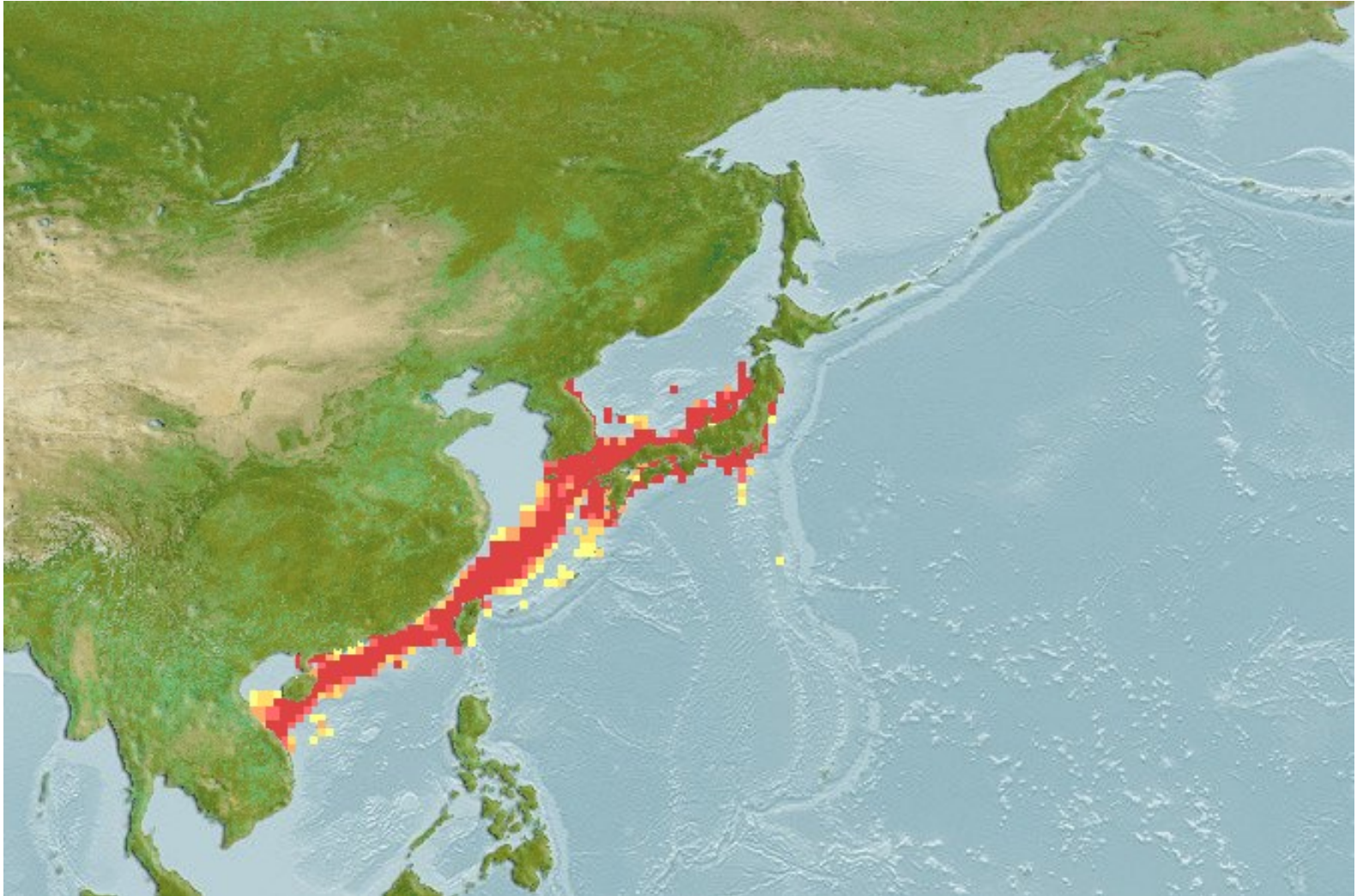


**Fishing vs. Climate change: an example of
filefish (*Thamnaconus modestus*) in the
northern East China Sea**

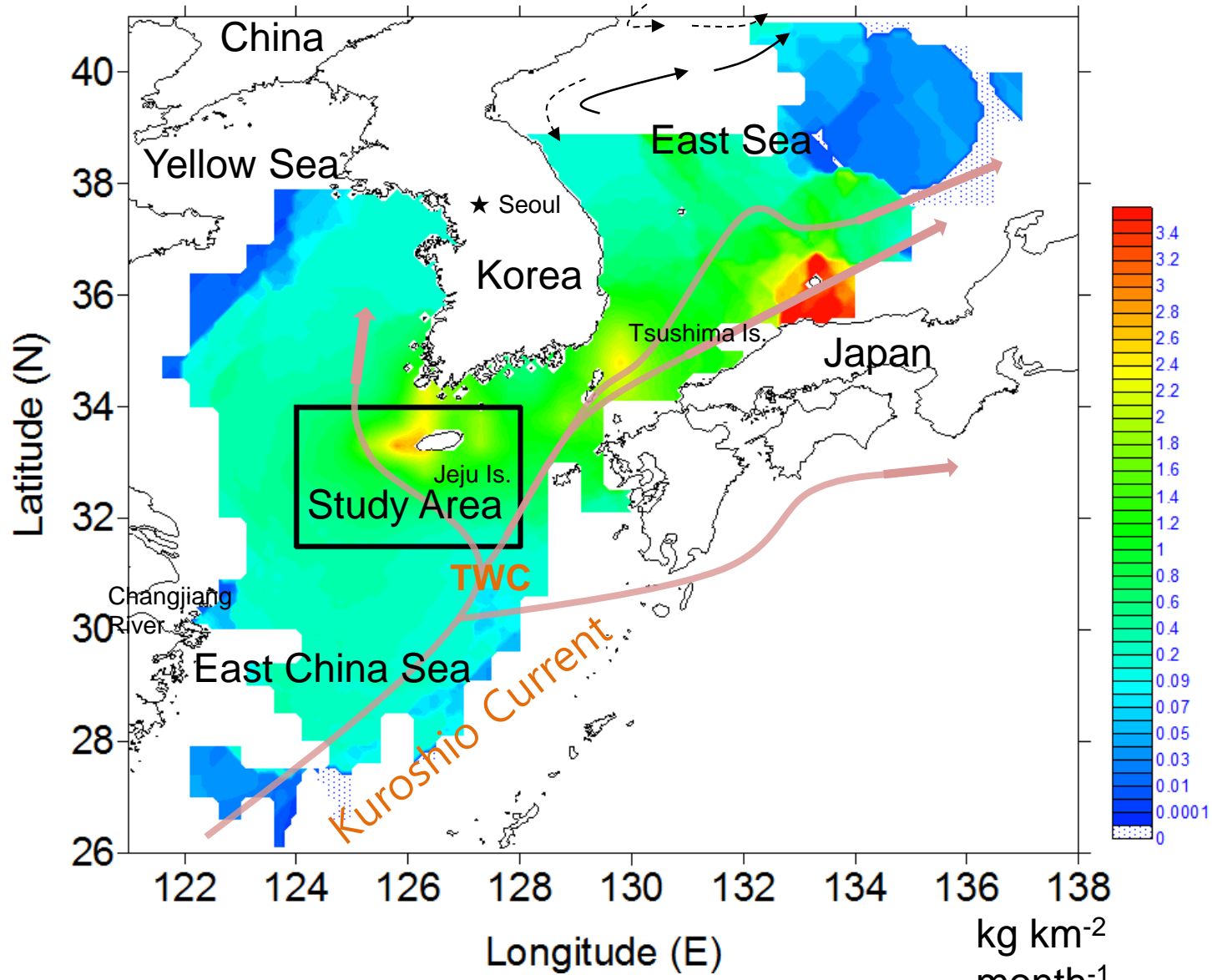
Sukgeun Jung

College of Ocean Sciences, Jeju National University,
