

An underwater photograph of a coral reef. The water is clear blue, and sunlight filters down from the surface, creating a shimmering effect. In the foreground, there is a large, diverse coral reef structure. Numerous small fish are swimming throughout the water column. A larger fish is visible in the upper right corner.

Structure and formation of the South Yellow Sea water mass in spring

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IOCAS,China
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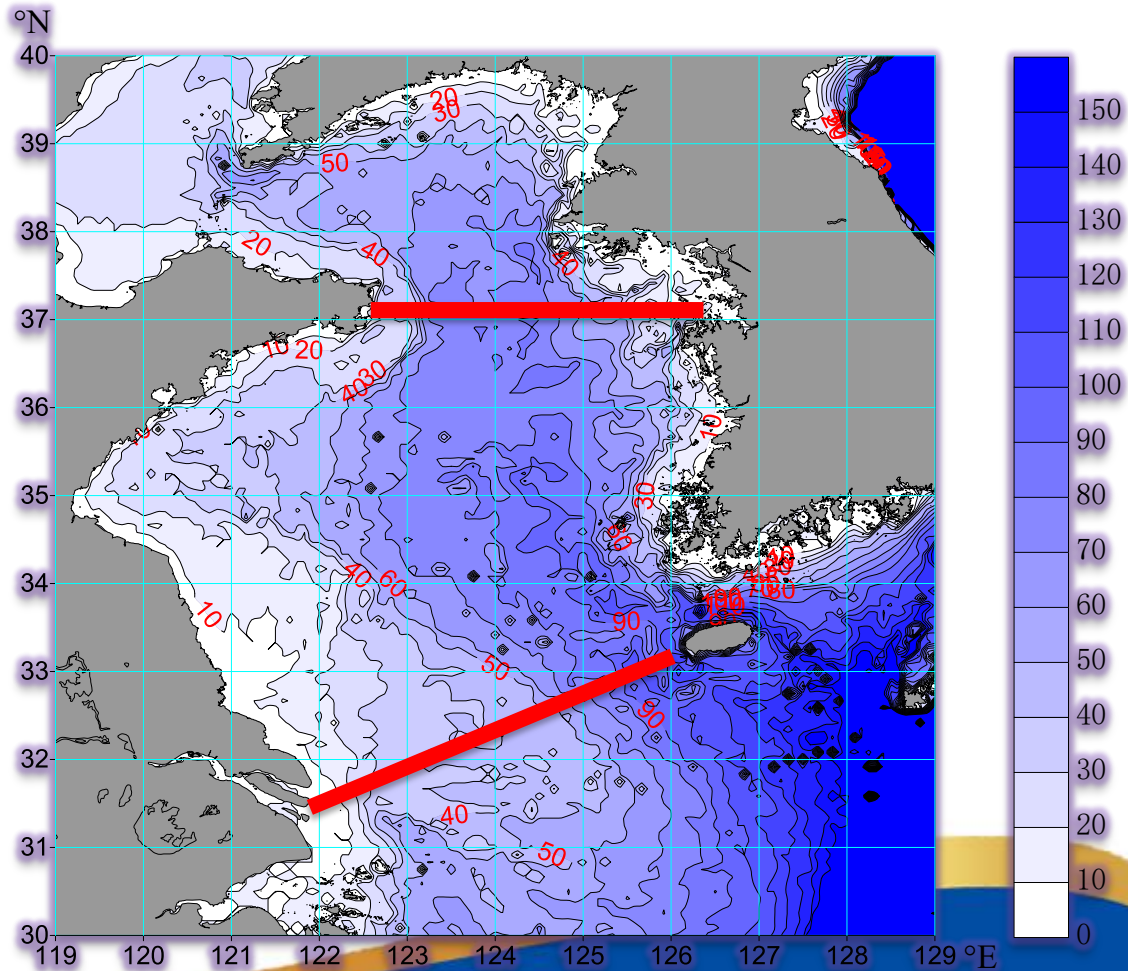
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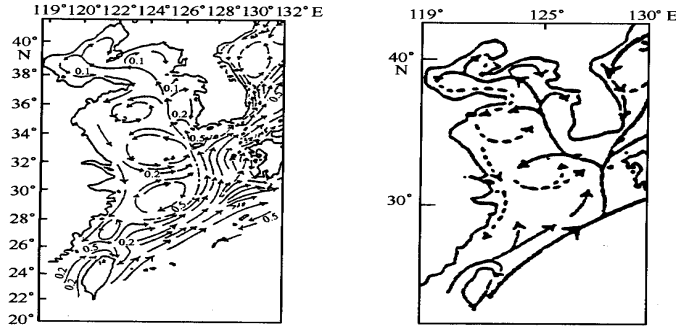


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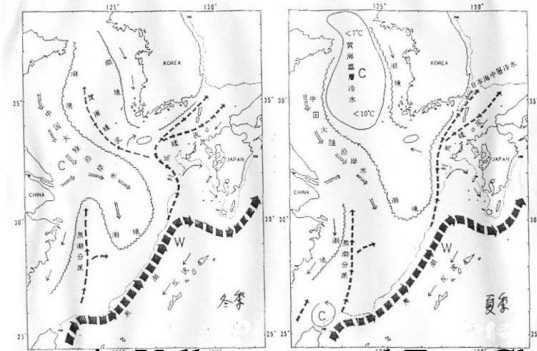
- The Yellow Sea (YS) is a semi-closed shelf region between China and the Korean peninsula.
- 37° N divided the Yellow Sea into south Yellow Sea and North Yellow Sea
- There is a trough in the middle of the YS with a maximum depth of about 90 m, which shallows to about 20 m within 50 km of the coasts.



