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Recent Progresses of China Seas Monitoring by SAR and Optical Sensors (ID. 5316)

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Outline

1 Oil spill monitoring

2 Ship monitoring

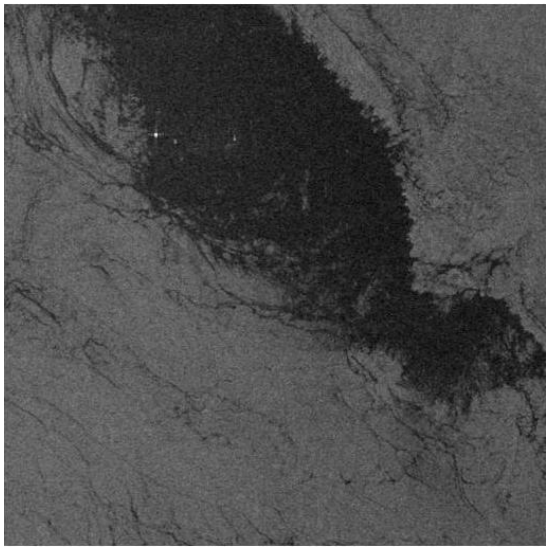
3 Sea ice monitoring

4 Internal wave monitoring

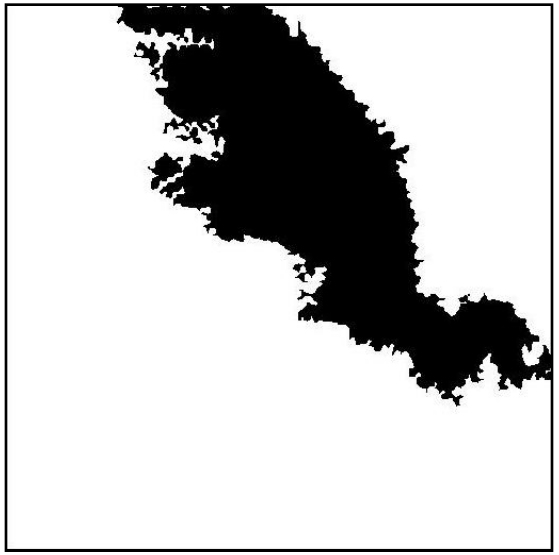
5 Upwelling monitoring

1 Oil spill monitoring

An oil spill detection algorithm was developed based on Fisher's discriminant method. This algorithm uses the characteristics such as averaged NRCS, NRCS deviation, contrast, correlation and discontinuity of the image. Oil spills can be well detected by using this algorithm.



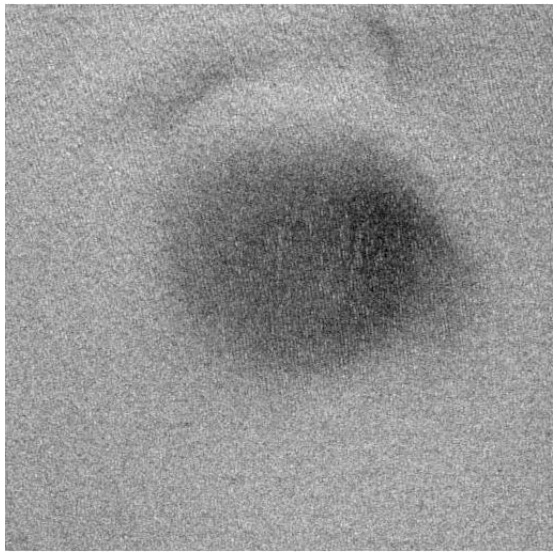
An Envisat ASAR image



Detected oil spills

1 Oil spill monitoring

The look-alikes such as low wind area and natural slicks can be filtered out.



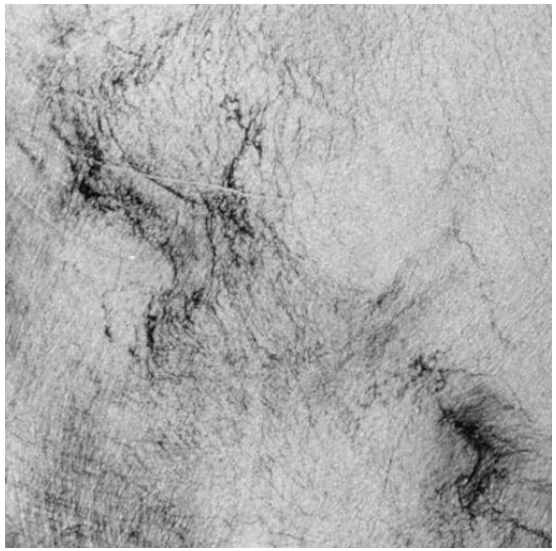
An Envisat ASAR image

No oil spill
(low wind area)

Low wind area was filtered out

1 Oil spill monitoring

The look-alikes such as low wind area and natural slicks can be filtered out.

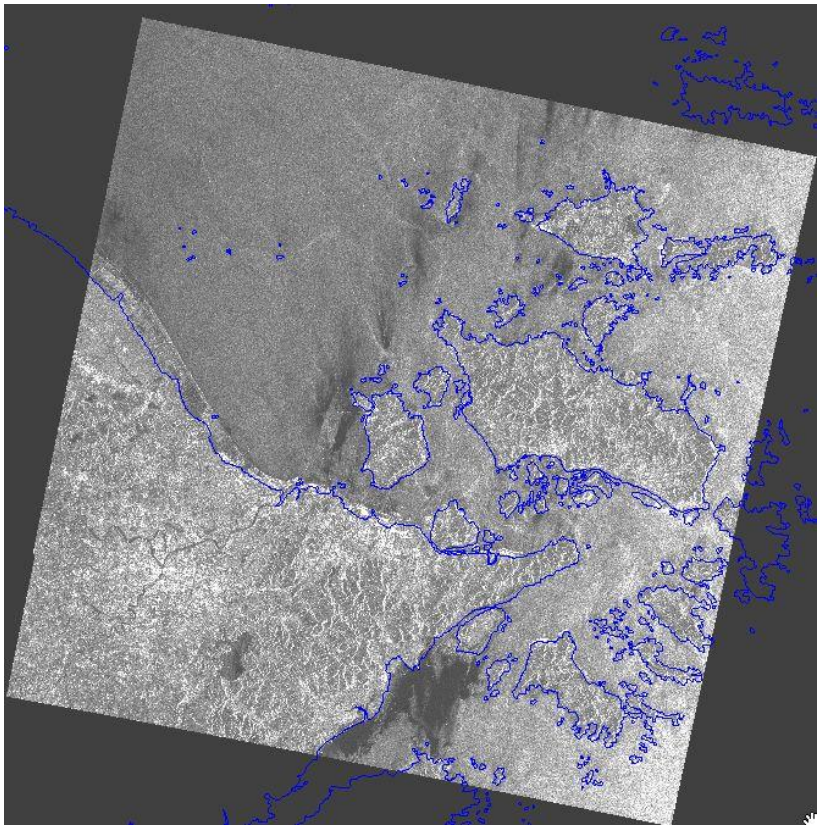


An Envisat ASAR image

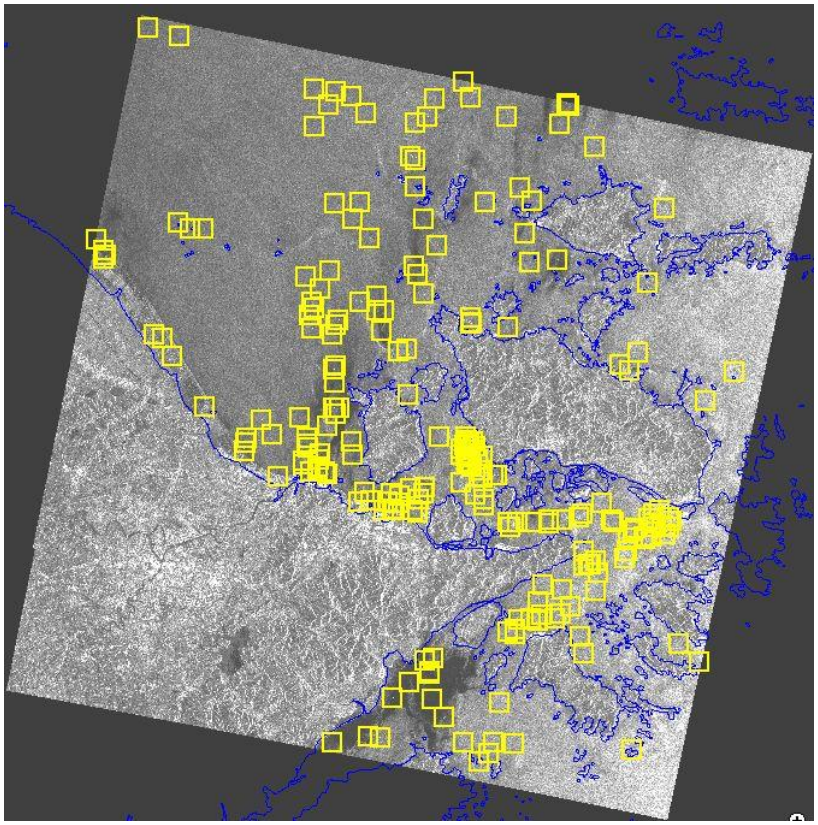
No oil spill
(natural slicks)