Korea

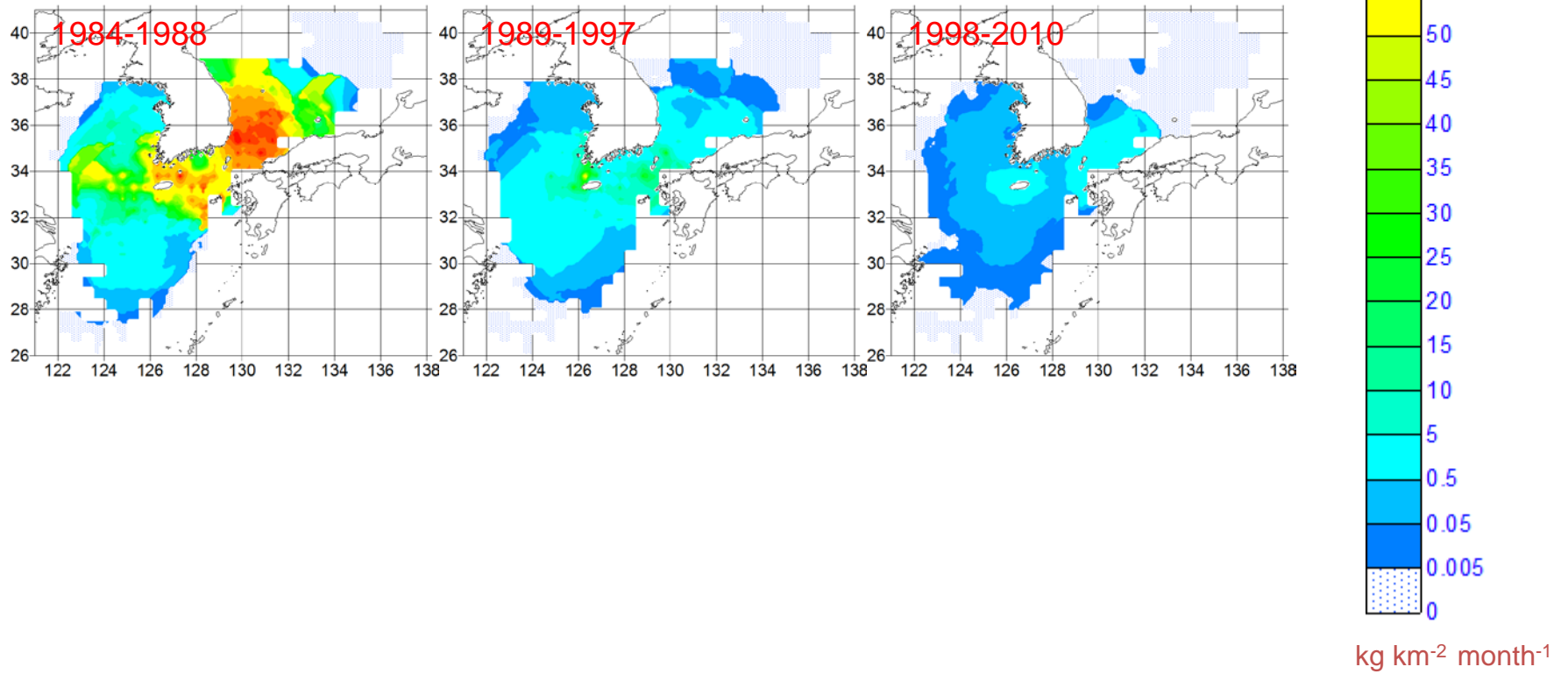
Distribution of filefish from fishbase.org



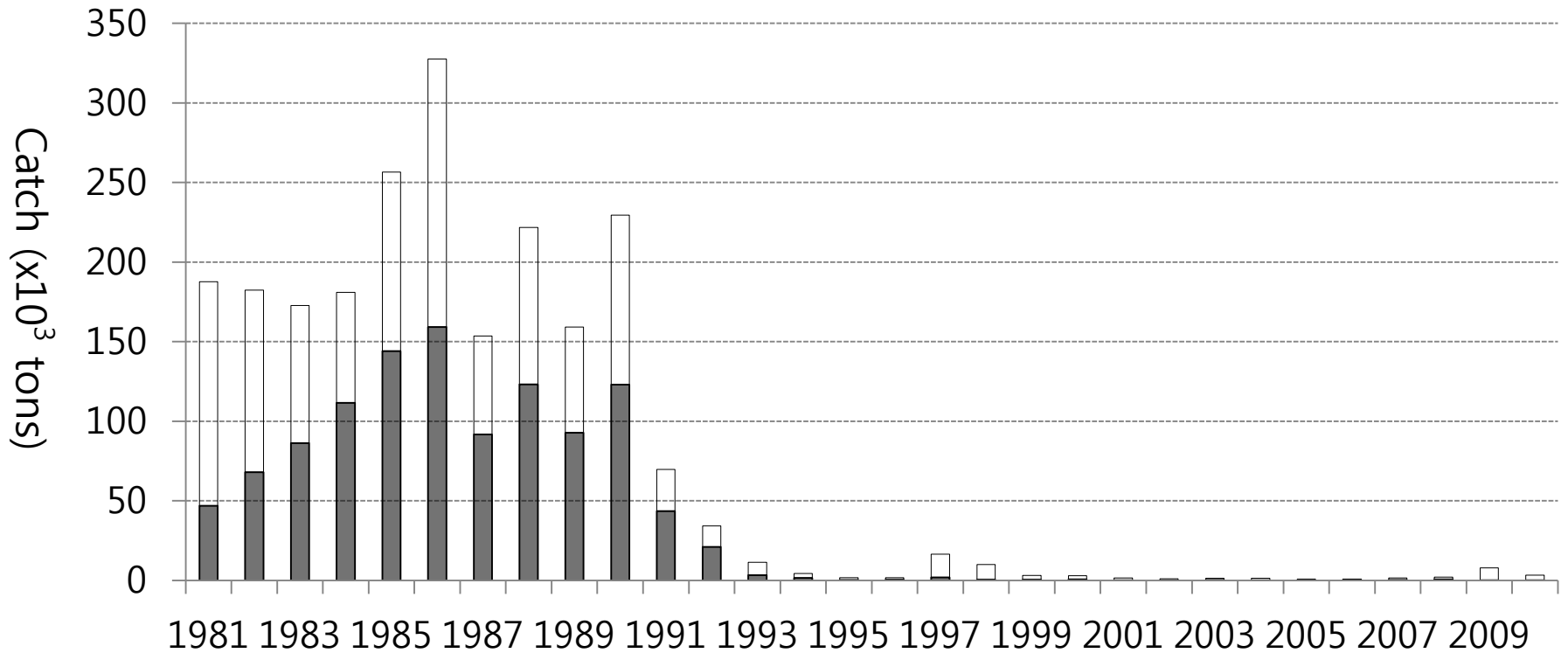
Mean biomass of filefish (color contour, $\text{kg km}^{-2} \text{ month}^{-1}$) from 1981 to 2010