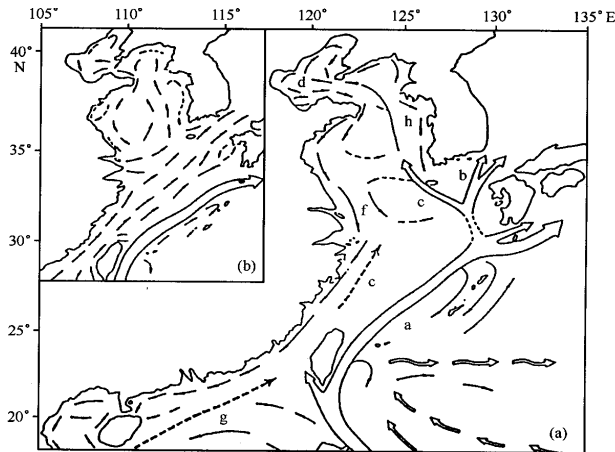
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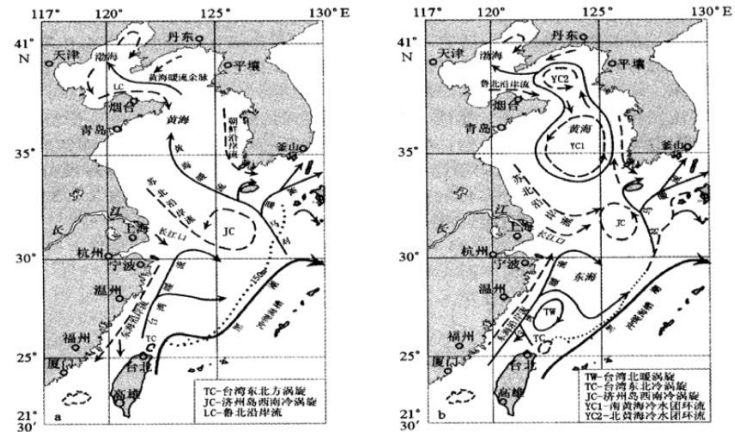
China current (Uda, 1934)



Current in Yellow sea and East China sea in winter and summer (Masahito, 1985)



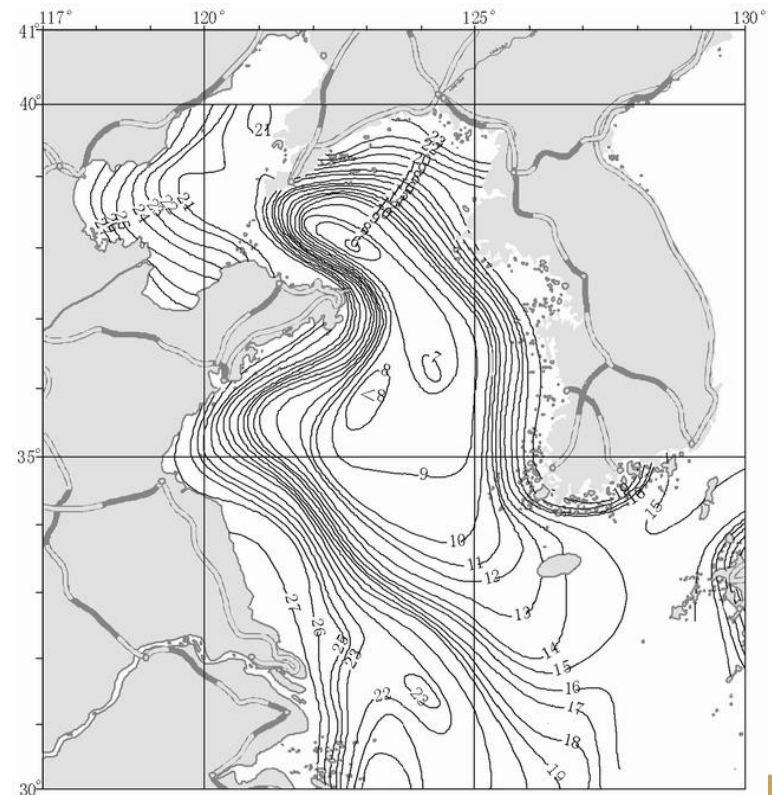
Main current of China sea winter (a, 2002)、summer (b, 1984)
(Guan bingxian)



China sea current winter (a)、summer (b) (Guo binghuo, 2000)

Introduction

- The YSCWM was first suggested by Uda (1934, 1936) based on hydrographic data and trajectories of drift bottles.
- He et al. (1959) used three-layer temperature and salinity data to describe the shape and formation of the YSCWM
- Using a progressive T–S method, Mao et al. (1964) revealed the details of three basic water masses (Continent Shelf Water, Mixed Yellow Sea Local Water, and Kushiro Water)
- Zhang et al. (1996, 2002, 2004) showed that the Qingdao Cold Water Mass (QDCWM)
- Zou et al. (2000, 2001) indicated that the Middle Layer Cold Water Mass to the south of Cheng shantou