Natural slicks were filtered out

2 Ship monitoring

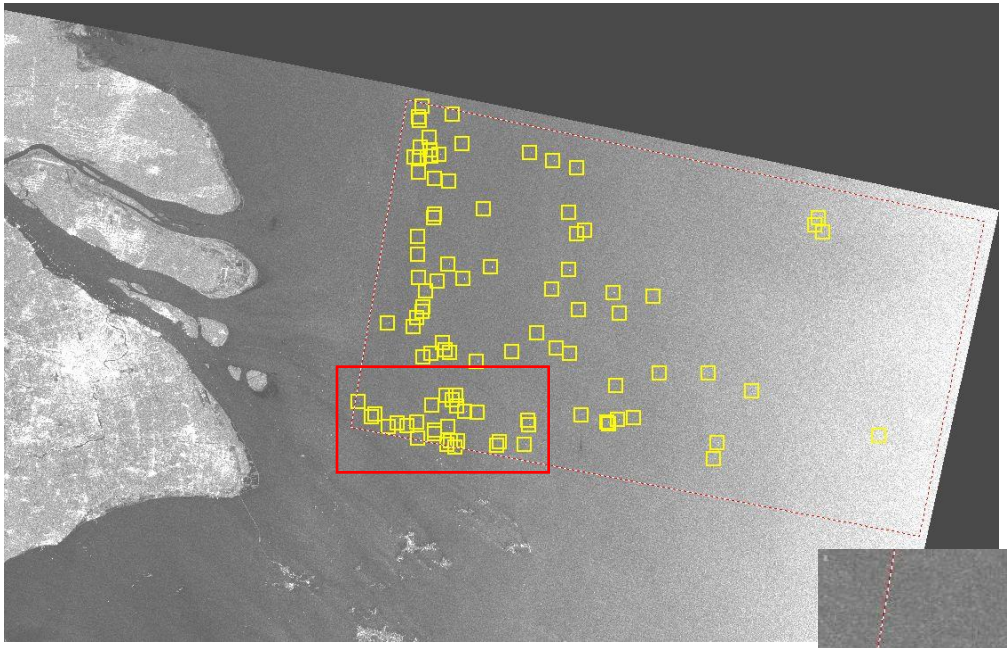


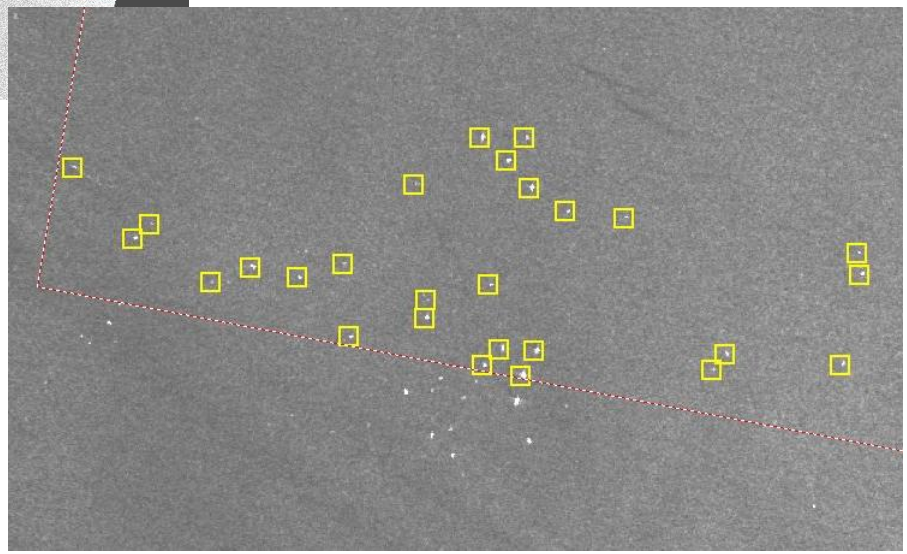
An Envisat ASAR image



Ships detected

2 Ship monitoring





Ships detected from an Envisat ASAR image (up) and zoomed in results (right)

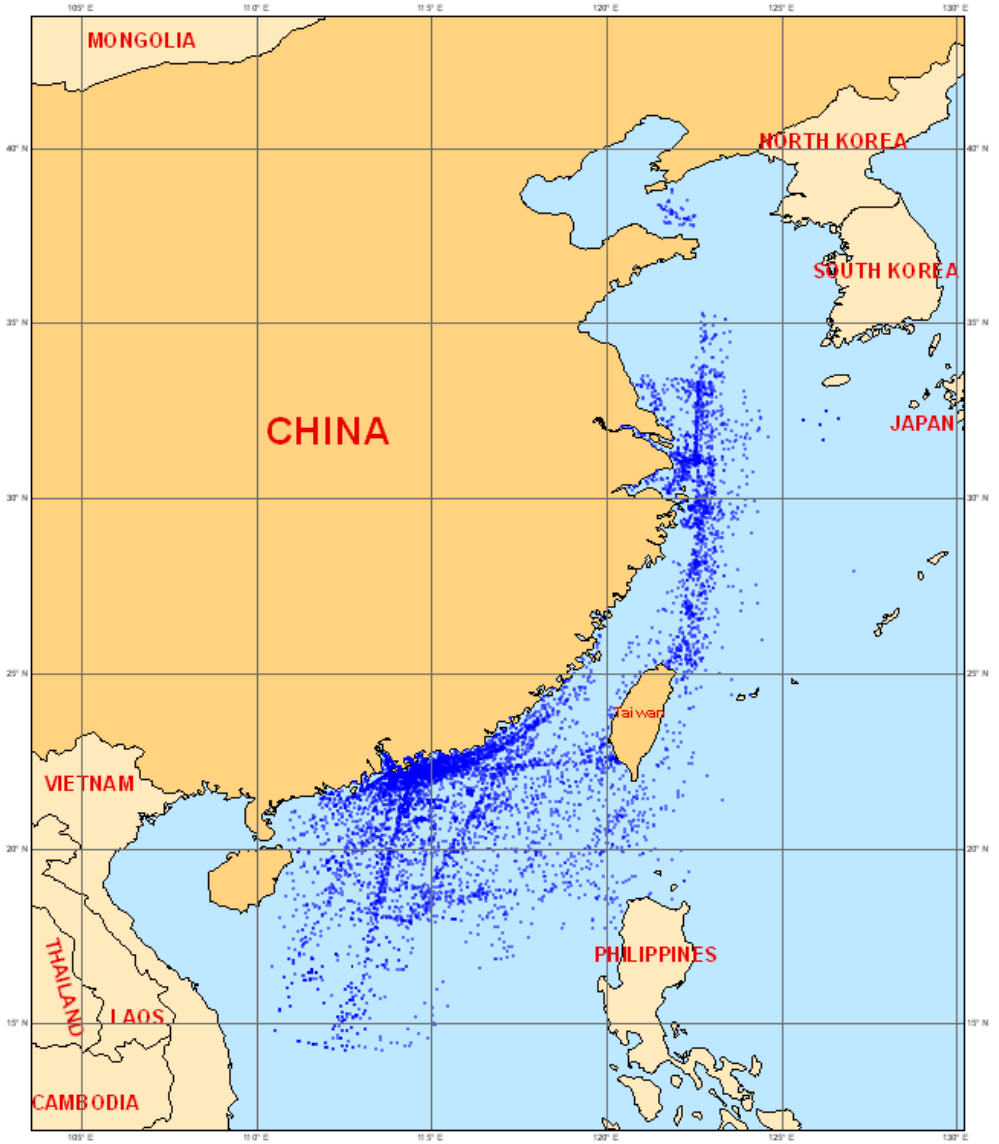
2 Ship monitoring

Validation of ship detection by using AIS system (left) and in situ observation (right)