Filefish catch averaged by period



Filefish catch in the northern East China Sea by Korean fishers

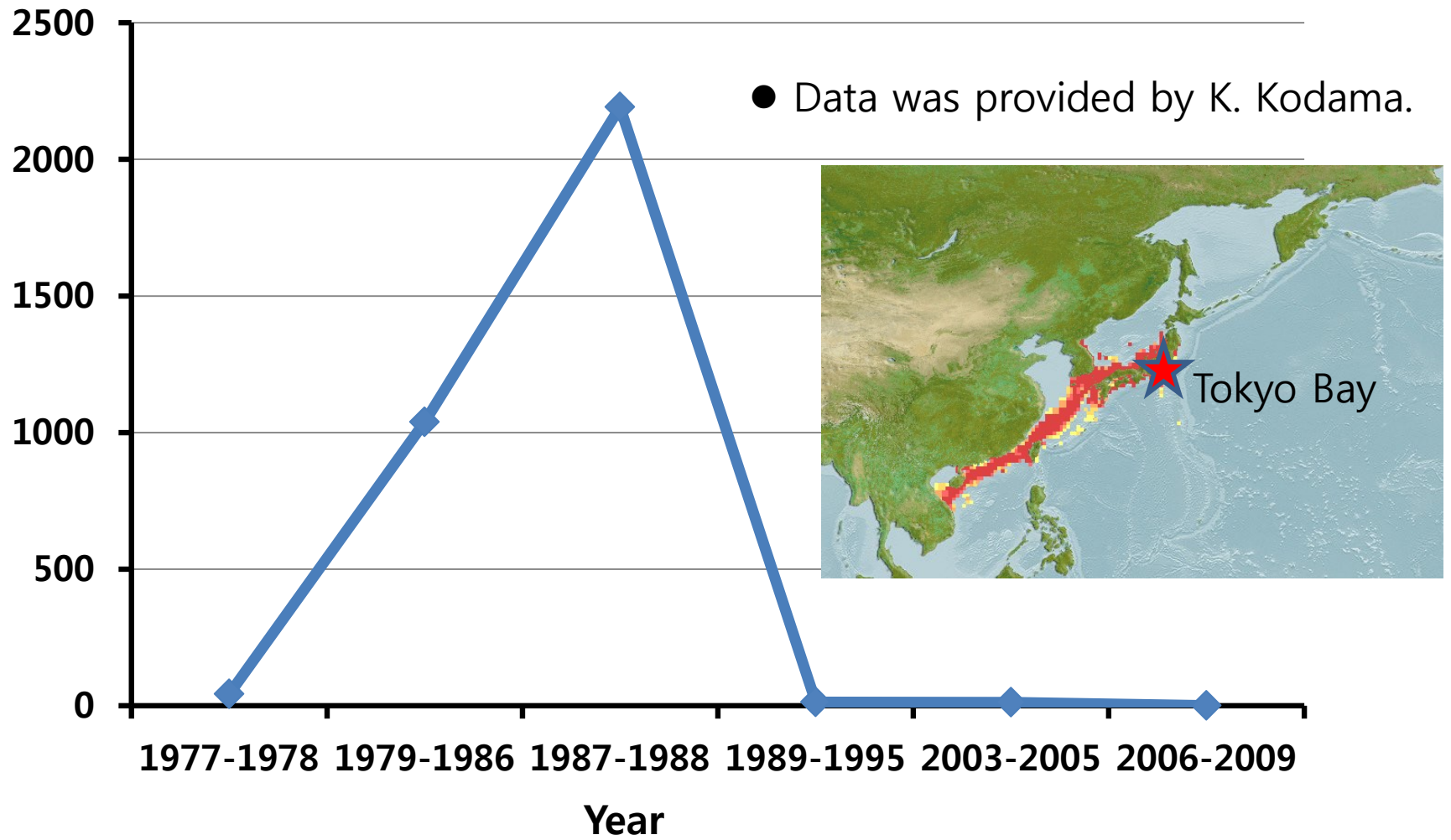


Fishing locations were reported by fishers

Fishing vs. Climate

- Fishing
 - Overfishing by trawlers was the main reason of filefish collapse
 - Anecdotal and instantaneous replies without any quantitative evidence such as fishing mortality
- Climate change
 - Shifts in oceanographic conditions in the late 1980s and the early 1990s

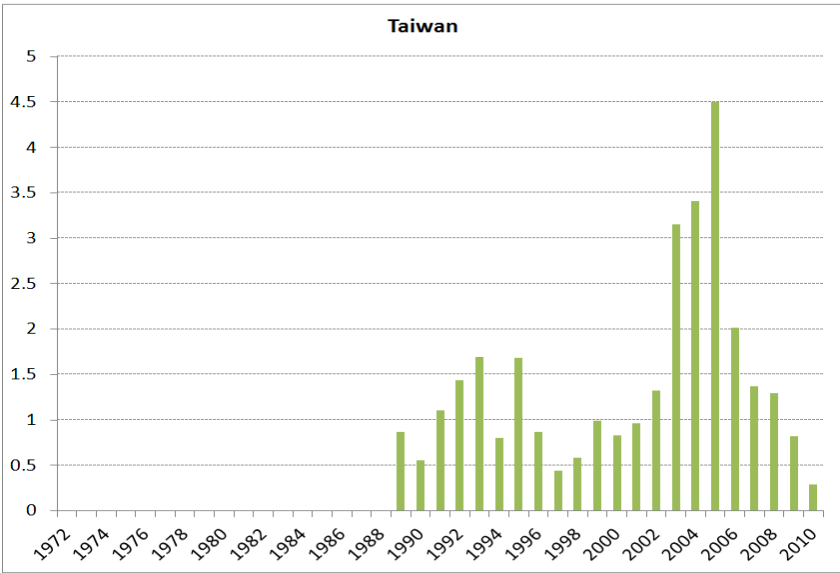
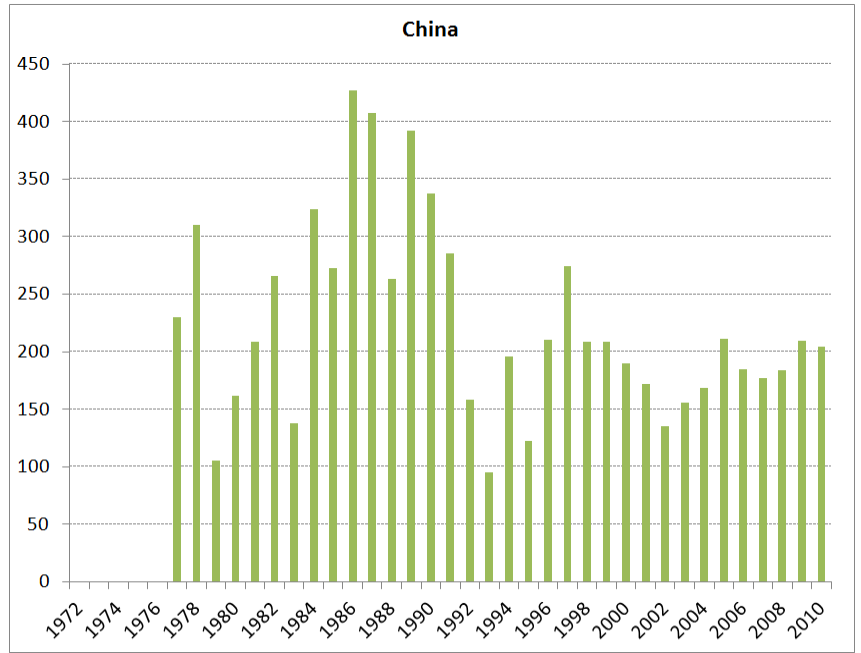
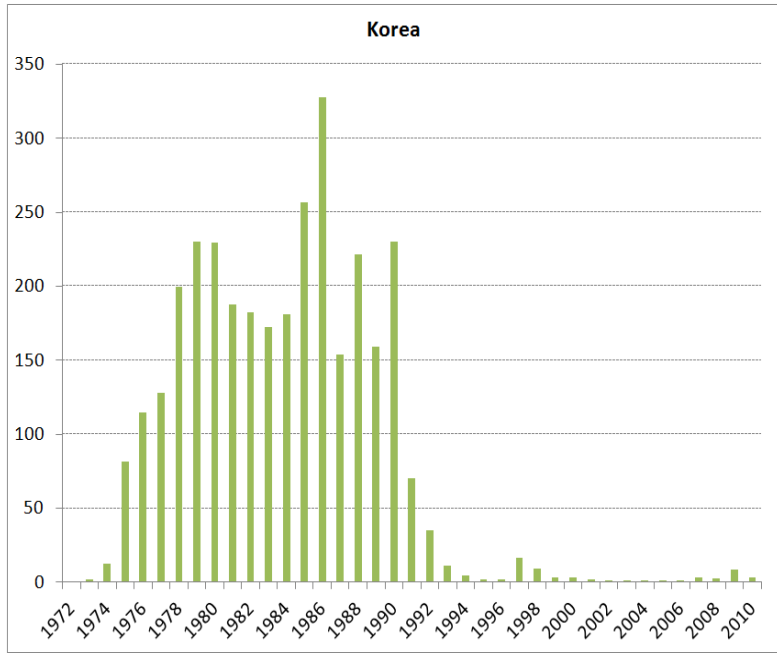
Abundance density (individuals km⁻²) of filefish in Tokyo Bay