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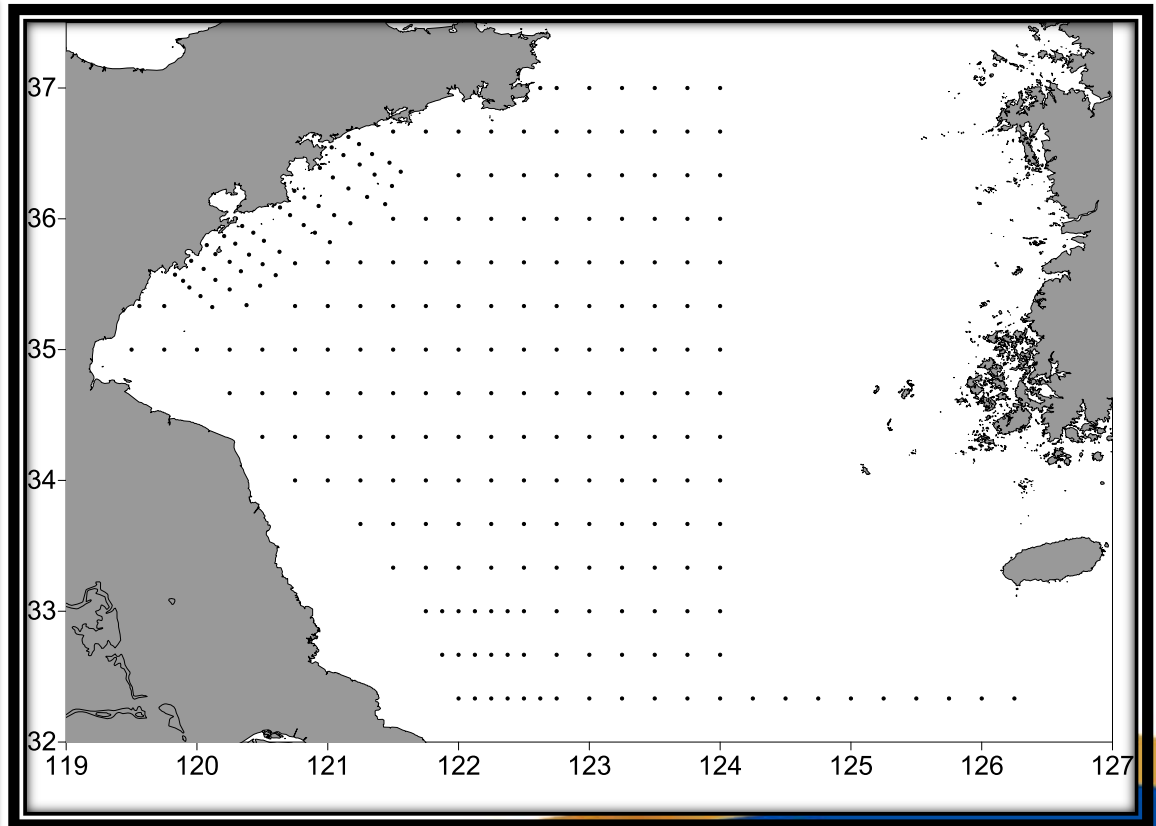
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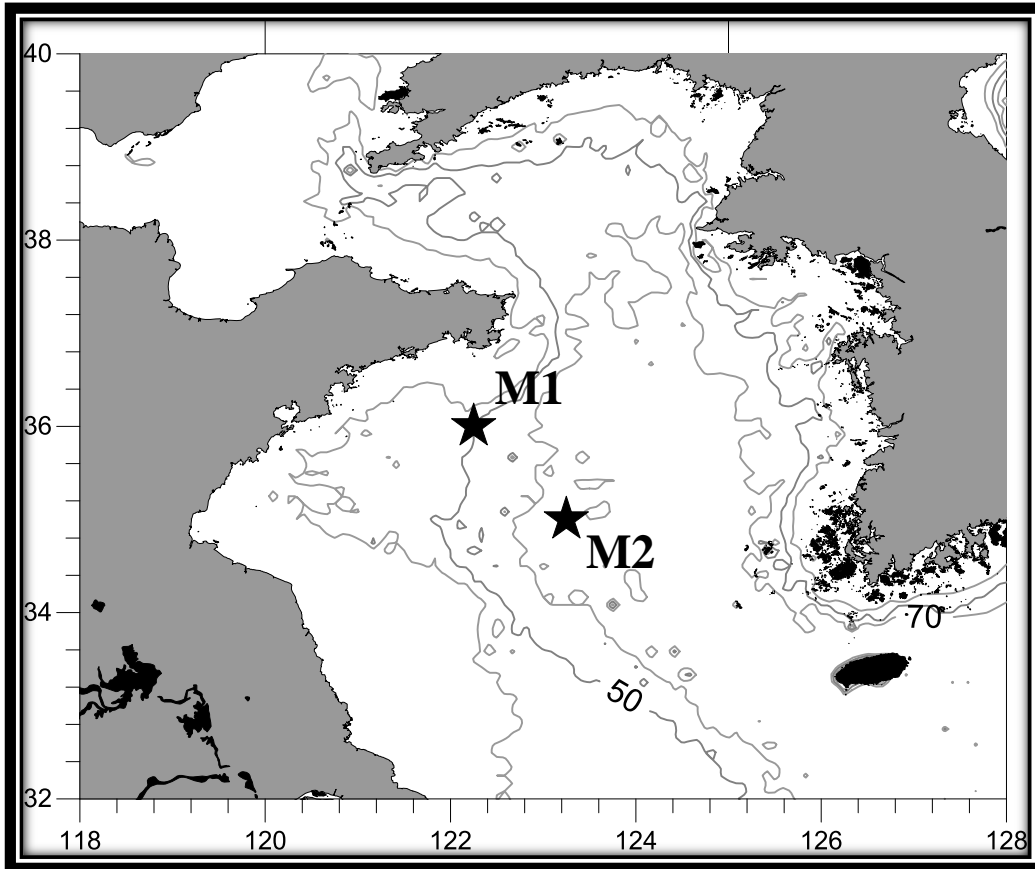


Data

In December 2006 and April 2007, data were obtained from over 250 CTD stations to investigate the structure of the South YS.



Data



A Hydrocat CTD system (temperature, conductivity, and optical oxygen sensors) and an RDI 300 KHz acoustic Doppler current profiler were installed in the mooring system. The sample interval of the acoustic Doppler current profiler was 30 min and the vertical resolution was 2 m.

