20 East China Sea

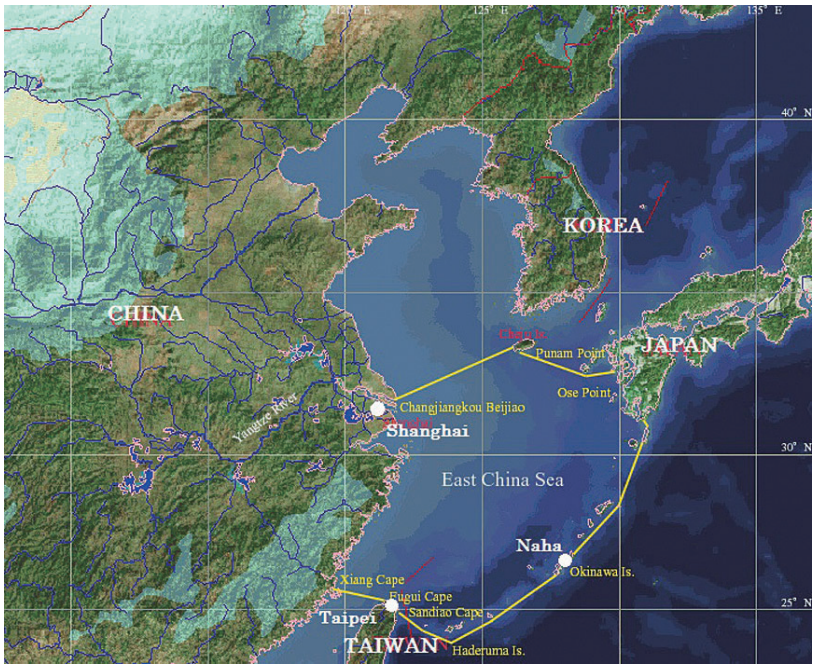
Overview

The East China Sea is one of the largest marginal seas in the world. Its surface area covers 735,800 ㎢. This region receives a tremendous inflow of freshwater and terrestrial sediments, mainly from mainland China. In the eastern part of the sea, the Kuroshio Current flows northward along the continental slope, effectively isolating the sea from the open Northwest Pacific Ocean. This provides the approximate limits of the region at 24°-30°N and 118°-130°E. The East China Sea is connected with the South China Sea, the Yellow Sea, the Sea of Japan and the Pacific Ocean.[2,8]

Location

Basic information[8]

Surface area : 735,800 ㎢
Volume : 128,765 ㎢
Average depth : 175 m
Maximum depth : 2,717 m



Nature

< Background >

The East China Sea has a catchment area of about 1,900,000 ㎢. The East China Sea is important for its spawning and nursery grounds for many pelagic fish.[3] The length from the northeast to southwest of the East China Sea is approximately 1,300 km. The width from the east to west is approximately 740 ㎢.[2]

Climate

Shanghai, the largest city facing the East China Sea, enjoys a pleasant northern, subtropical maritime monsoon climate with four distinct seasons. Influenced by the hot air currents from the Pacific Ocean, the East Asia subtropical monsoon sub region is warmer and humid in summer, but colder and drier in winter because of the influence of Mongolian high-pressure systems. The East China Sea area is also affected by typhoons and cyclones. The annual mean temperature is 16-18 ℃. The maximum monthly temperature is in July with temperatures exceeding 28 ℃, with the minimum monthly temperature of 4-6 ℃ in January. At the mouth of the river, the annual average rainfall is about 1,000 ㎜. On average, about 60-80% of rainfall occurs in the summer.[2]

Topography

The major part of the East China Sea sits on top of a shallow continental shelf. The shelf stretches out towards the Pacific Ocean until it reaches a deep trough located inside of the Nansei Islands.

Hydrology

In the East China Sea, the northeast flow of the Kuroshio Current limits the transport of East China Sea shelf waters to the Northwest Pacific Ocean. The Kuroshio enters the East China Sea from the northeast region of Taiwan and flows along the Okinawa Trough; it then turns to the east and leaves the East China Sea, joining the North Pacific Ocean at about 30°N through the Tokara Strait.

The Taiwan Warm Current is formed by water from the Taiwan Strait and the upwelling of the Kuroshio at the northeast corner of Taiwan. The Taiwan Warm Current occupies the broad shelf of the East China Sea, and affects the region off the Yangtze River estuary at water depths of 50 m, inducing local upwelling along the coast in the summer when the south monsoon prevails.[2]

< Surrounding environment >

Biota

There are four types of fish which inhabit the East China Sea: tropical species (61% of all species), warm water species (37% of the total), cold-temperate species (8 species), and cold-water species (only 1 species of Cololabis saira). There are also more than 10 species of anadromous fishes which inhabit coastal waters and swim to the estuaries or upper river areas to spawn. Many fish species inhabit the Yangtze River system, which has 370 species.[2]

History and Culture

Shanghai, the largest city in the East China Sea, began more than 1,000 years ago as a fishing village. It was officially designated as a market town in 1074 and a market city in 1159. The main activities at the time were fishing, farming, crafts, commerce and shipping. Shanghai continued to grow during the Ming dynasty (1368-1644). Near the beginning of the 15th century, when Shanghai had an estimated 64,000 households, a new channel was cut north to the Yangtze to permit better drainage and to keep the outlet to the Yangtze and the East China Sea from filling with silt. This also provided a much more reliable and shorter channel for river traffic to the Yangtze.