Japanese filefish

- Filefish has not been a target species of Japanese commercial fisheries
- The overfishing hypothesis was ruled out
- The same environmental changes might have triggered the decline of both Korean and Japanese filefish stocks after 1989.

Catch (x10³ tons)



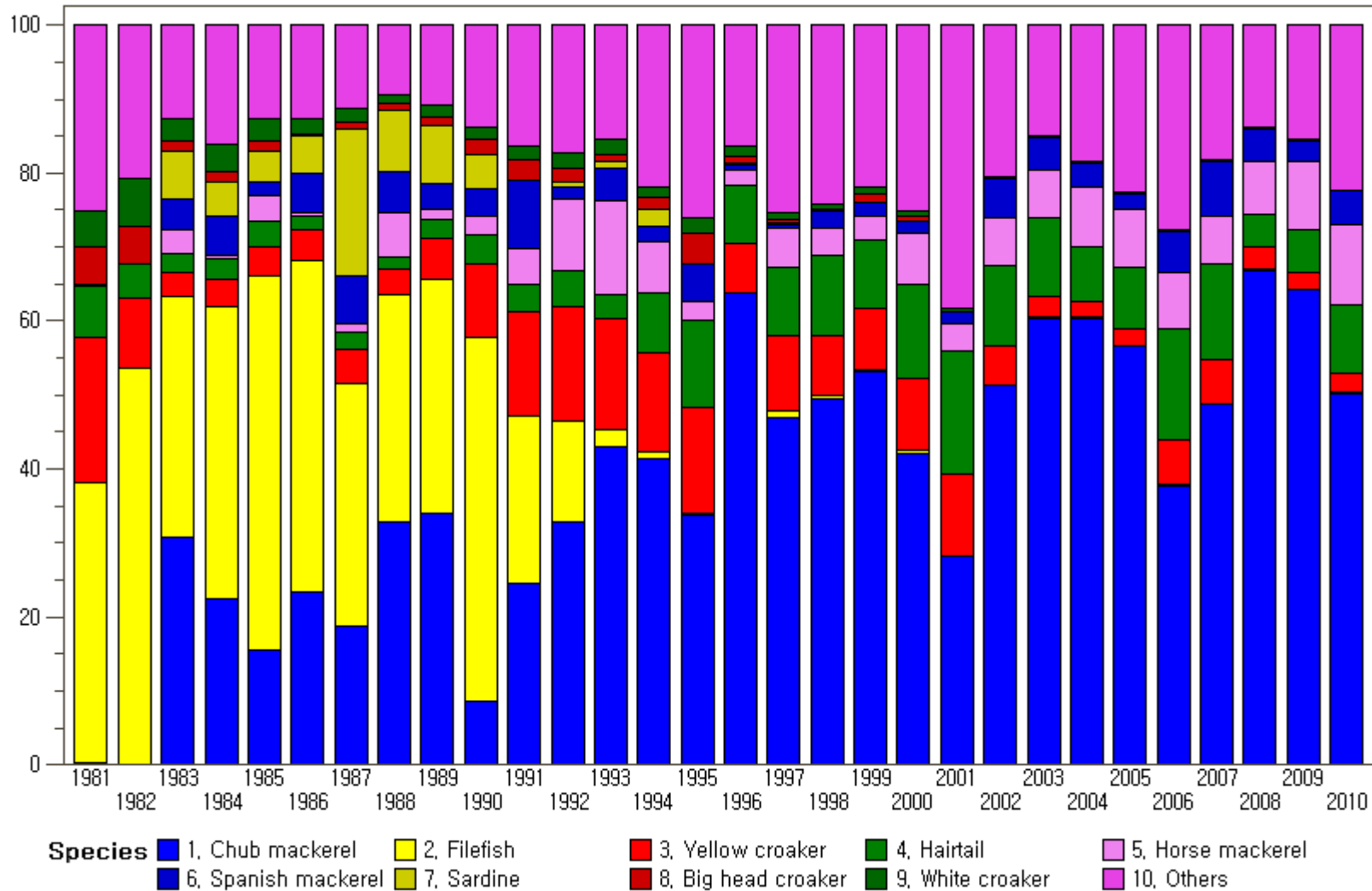
Chinese filefish

- Chinese filefish catch maintained a similar level of the pre-1990 catch.
- If overfishing was the major cause, then the same trend of filefish fishery collapse should have been observed in China after 1991, but this was not the case.