Station	Depth(m)	Longitude	Latitude	Time
M1	50.0	122°15.1897'	35°59.9595'	27,May-30,June
M2	73.0	123°30.0076'	36°59.4728'	5,June-10,July

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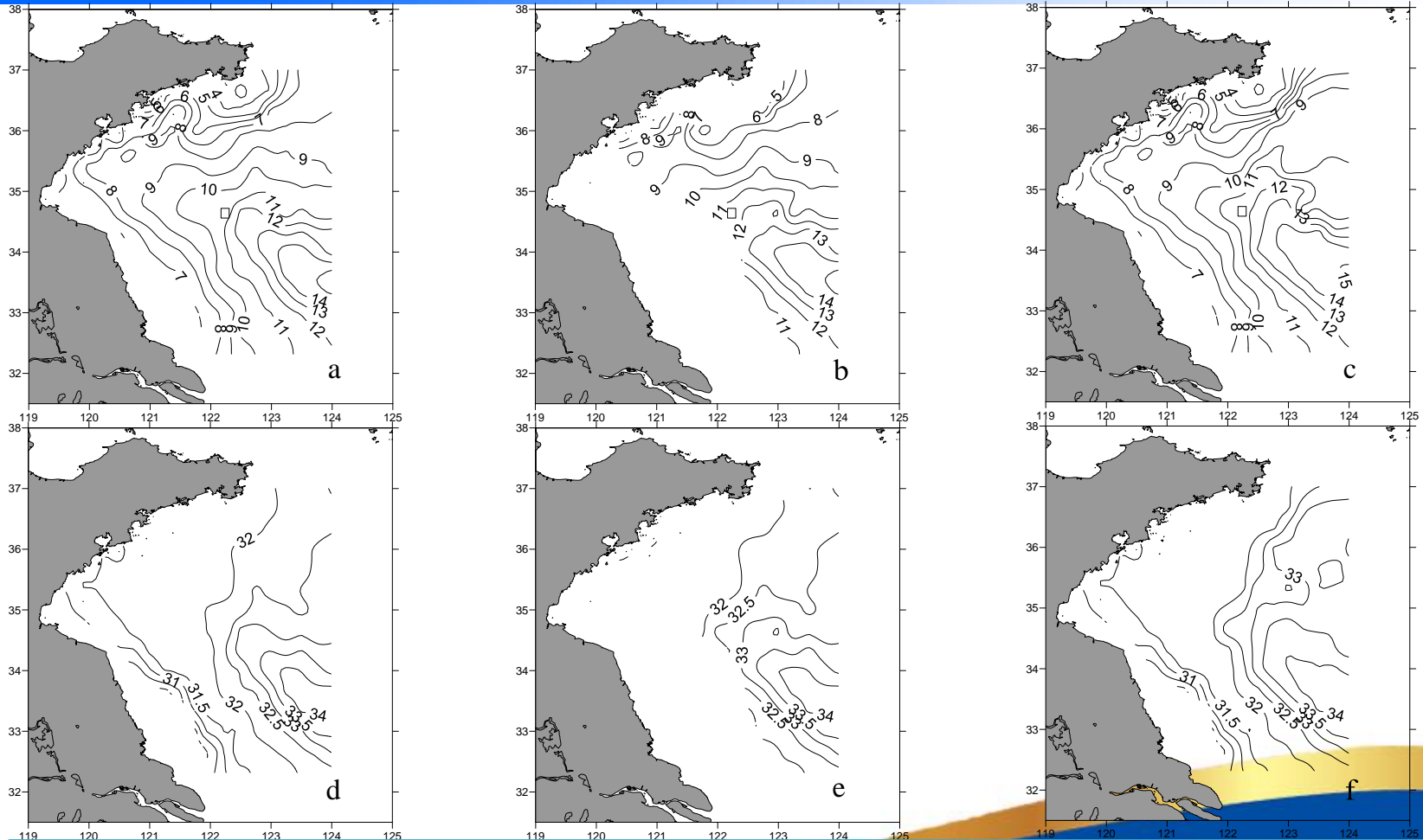
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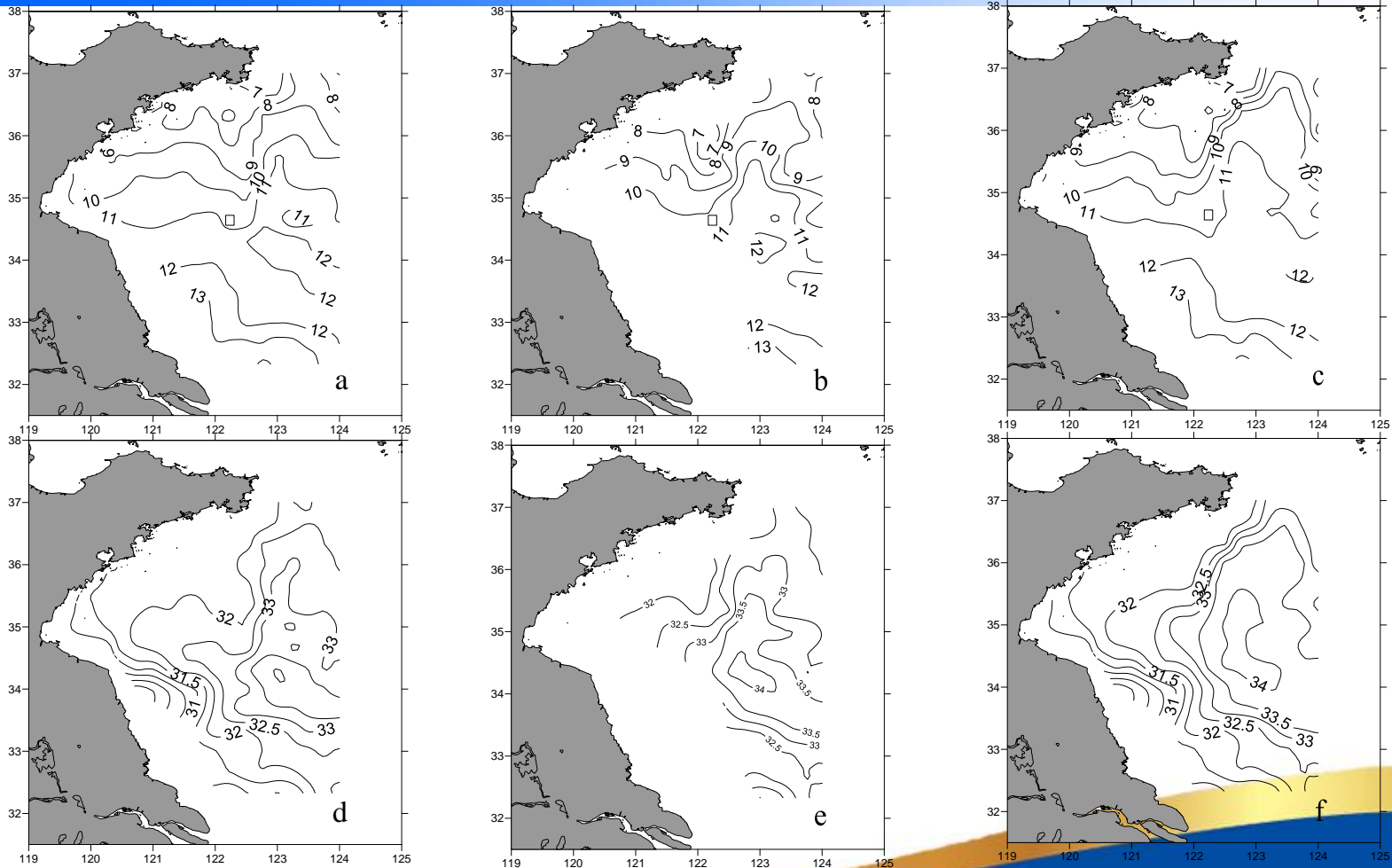