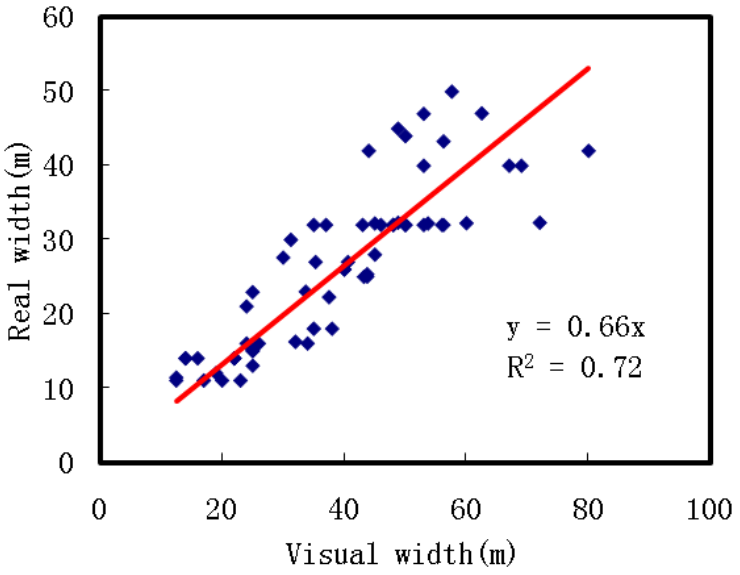
2 Ship monitoring

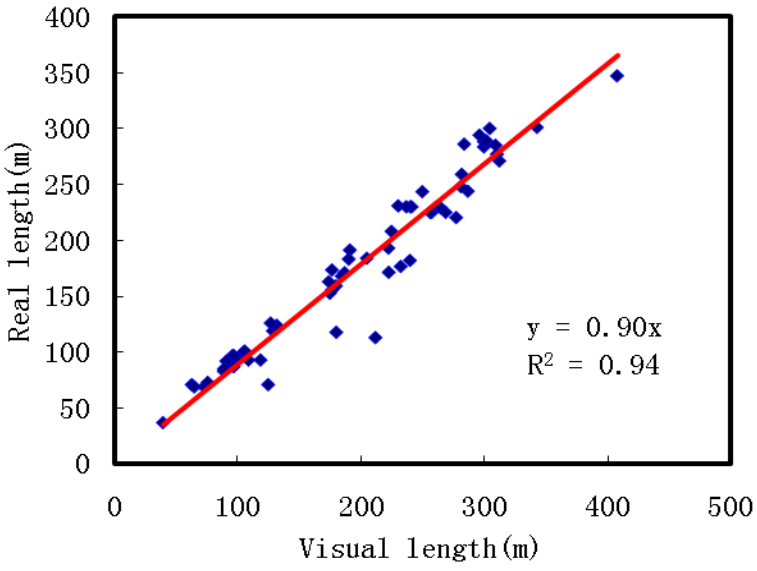
Locations of ships detected from 155 Envisat ASAR images.

Ship routes can be inferred.



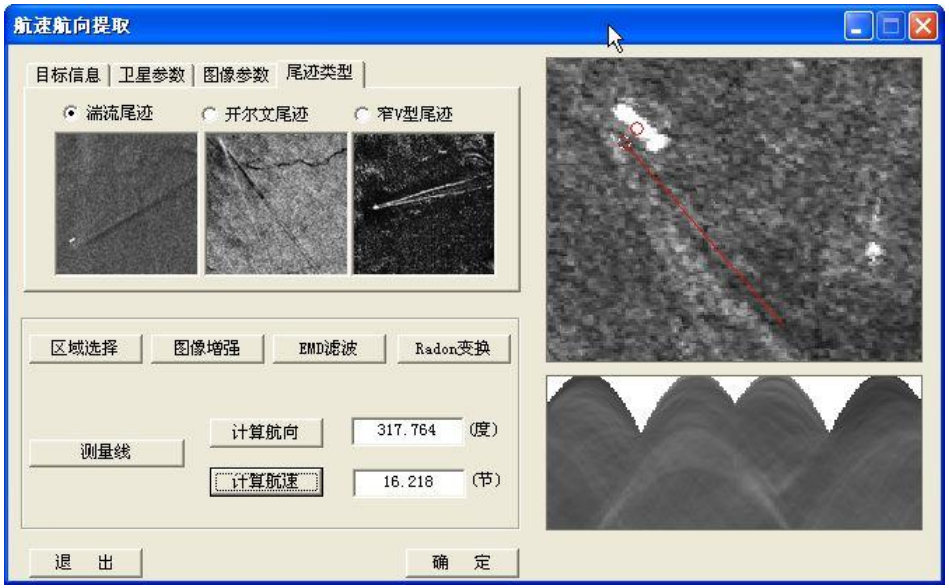
2 Ship monitoring





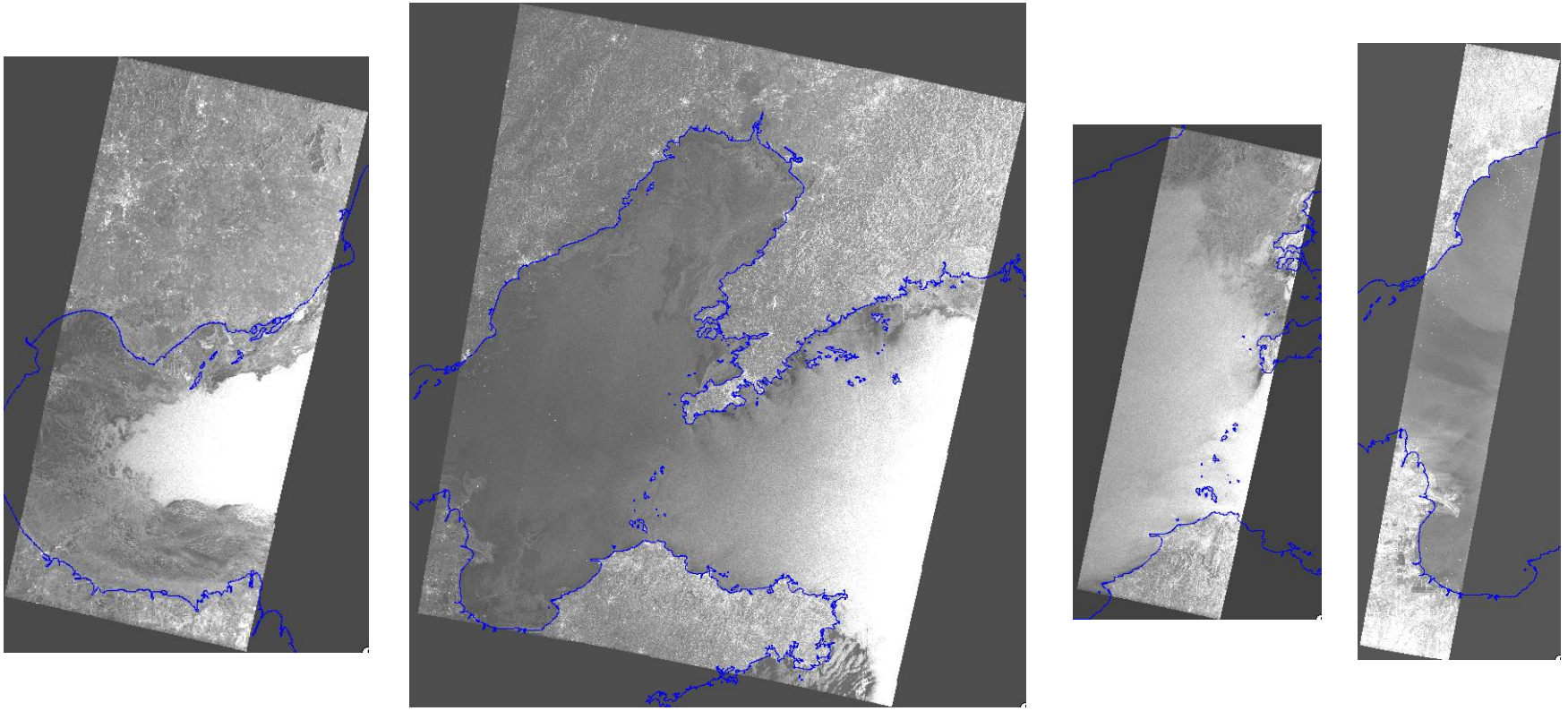
Comparisons between real values and visual values in SAR imagery for ship width measurement (left) and ship length measurement (right).