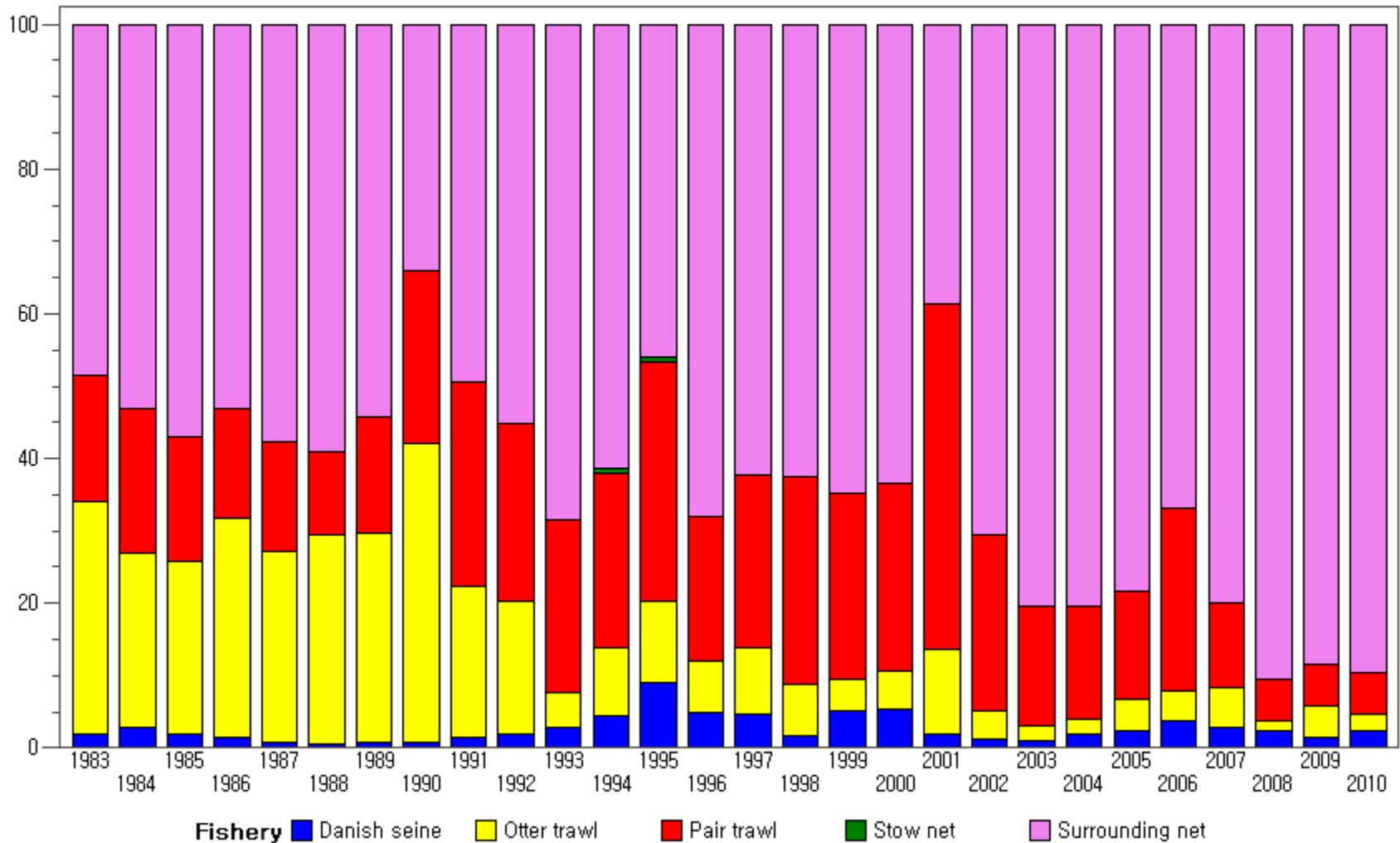
Climate

- The overfishing hypothesis was ruled out in both Japanese and Chinese filefish
- Changes in fish assemblage structure
- Changes in oceanographic conditions

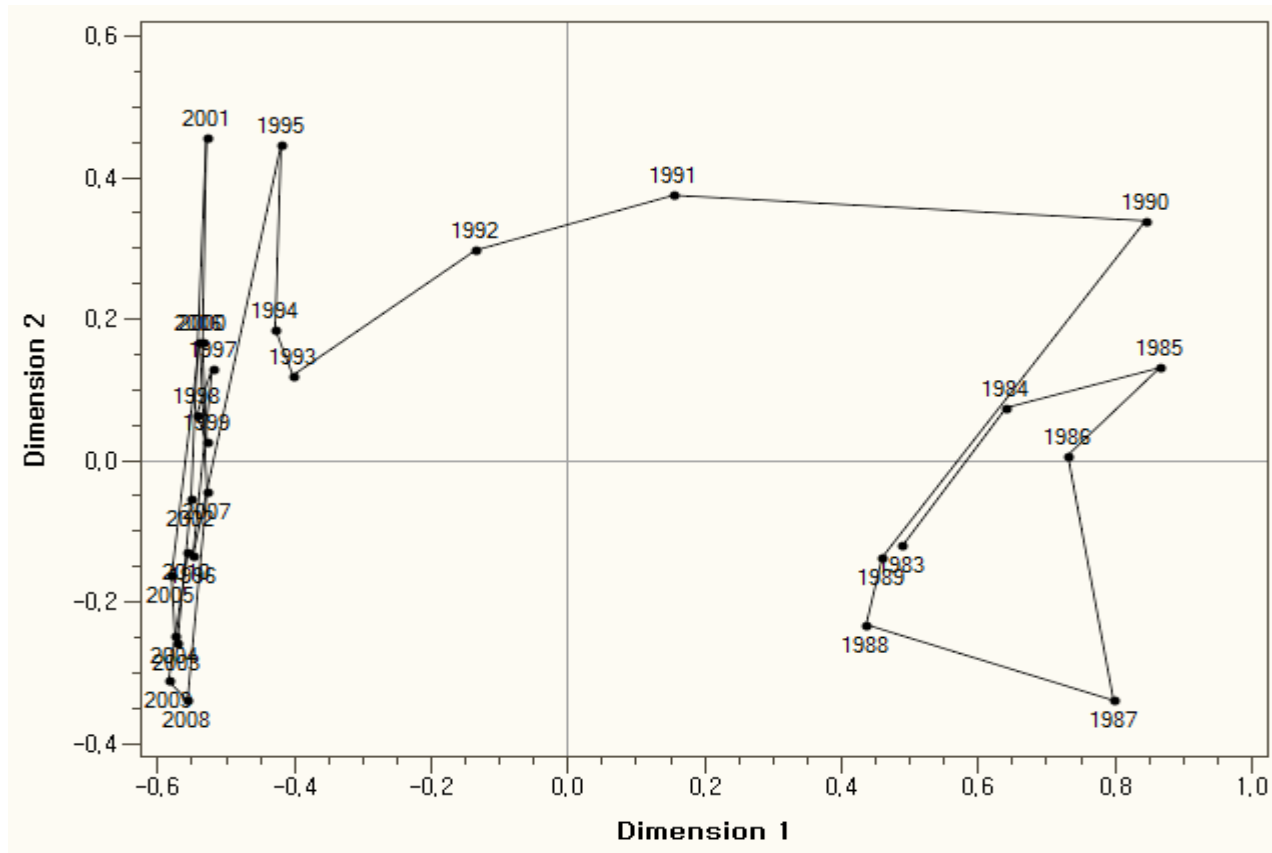
Species composition in biomass of Korean fisheries catches in the study area