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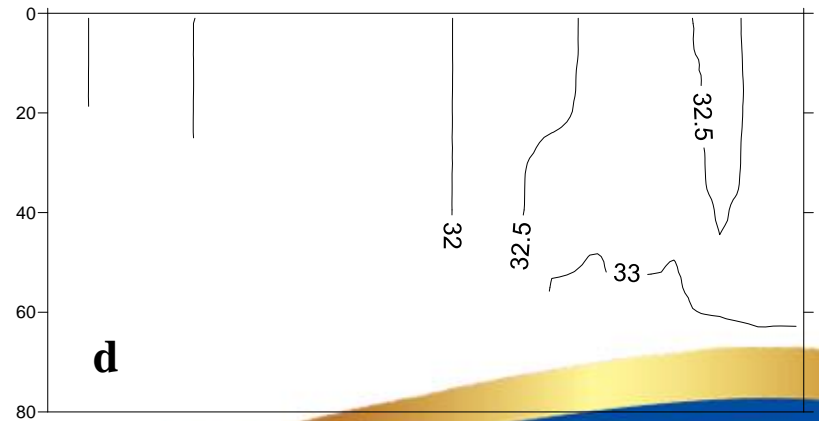
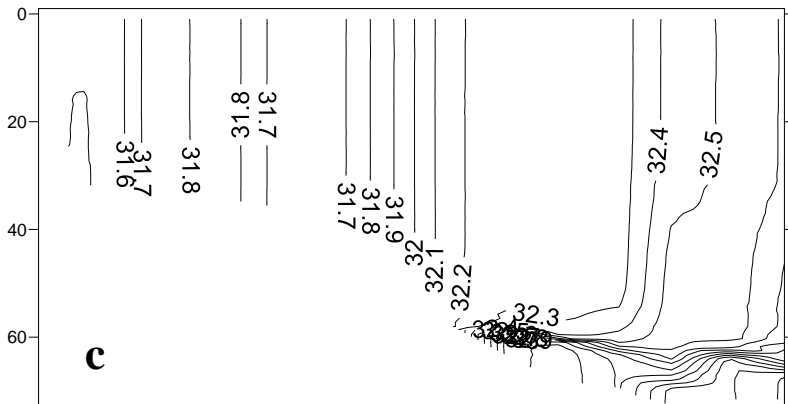
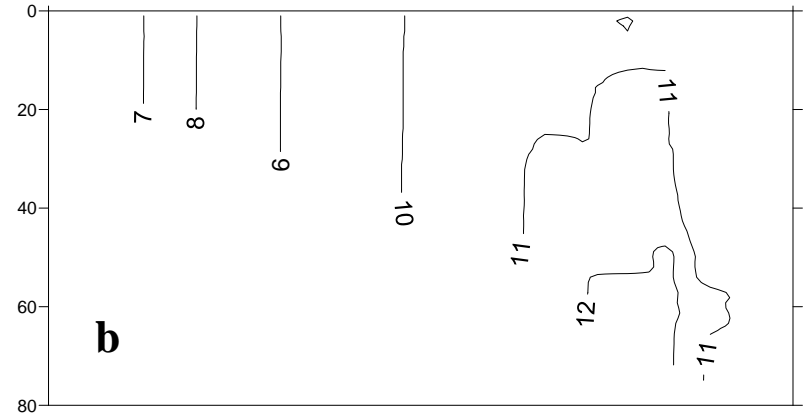
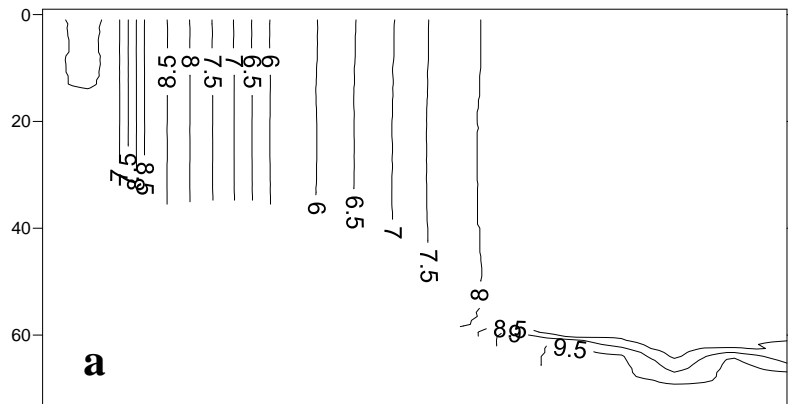
Wintertime horizontal distribution of: (a) surface temperature; (b) 30-m temperature; (c) bottom temperature; (d) surface salinity; (e) 20-m salinity; (f) bottom salinity