2 Ship monitoring



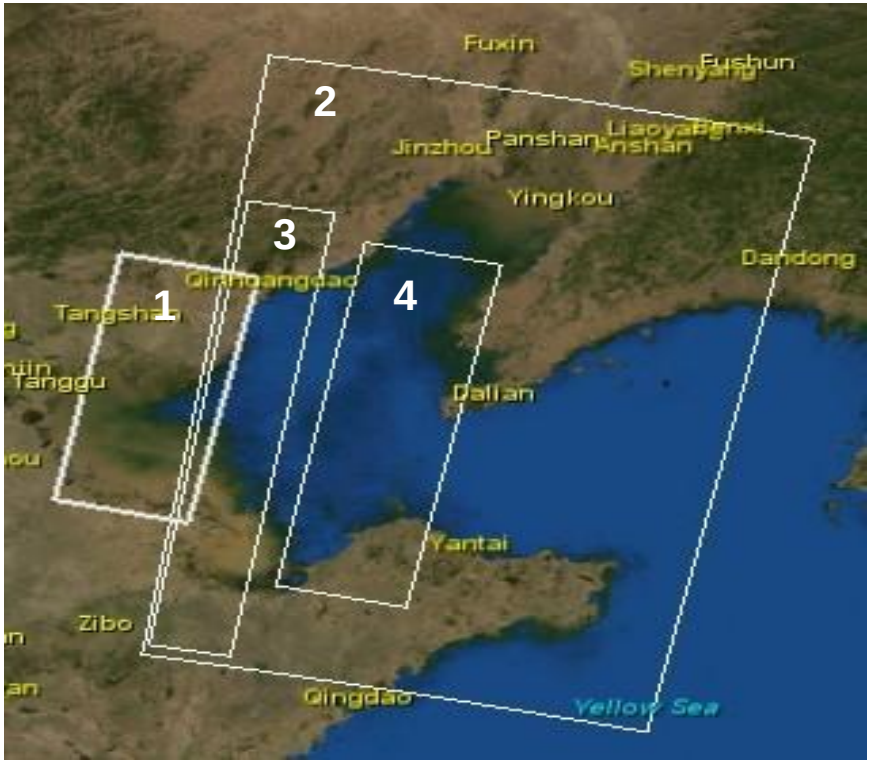
Software interface for ship speed and ship direction measurement.

3 Sea ice monitoring



4 Envisat ASAR images of Bohai sea from Jan. to Mar., 2010.

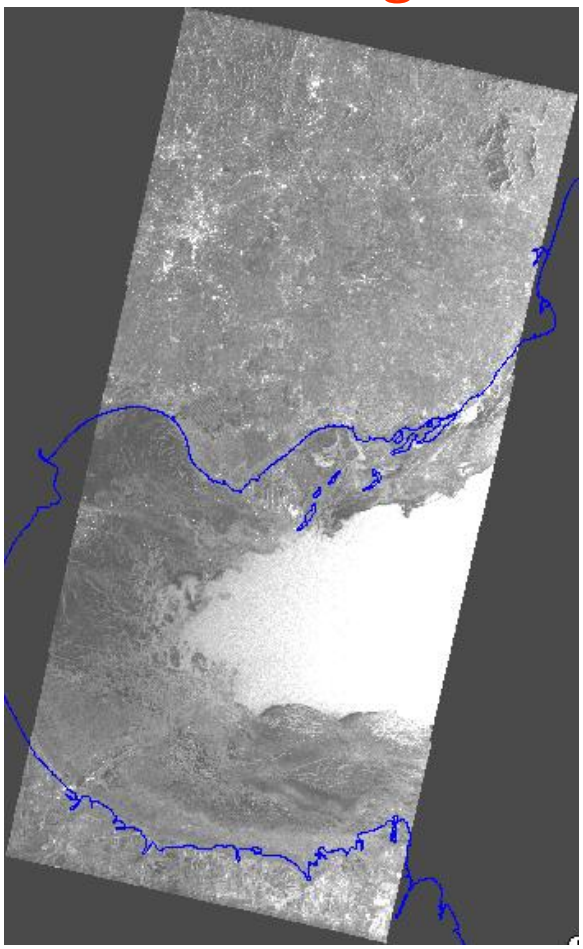
3 Sea ice monitoring

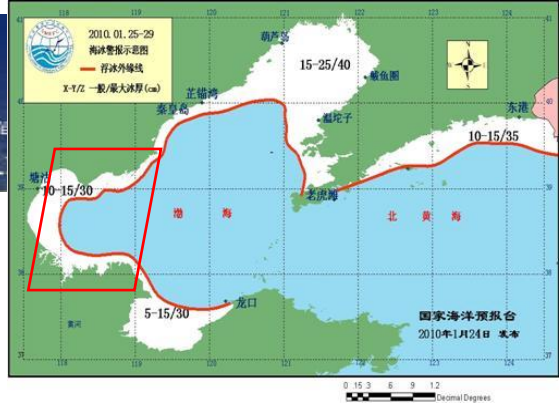


NO.	Mode	Time
1	IM	24, Jan. 2010
2	WS	31, Jan. 2010
3	IM	22, Feb. 2010
4	IM	26, Mar. 2010

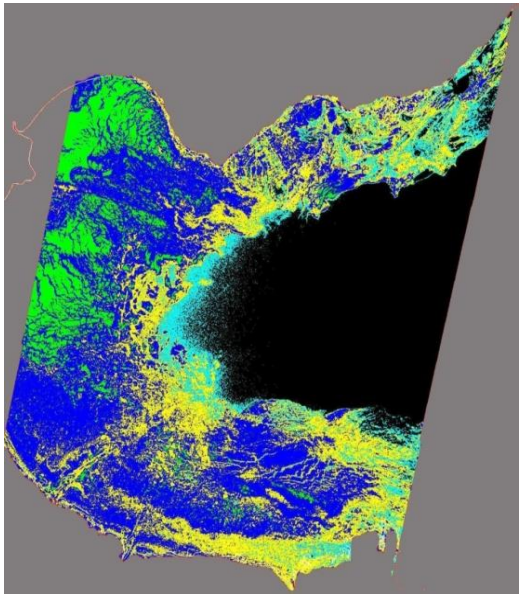
Coverage of 4 Envisat ASAR images of Bohai sea from Jan. to Mar., 2010