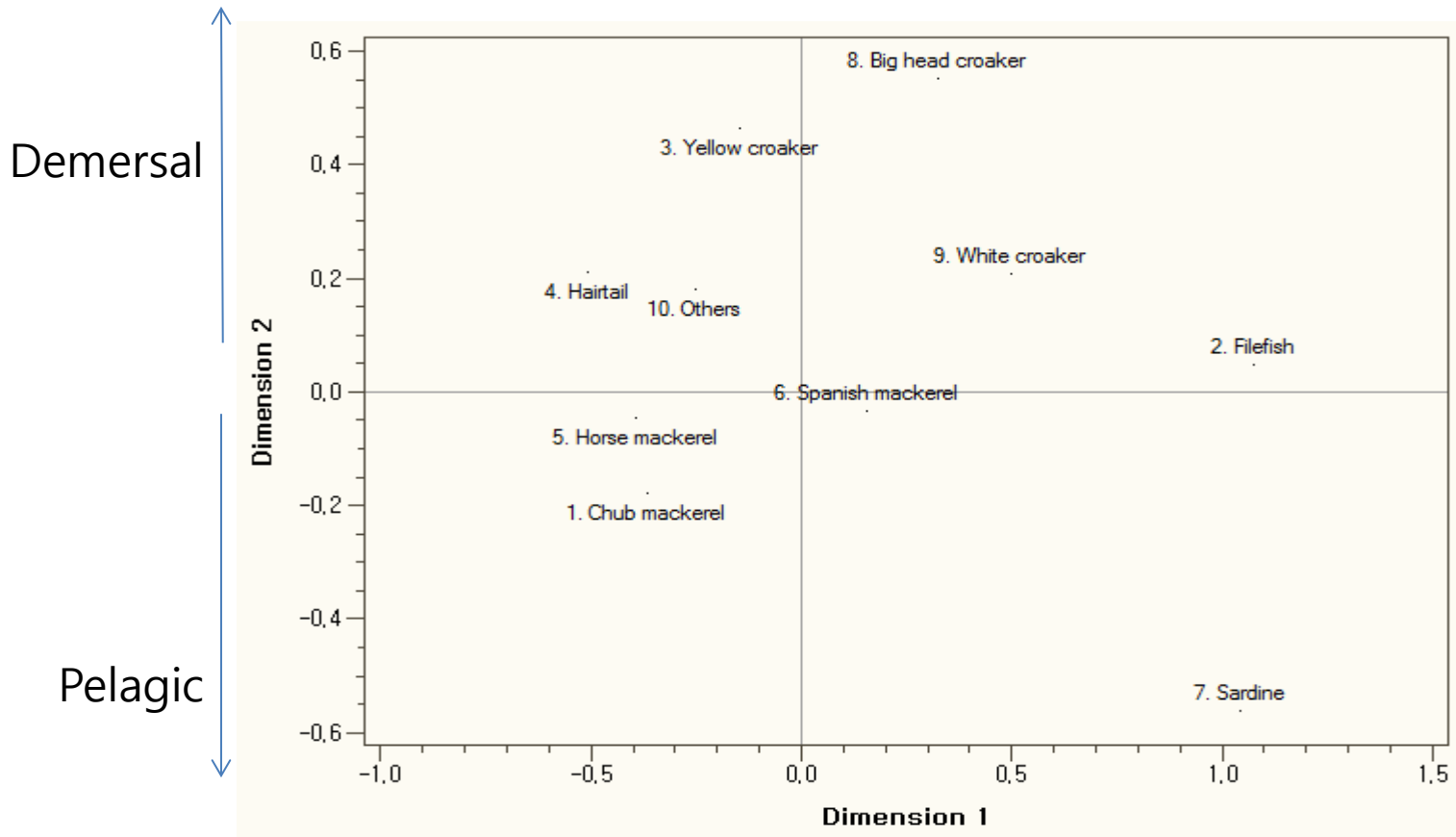
Biomass composition of Korean fisheries catches by fishery type in the study area



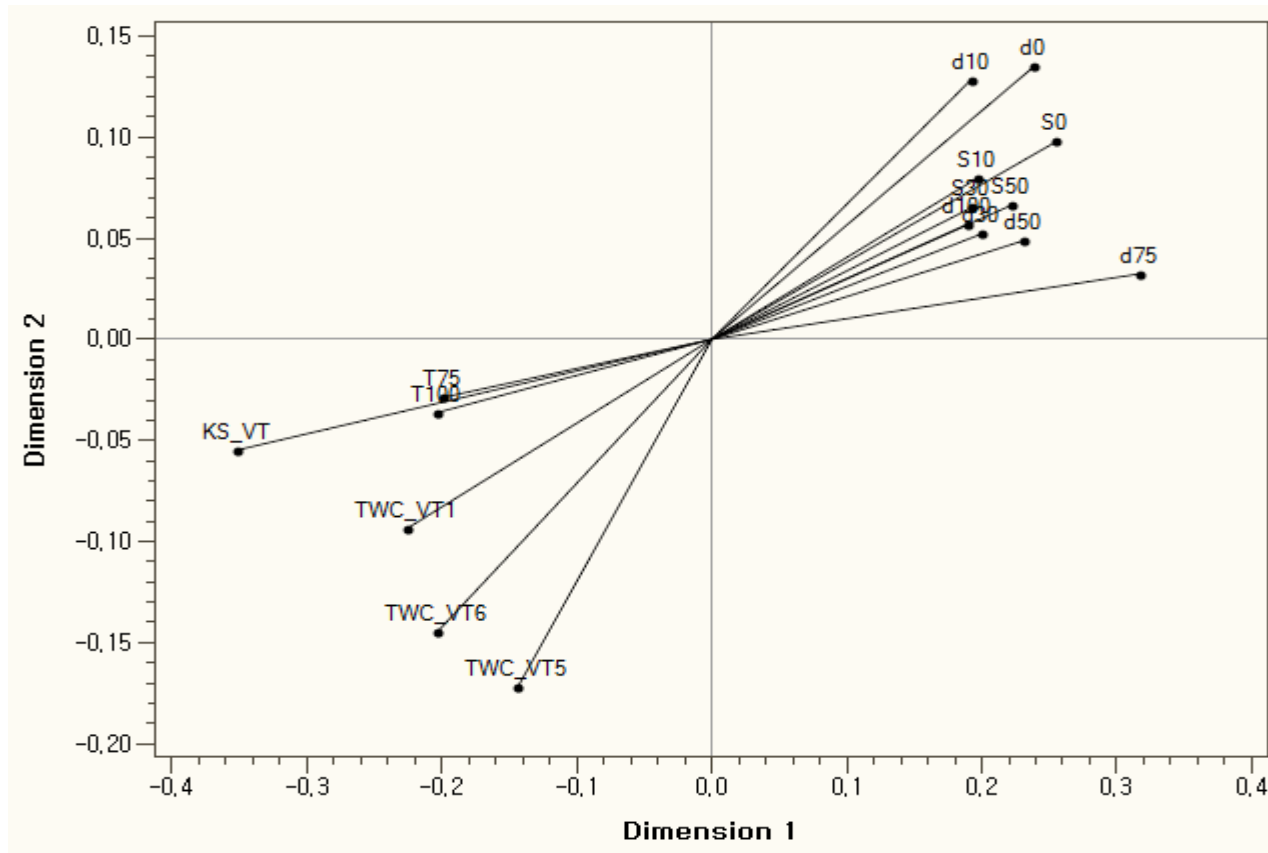
Correspondence analysis on species biomass composition