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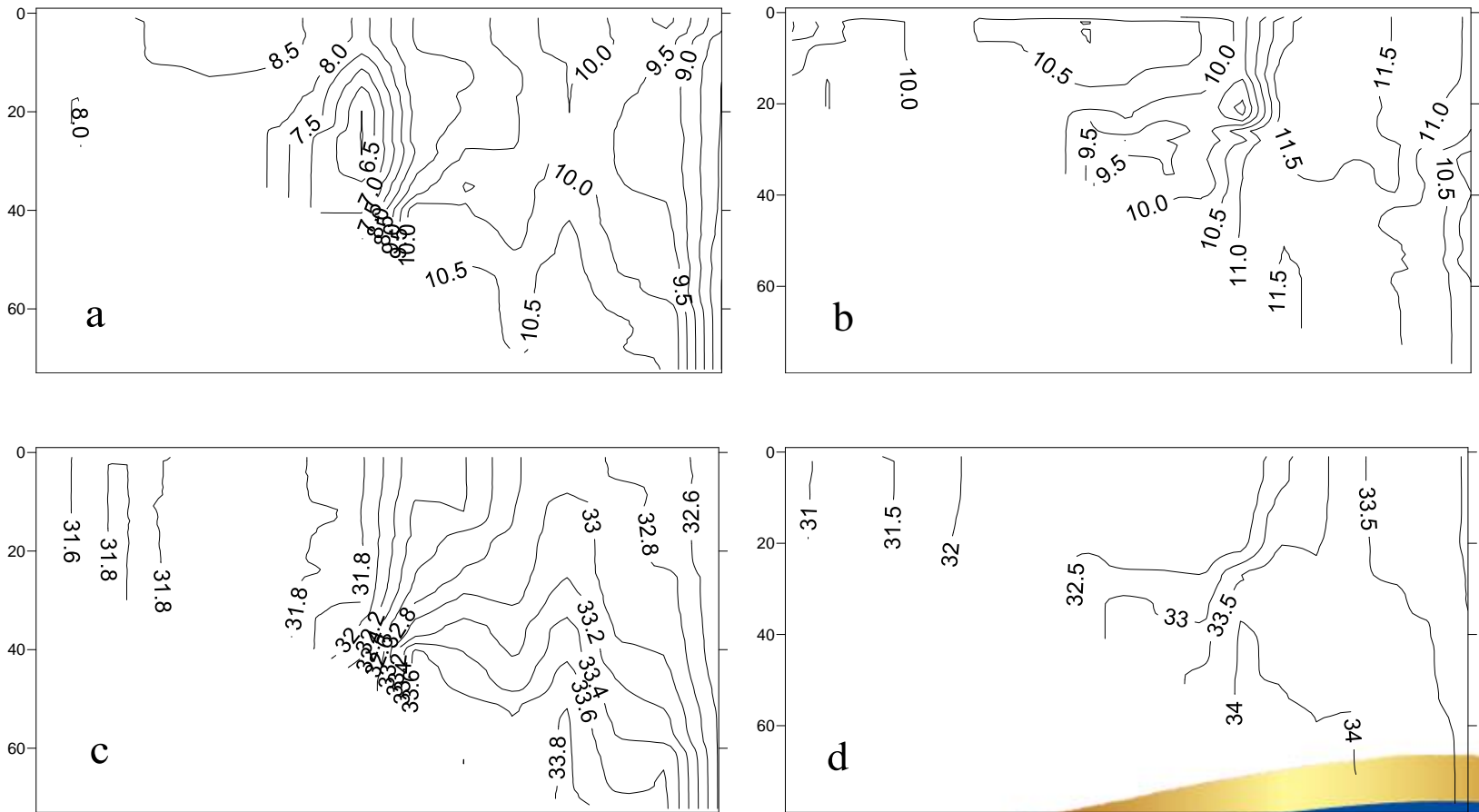
Springtime horizontal distribution of: (a) surface temperature; (b) 30-m temperature; (c) bottom temperature; (d) surface salinity; (e) 20-m salinity; (f) bottom salinity