3 Sea ice monitoring





Black: water
Yellow: trash ice
Blue and green: ice block

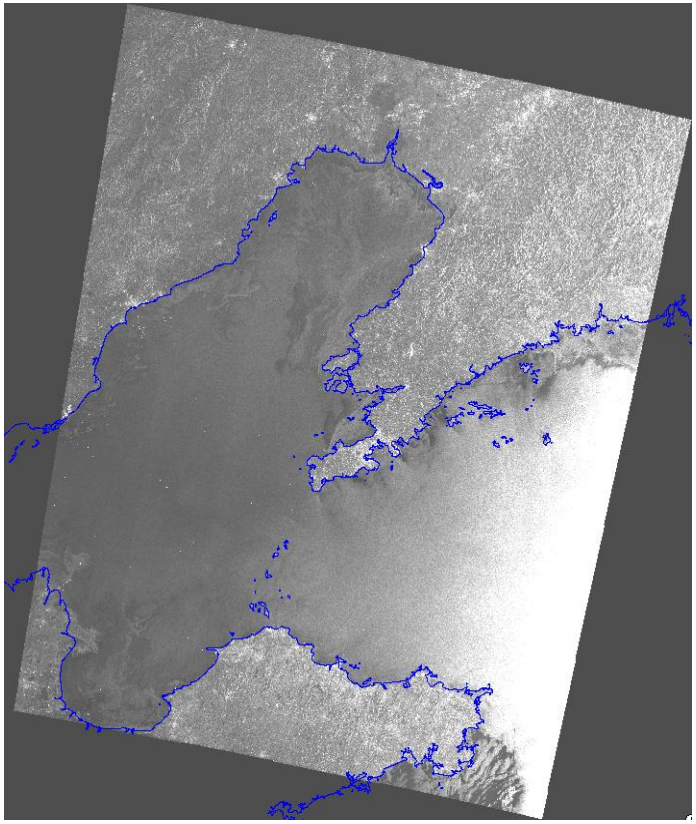


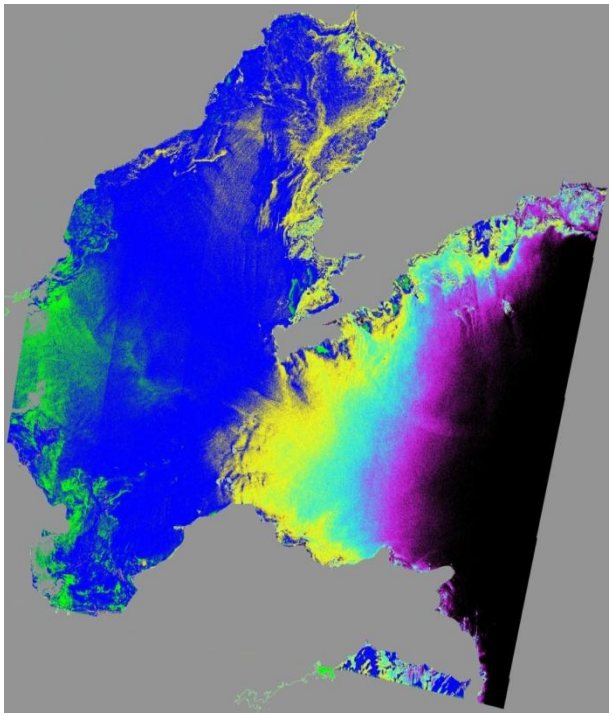
K-Means algorithm was used.

Envisat ASAR image on 24 Jan. 2010 (left), sea ice detection result (right) and forecasting from NMEFC (upper right).

3 Sea ice monitoring

Black: water
Yellow: trash ice
Blue and green: ice block

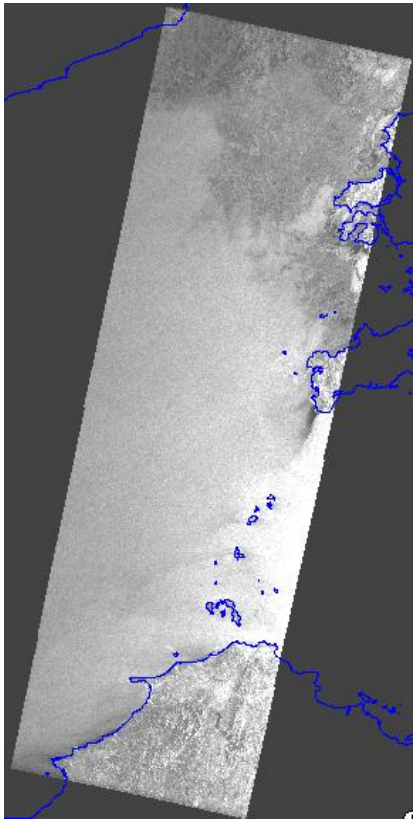


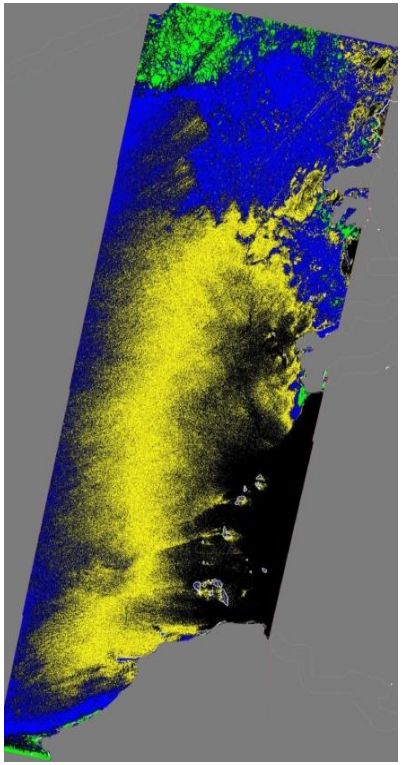


Envisat ASAR image on 31 Jan. 2010 (left), sea ice detection result (right) and forecasting from NMEFC (upper right).

3 Sea ice monitoring

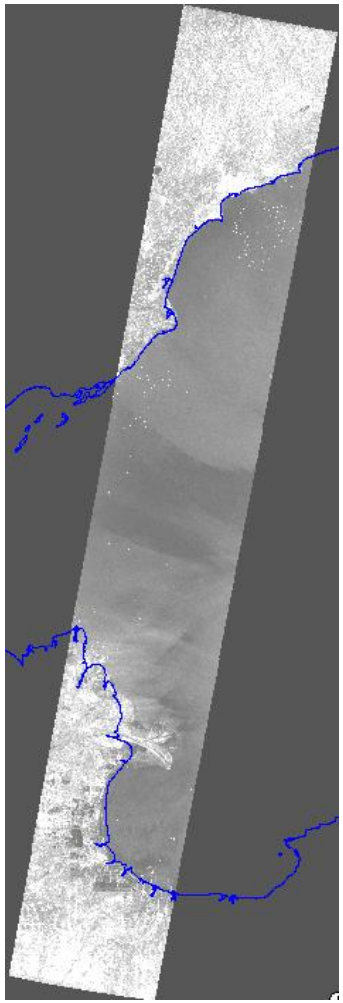
Black: water
Yellow: trash ice
Blue and green: ice block

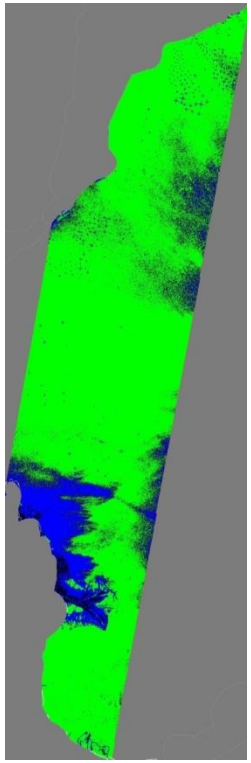


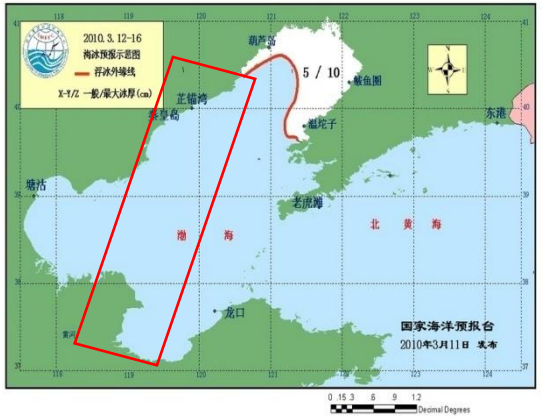


Envisat ASAR image on 22 Feb. 2010 (left), sea ice detection result (right) and forecasting from NMEFC (upper right).