Correspondence analysis on species biomass composition



Canonical correspondence analysis



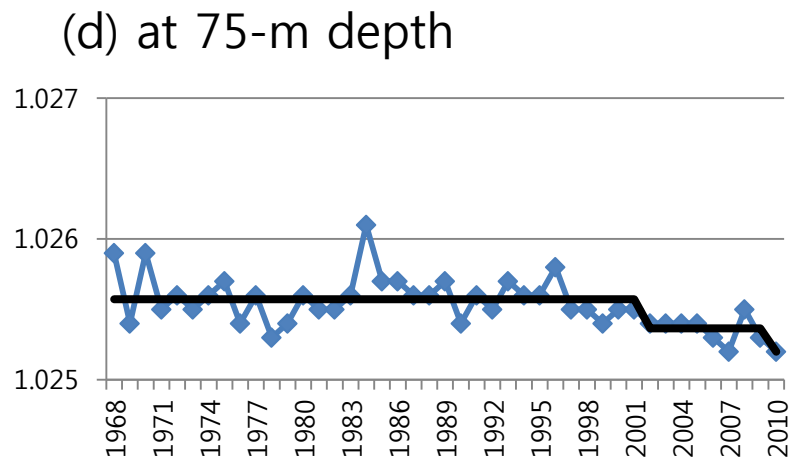
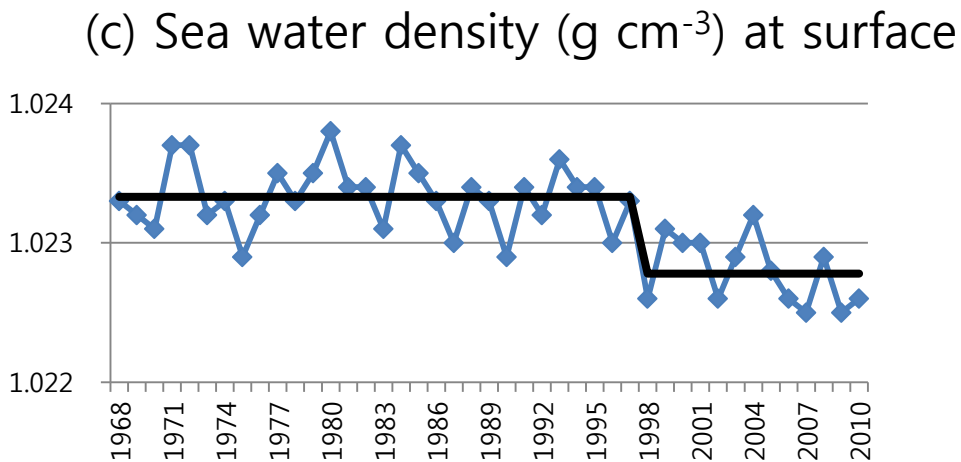
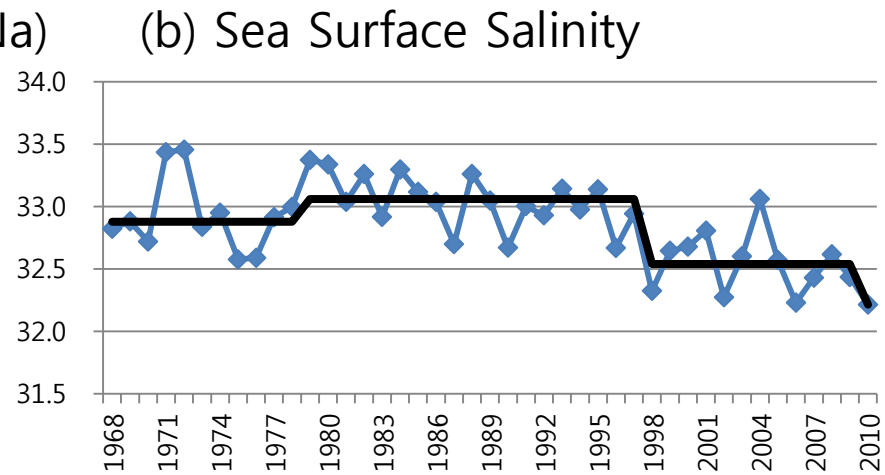
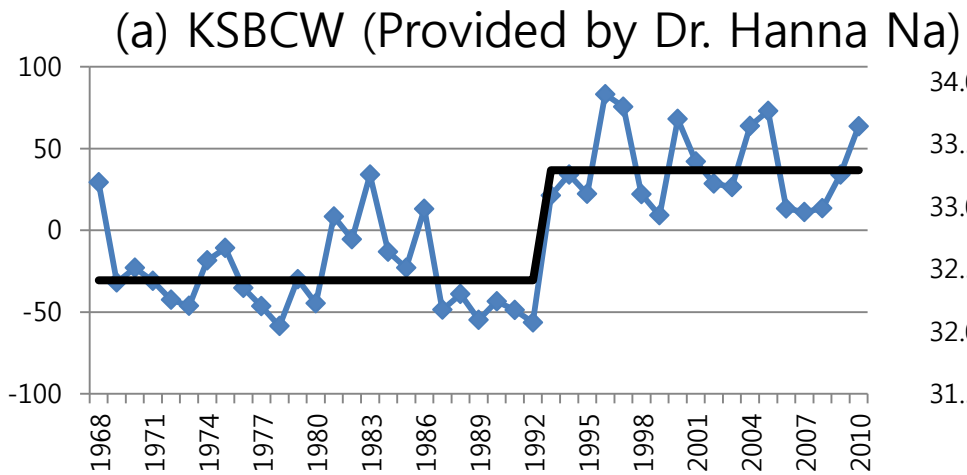
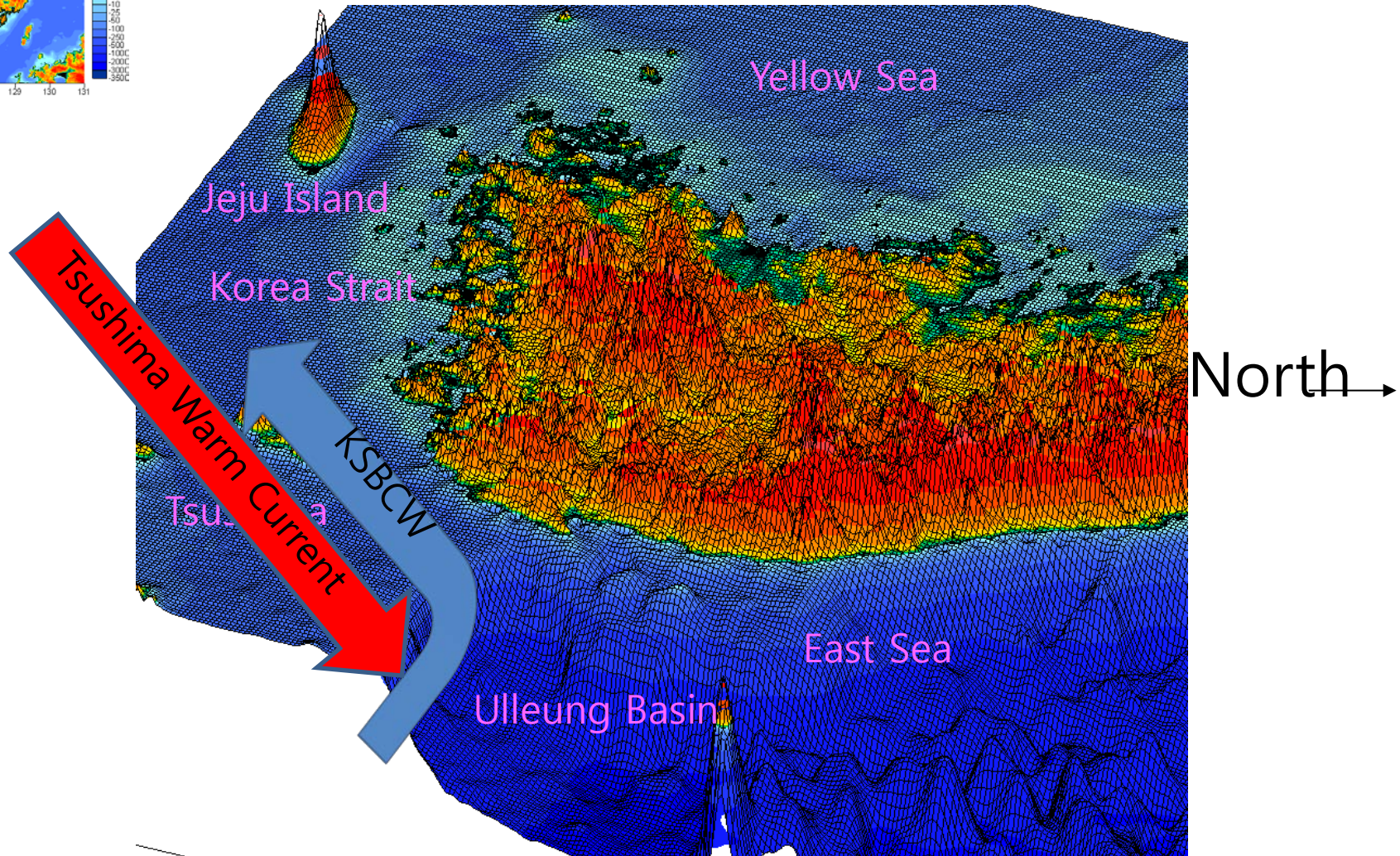
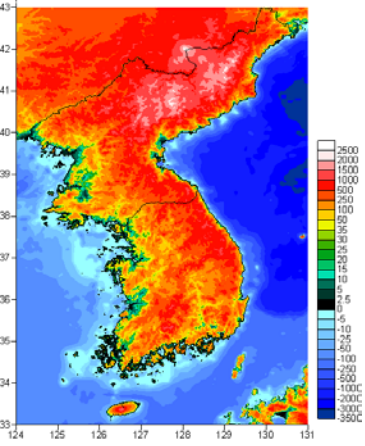
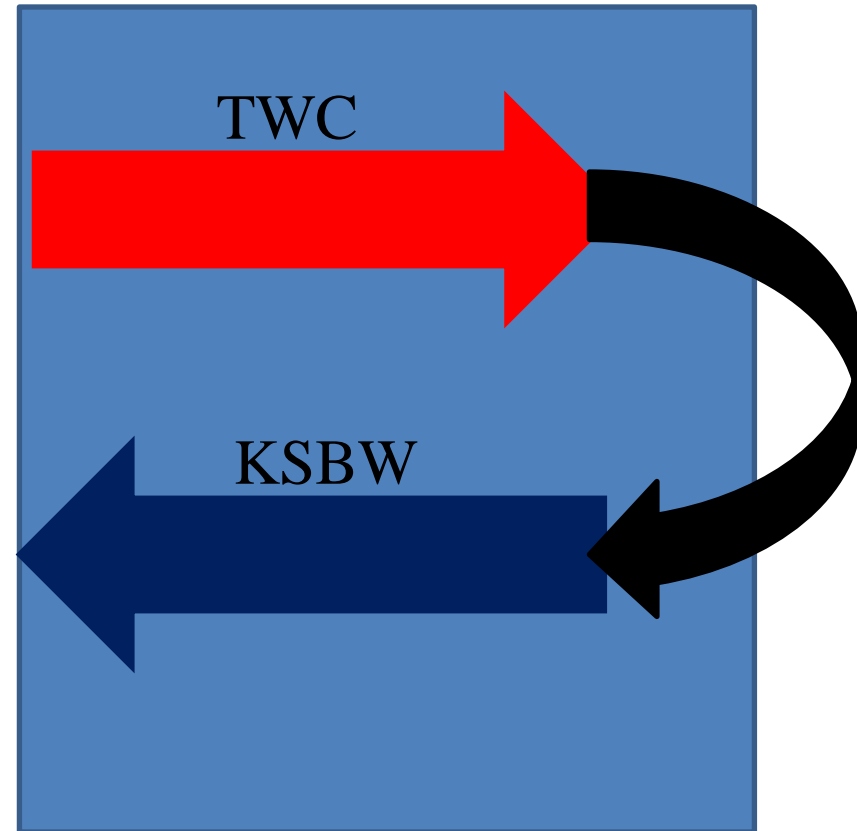
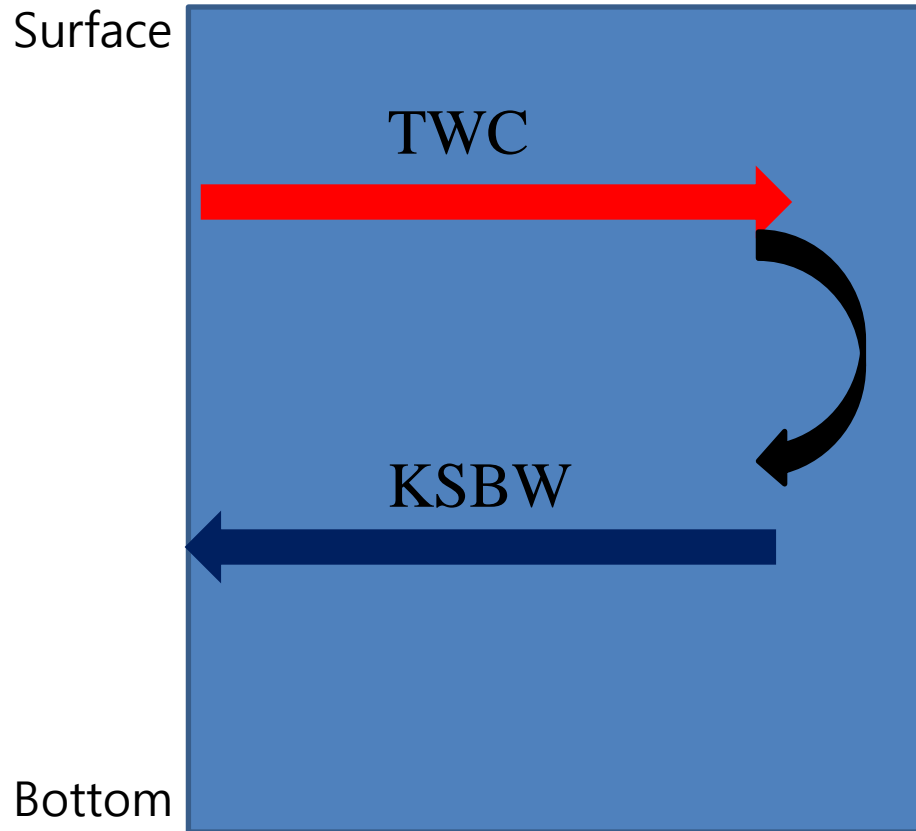