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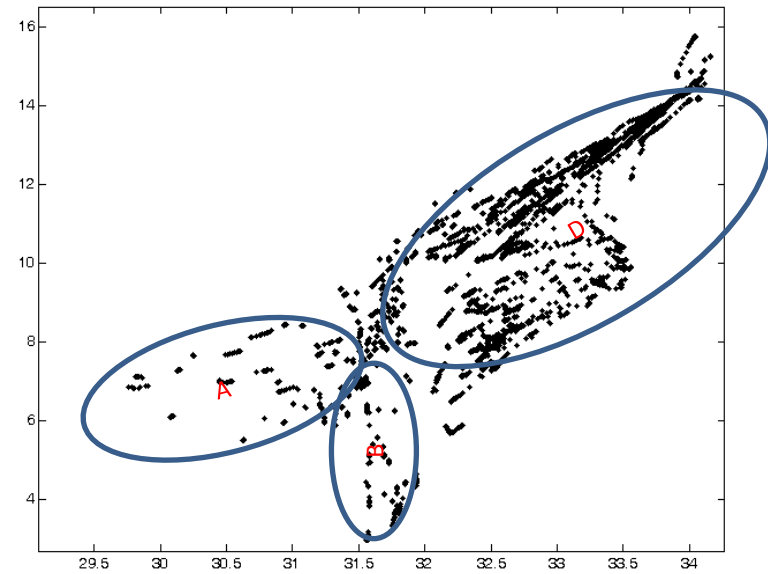
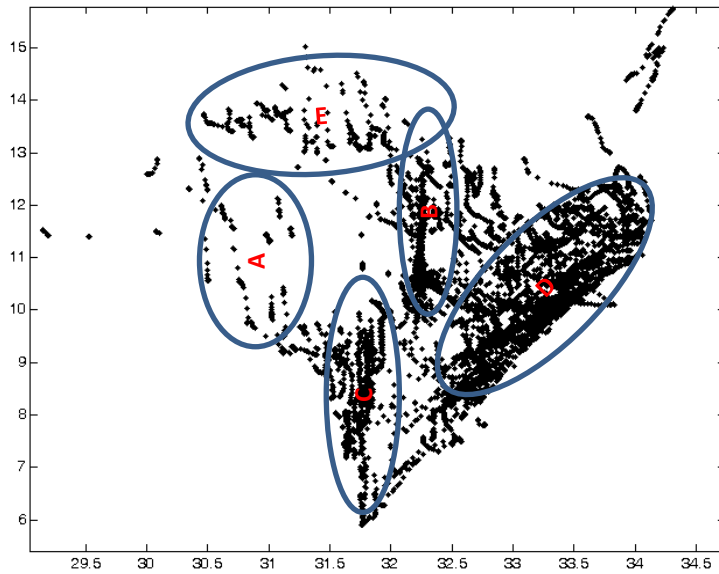
Wintertime vertical distributions of temperature at (a) 36° N, (b) 35° N and salinity at (c) 36° N, (d) 35° N

Result



Summertime vertical distributions of temperature at (a) 36° N, (b) 35° N and salinity at (c) 36° N, (d) 35° N

Result



T-S curve in spring and winter: (a) Southwest Yellow Sea Coastal Water Mass, (b) Southwest Yellow Sea Local Water Mass, (c) Qingdao Cold Water Mass, (d) Yellow Sea Warm Current, (e) Subei Coastal Water Mass