3 Sea ice monitoring







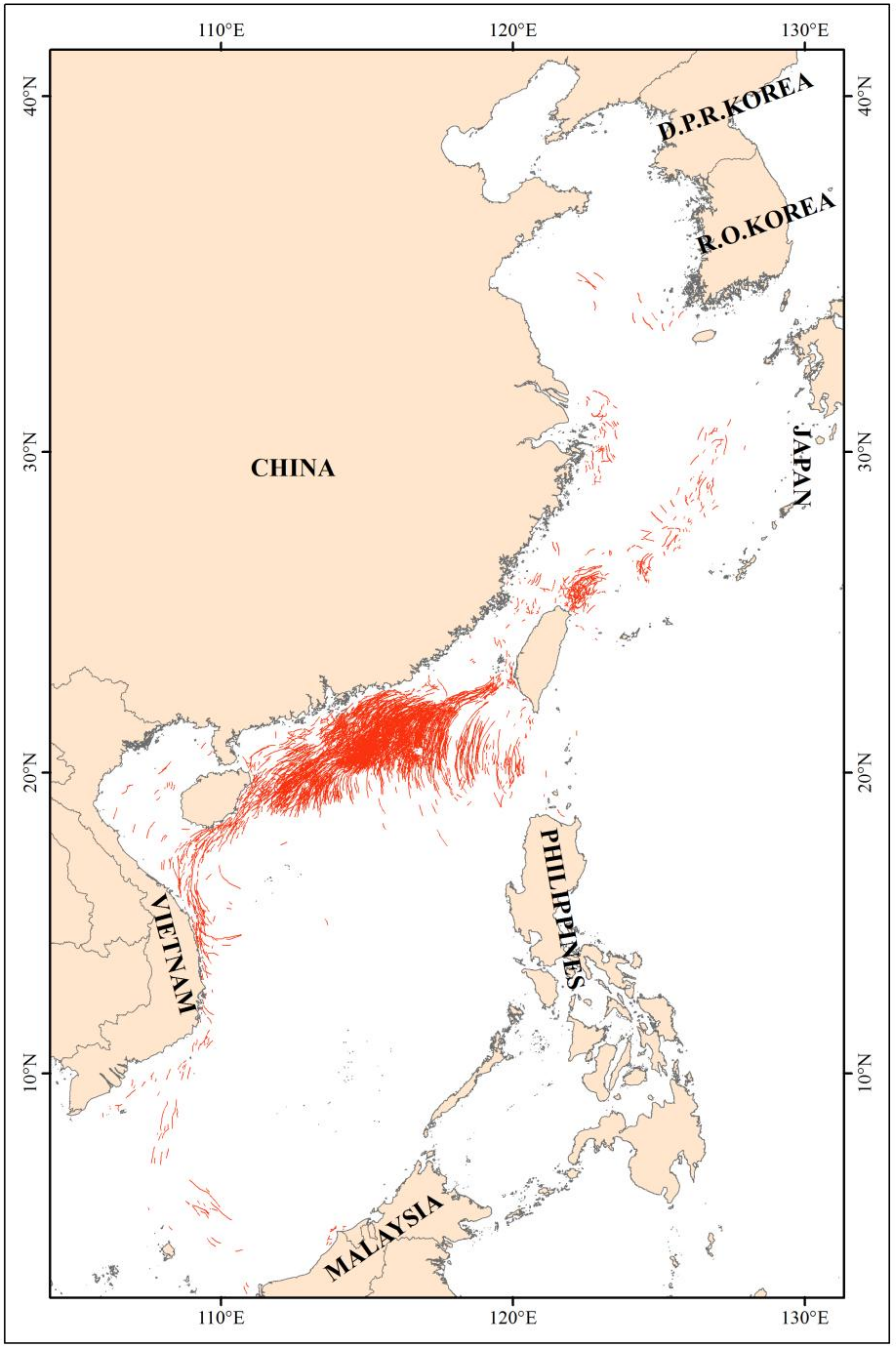
Green: water
Blue: error

Ice has melt in the imagery area.

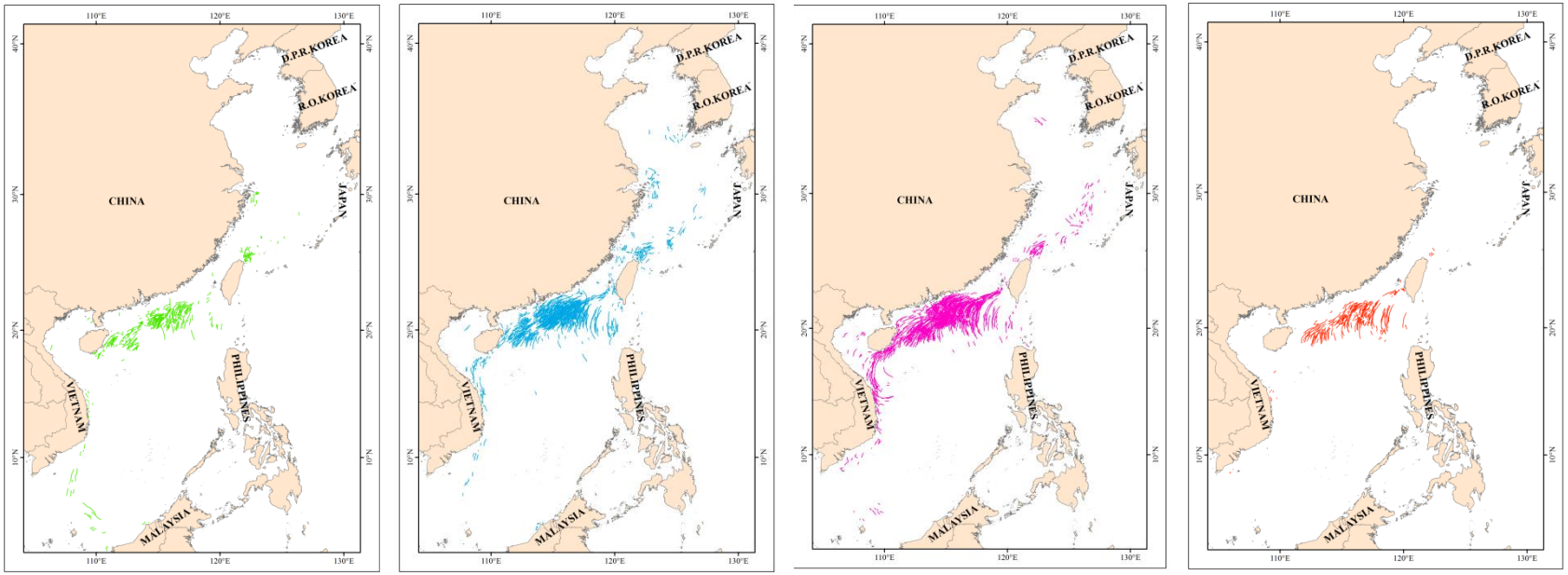
Envisat ASAR image on 26 Mar. 2010 (left), sea ice detection result (right) and forecasting from NMEFC (upper right).

4 Internal wave monitoring

Distribution map of ocean internal waves in China Seas and adjacent waters based on ERS SAR and Envisat ASAR images.