Fig. 7.

Physical Oceanography



Tsushima Warm Current (TWC) vs. Korea Strait Bottom Cold Water (KSBW)



Conclusion

- Intensified Korea Strait Bottom Coldwater, originating from the deep East Sea, seems to have been the main cause of habitat shrinkage and collapse of the filefish stock in Korean waters after 1992.
- Intensive fishing activity by Korean trawlers could have aggravated the potential resilience of the filefish stock.
- More talk at S5, 18:05 PM, Wednesday

FISHING VS. CLIMATE CHANGE: AN EXAMPLE OF FILEFISH (*Thamnaconus modestus*) IN THE NORTHERN EAST CHINA SEA

Sukgeun Jung¹ and Hyung Kee Cha²

Key words: East China Sea, filefish, climate change, fish assemblages.

ABSTRACT

The main cause of annual fluctuations in catch and species composition of fisheries is usually uncertain, but a prevailing view has been that fishing effects are more critical than environmental variability. Filefish is a good anecdote: many Korean fisheries scientists have attributed the sudden collapse of

Korea had gradually increased to 1.4×10^6 metric tons in the mid-1980s, probably by improvement of fishing technology and capitalization. However, thereafter the annual catch level seemed to reach an equilibrium level at ca. 1.0×10^6 metric tons, causing concern over possible overfishing. Consequently, in the late 1990s, Korean government began to impose the total allowable catch (TAC) for major commercial species [35, 61] to manage and preserve fish stocks. However, despite relatively stable status of the total annual catch, catches of individual species have fluctuated greatly with

Future works

- Restoration of time-series of volume by the Korea Strait Bottom Cold Water based on regional ocean circulation models
- Understanding of ocean circulation dynamics in the Japan/East Sea, especially in the deep water

Acknowledgements



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