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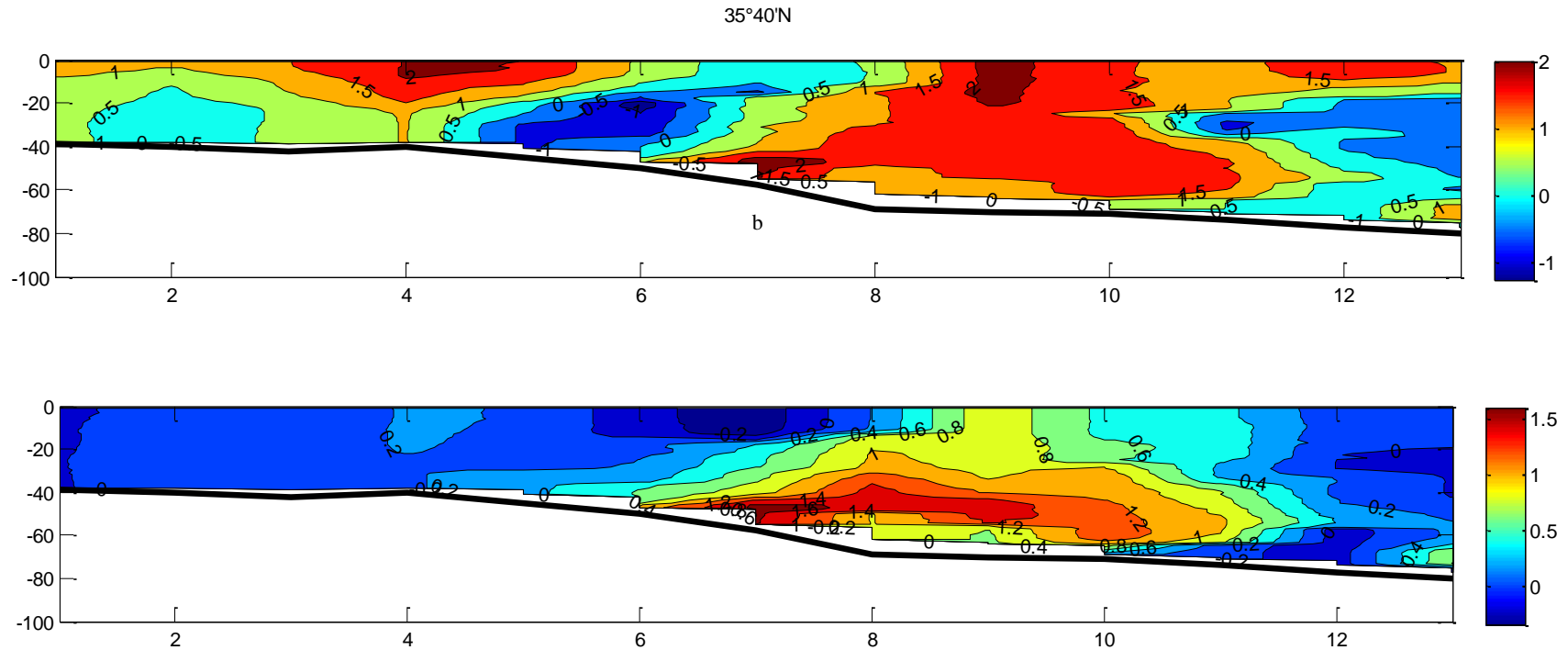
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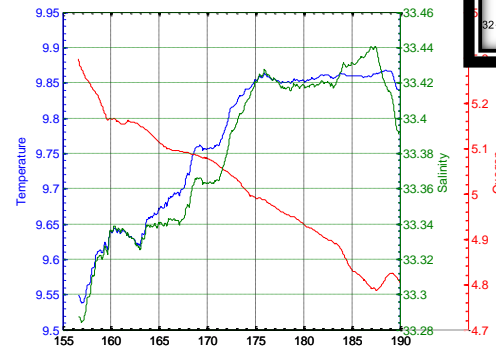
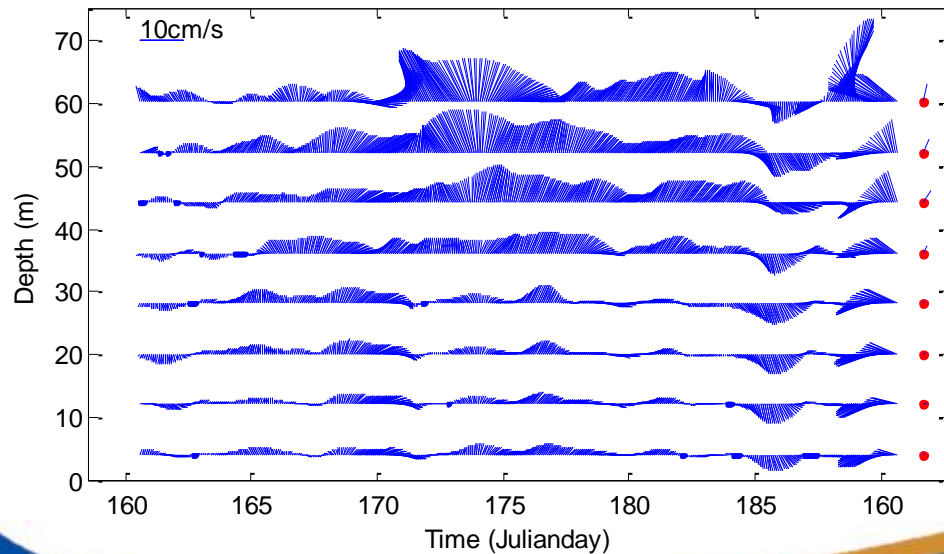
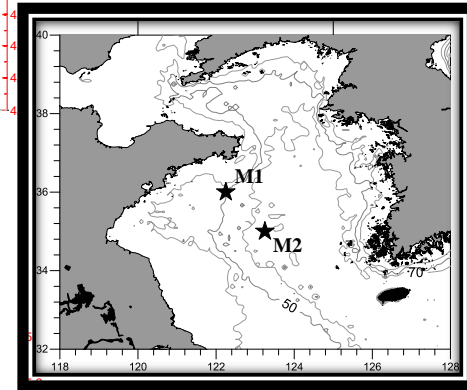
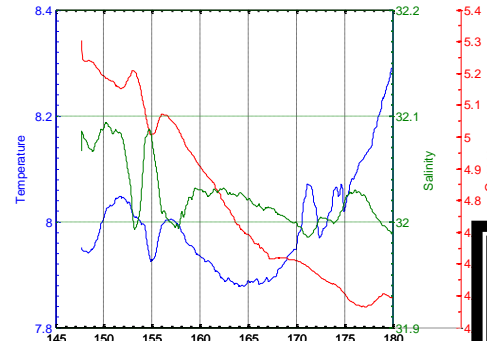
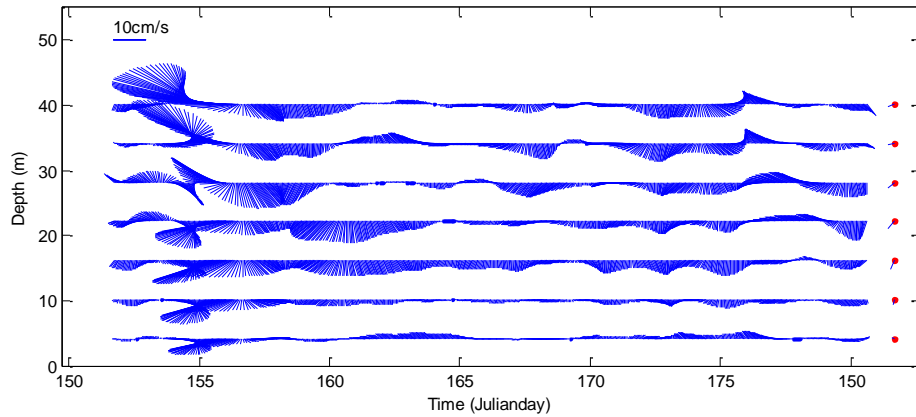
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Difference from winter to spring of (a) temperature and (b) salinity



Discussion



Residual current and T, S, D.O. at station (a) M1 and (b) M2

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Conclusion

(1) The YSWC still exists in the bottom layer in spring. Its northwest branch retreats and the axis of the north branch turns to the east. At the same time, cold and less saline water turns south from Cheng shantou and stretches along the 50-m isobaths. With the YSWM below, it becomes the middle layer cold water and constitutes the QDCWM. In the Subei coastal area, because of its shallow depth, the temperature rises more quickly than in other places.

(2) There are six water masses in the South YS in spring: the SWYSCWM, SWYSLWM, QDCWM, YSWC, the ICWM, and SBCWM. Of these, the QDCWM, YSWC, and ICWM constitute the YWCWM.

(3) The mechanisms of formation of these water masses are very different. The SWYSCWM is affected by continental water, whereas the SWYSLWM and SBCWM are local water masses that are less affected by other waters. The QDCWM derives from cold northern water. The YSWC still exists. Because of the limited data coverage, the mechanism of formation of the ICWM remains unclear.



Thank you!