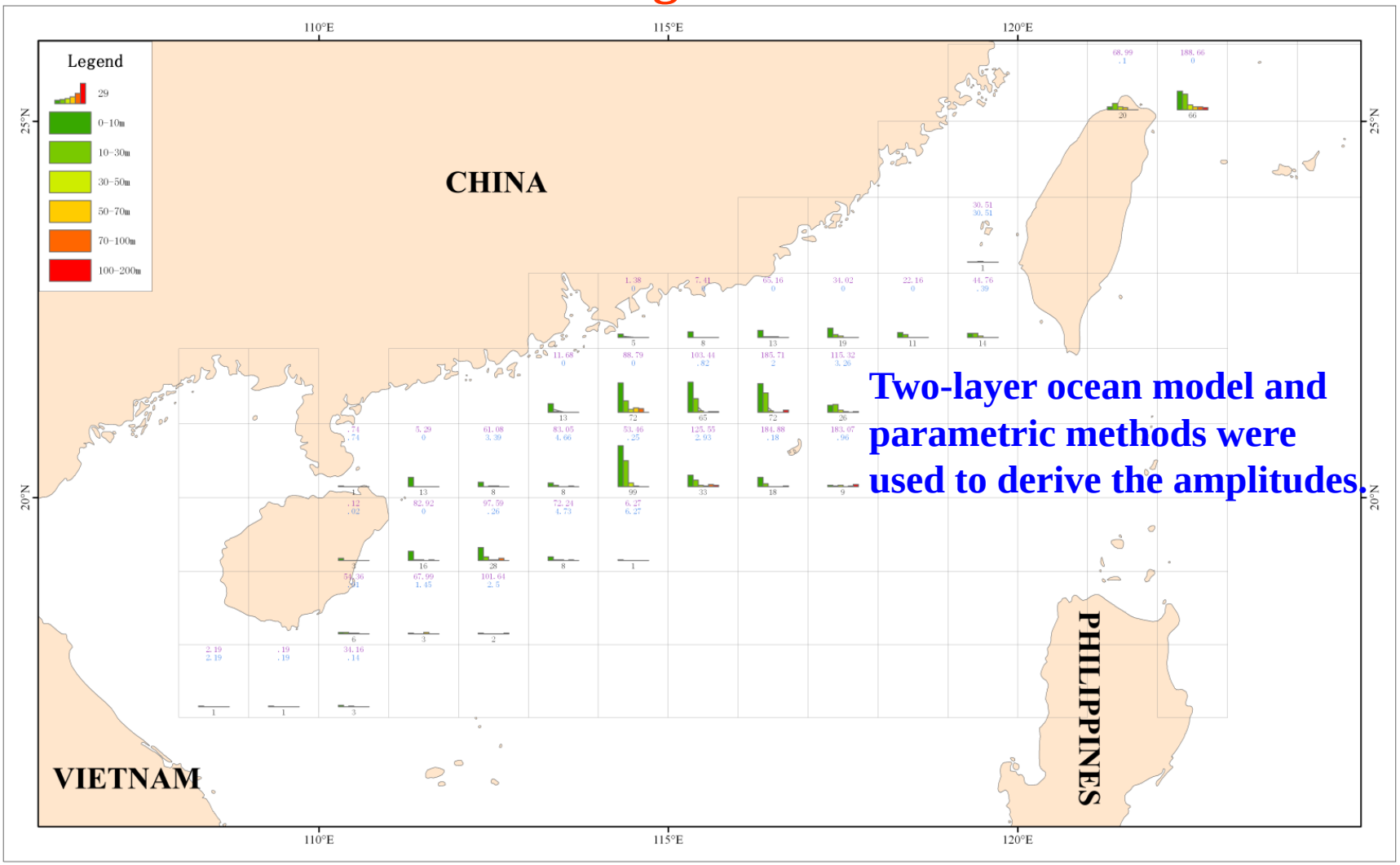
4 Internal wave monitoring



spring summer autumn winter

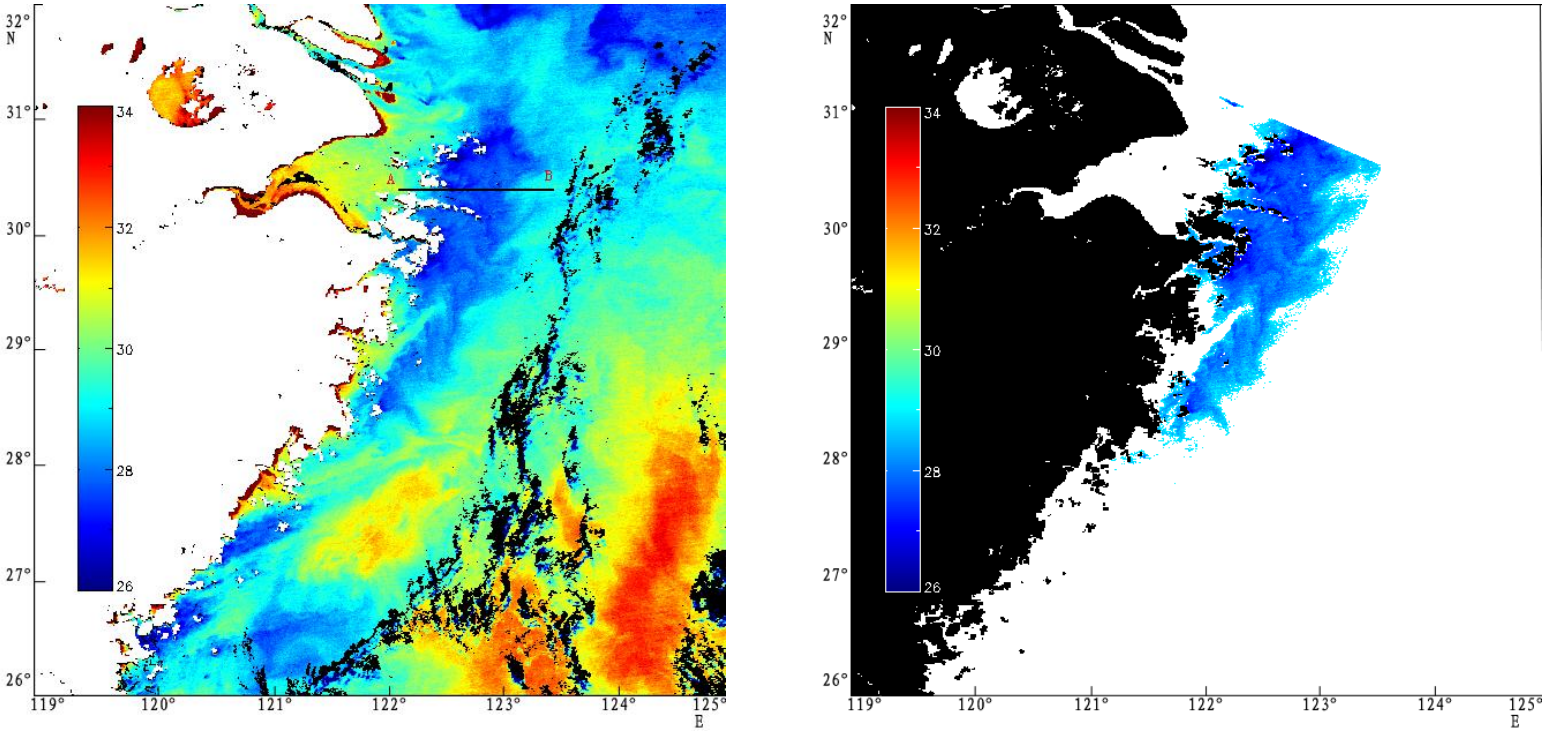
Seasonal distribution of ocean internal waves in China Seas and adjacent waters based on ERS SAR and Envisat ASAR images.

4 Internal wave monitoring



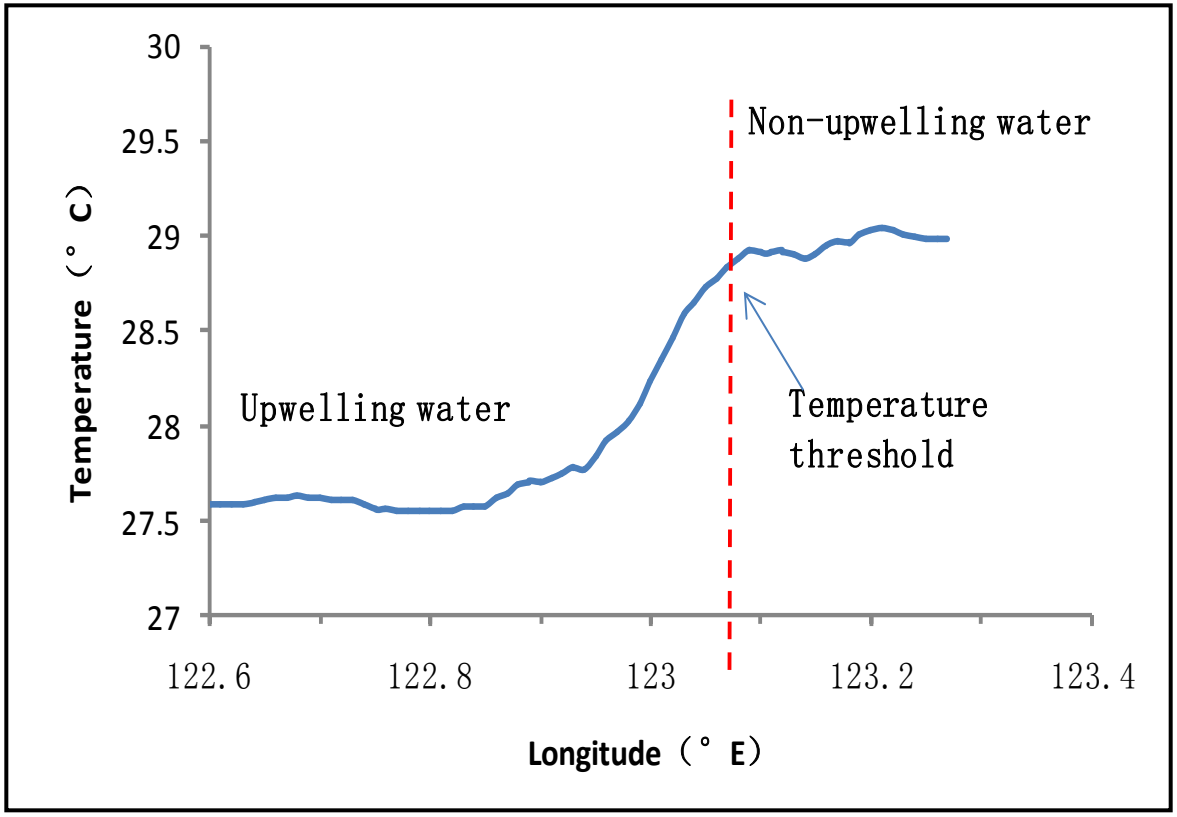
Frequency and amplitude distribution of ocean internal waves in China Seas and adjacent waters based on ERS SAR and Envisat ASAR images.