Shanghai grew rapidly during the Qing dynasty (1644-1911), when the development and use of cotton as a fabric material became widespread. By the 18th century, the city was a prosperous center of cotton farming, and fabric and garment production.

The Opium War between Britain and China ended with the Treaty of Nanjing in 1842, and a supplementary agreement was signed in 1843. As a result, China was forced to open Shanghai to British trade and residence. Other countries demanded and received similar privileges. British, French and American citizens were awarded small territorial zones north of the original-walled Chinese city. While there was some development and expansion, the foreign community numbered only a few hundred individuals until the late 19th century.[4]

Shanghai has achieved a rapid and sustained growth since the late 1970s when China began its economic reform. During 1978-2000, the city's GDP achieved a 6.5 times increase and reached 48.75 billion U.S. dollars, with an annual growth rate of 9.5%.[3] In 2014, Shanghai's GDP amounted to 380 billion U.S. dollars.[7] The city has evolved from an industrial and commercial city into a national economic center.[3]

Social Environment

< Population >

Compared to the overall population of China that was 1.35 billion in 2011, the East China Sea coastal region had about 300 million people, increasing 9.6% compared to 2000. The population of the Yangtze River basin makes up about 40% of the country's total. In addition, the population of the East China sea coastal region is characterized by a young age structure. This trend is more significant in less developed provinces such as Jiangxi. But Shanghai has 8.28% of its population under age 15, which shows a trend toward a falling birthrate.[2,7]

Table: Population structure in the East China Sea region.[7]

Region	Population	Age 0-14		Age 15-64		Age 65 and over	
	(million)	(million)	(%)	(million)	(%)	(million)	(%)
Shanghai	20.06	1.66	8.28	16.82	83.85	1.58	7.88
Jiangsu	67.49	8.77	12.99	51.42	76.19	7.30	10.82
Zhejiang	46.67	5.89	12.62	36.79	78.81	4.00	8.57
Anhui	50.99	9.19	18.02	36.46	71.50	5.34	10.47
Fujian	31.78	5.01	15.76	24.34	76.56	2.44	7.68
Jiangxi	38.35	8.23	21.47	27.19	70.92	2.92	7.62
Taiwan	23.23	3.50	15.08	17.20	74.04	2.53	10.89

< Industry >

Eastern China is experiencing rapid industrialization. Fishing activities have been conducted for a long period by China in this area. Aquaculture is also a growing economic activity in the region.

Environmental Problems

< Water and sediment quality >

Water quality

Population growth, urbanization and industrialization have accelerated environmental pollution and water quality deterioration. The rivers in Shanghai have been seriously polluted, with more than 92.2% of the river sections monitored containing water that was not acceptable for domestic use. Pollution of the Yangtze River drainage basin is an important problem too, especially in the delta area. In the area adjacent to the Yangtze River Estuary, hypoxia is a problem. The estuary receives flows from various land-based pollution sources, which may alter the ecosystem.[2]

Sediment quality

The sediment quality in the coastal area off Shanghai is not seriously polluted as a whole. In the coastal area of the Shanghai, petroleum hydrocarbons (20.70 mg/kg-wet) in *Bullacta exarata* exceeds grade Ⅰ[1] for biological standards, and copper (Cu) (33.60 mg/kg-wet) exceeds the grade Ⅱ standard. Heavy metals such as zinc (Zn), Cu, and petroleum hydrocarbons, in

[1] Grade Ⅰ is the water quality standard with the most strict standard levels

the oyster area near Yangtze River estuary all exceed the standards, with petroleum hydrocarbons and DDT exceeding grade Ⅱ, and Cu and Zn exceeding grade Ⅲ.[2]

Eutrophication

Since the 1980s, the use of chemical fertilizer has greatly increased, while aquaculture is also expanding. The loss of nutrients from these activities and the run-off of organic substances, nitrogen and phosphorus have caused eutrophication to be ubiquitous in rivers, lakes and the coastal sea. The main source of nitrogen is run-off from agriculture, while most phosphorus comes from domestic sewage and industrial wastewater discharges.[1]

< Environmental Protection Measures >

Environmental Protection Law of the People's Republic of China

In 2014, China has considered and passed the Environmental Protection Act amendment to stop and improve the deterioration of ecological environment due to rapid economic growth. The Environmental Protection Law of the People's Republic of China is a national law formulated for the purpose of protecting and improving environment, preventing and controlling pollution and other public hazards, safeguarding public health, promoting ecological civilization improvement and facilitating sustainable economic and social development.

The amended Law, adopted at the 8th Meeting of the Standing Committee of the Twelfth National People's Congress of the People's Republic of China on April 24, 2014, entered into force on January 1, 2015. A "strengthening of enforcement authority by environmental protection administrative department" and "accountability to the administrative department that does not respond appropriately to environmental pollution" was added to this revised law. This Law defines an ecological redline for strict protection on key ecological functional zones, and areas of sensitive and fragile ecological environment.

In accordance with this law, citizens, legal persons and other organizations have the right to obtain environmental information, participate and supervise the activities of environment protection.[5]

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