5 Upwelling monitoring



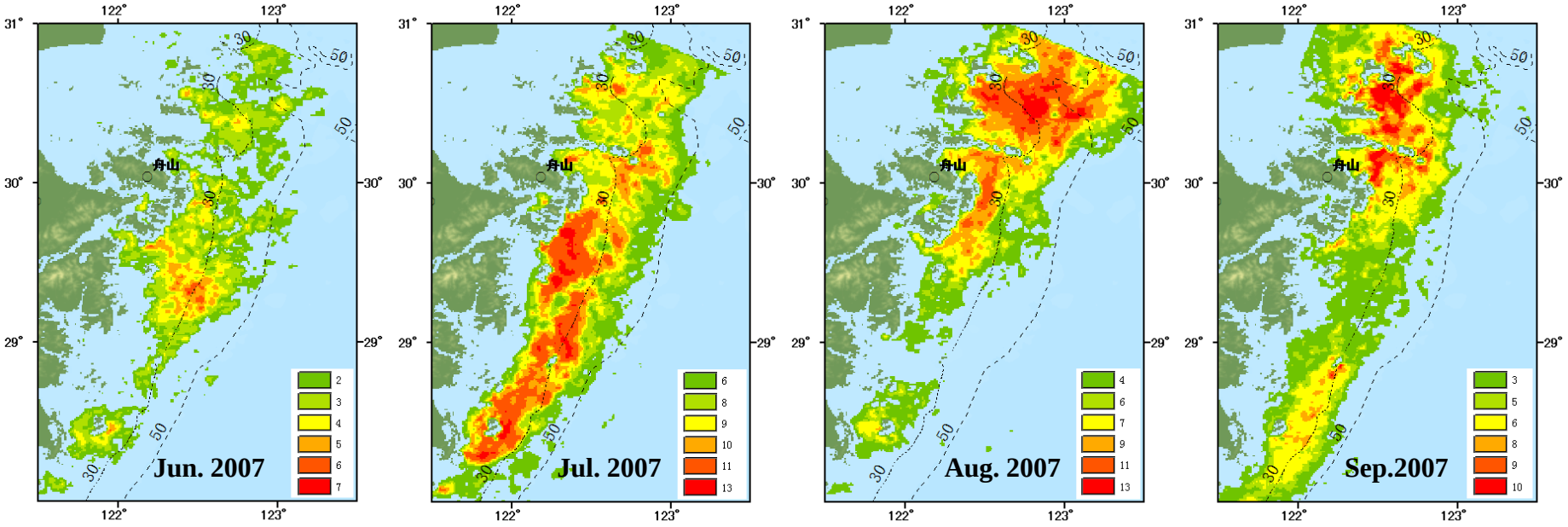
A color enhanced SST image (from MODIS) of the Zhejiang Coastal Waters (left) and detected upwelling area (right)

5 Upwelling monitoring



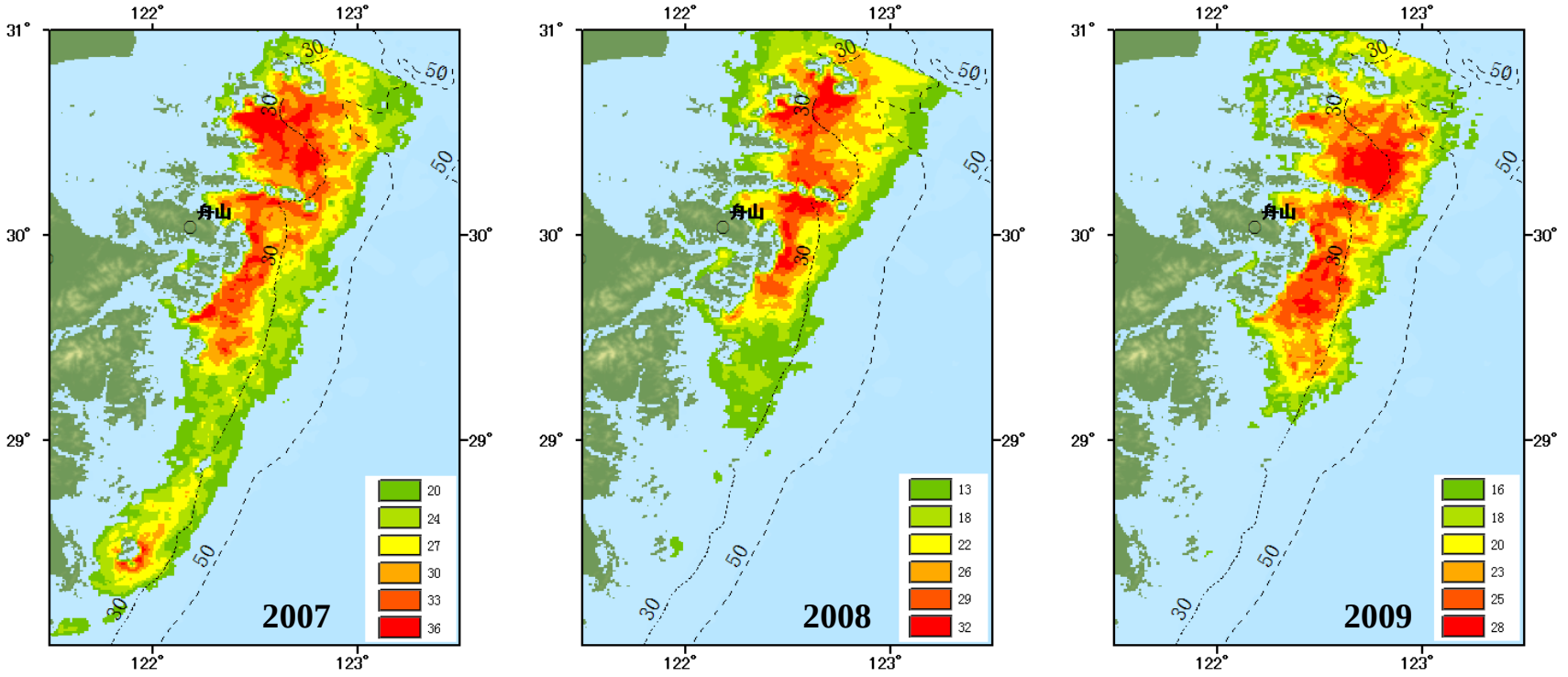
Temperature threshold for upwelling detection in the coastal waters of Zhejiang province.

5 Upwelling monitoring



Spatial cumulative frequency map of the Zhejiang Coastal Upwelling from Jun. to Sep., 2007 with black broken isobathic lines.

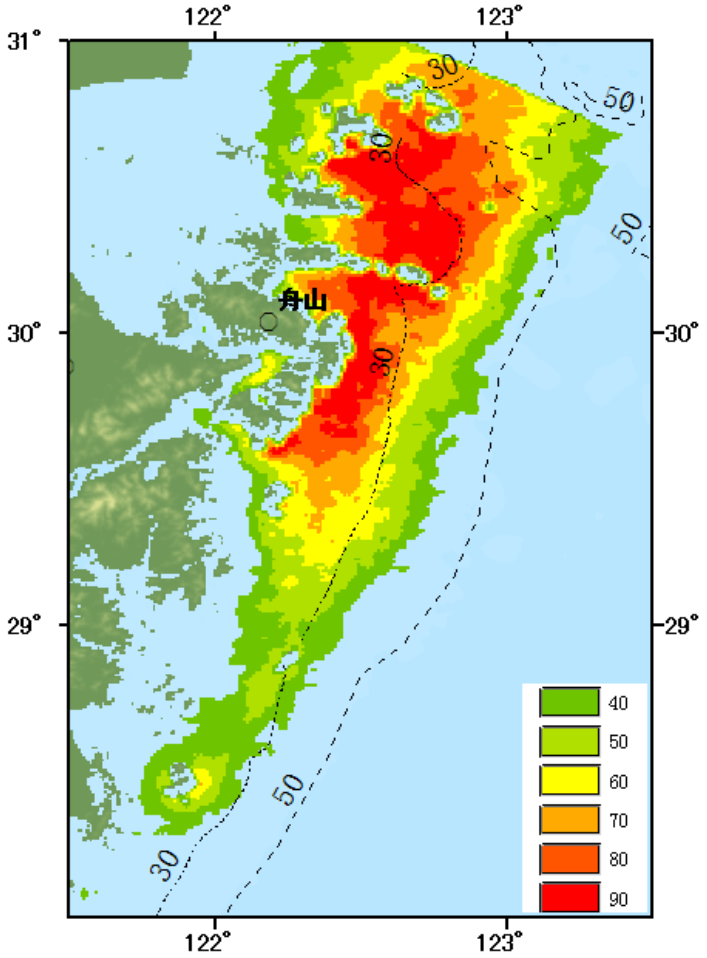
5 Upwelling monitoring



Spatial cumulative frequency map of the Zhejiang Coastal Upwelling for 2007, 2008 and 2009 with black broken isobathic lines.

5 Upwelling monitoring

Spatial cumulative frequency map of the Zhejiang Coastal Upwelling during 2007~ 2009 with black broken isobathic lines.



Thanks for your attention!