

# 9 Bohai Sea

## Overview

The Bohai Sea is China's only semi-enclosed inland sea. It is surrounded by Liaodong Peninsula, the North China Plain and Shandong Peninsula. It is located at  $117^{\circ}35' \sim 121^{\circ}10'E$  and  $37^{\circ}07' \sim 41^{\circ}N$ , (the area west of the line linking Laotieshan in Liaodong Peninsula and Penglai, north of Shandong Peninsula), and is adjacent to the Yellow Sea to the east.<sup>1</sup>

## Location

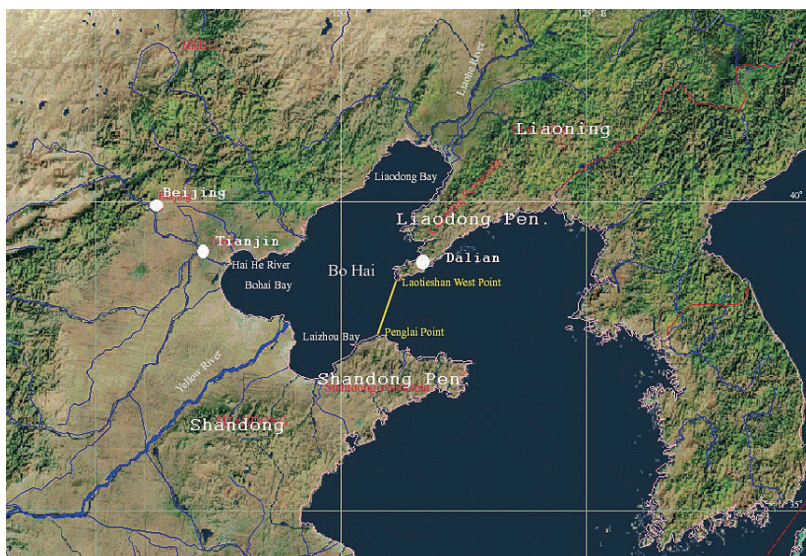
### Basic information<sup>10</sup>

Surface area : 77,284 km<sup>2</sup>

Volume : 2,009 km<sup>3</sup>

Average depth : 26 m

Maximum depth : 85 m



## Nature

### < Background >

The Bohai sea has a catchment area of 1,400,000 km<sup>2</sup>.<sup>2,3</sup>

It is the inner most gulf of the Yellow Sea in northeastern China bordering the Liaoning Peninsula to the east and the Shandong Peninsula to the south. The Bohai Sea consists of three bays: Laizhou Bay to the south; Liaodong Bay to the north; and Bohai Bay to the west. Three large rivers, the Yellow River, the Liao River and the Hai River drain into the Bohai Sea. The Bohai Sea is an ecologically important and stressed body of water. Its marine resources are important to China, Japan, and North and South Korea.<sup>4</sup>

### Climate

Its location in the north temperature zone gives Bohai Sea an average annual temperature of around 8-11 °C, with an average water temperature of around 1-2 °C in winter and 24-26 °C in summer. Annual precipitation is around 300-400 mm.<sup>1</sup>

### Topography

The Bohai Sea has an average water depth of 26 m, a maximum water depth of 85 m, and the majority of the sea area is shallow water with less than 20 m depth. Bohai Sea has an area of 77,284 km<sup>2</sup>, which includes Bohai, Laizhou and Liaodong Bays.<sup>1</sup>

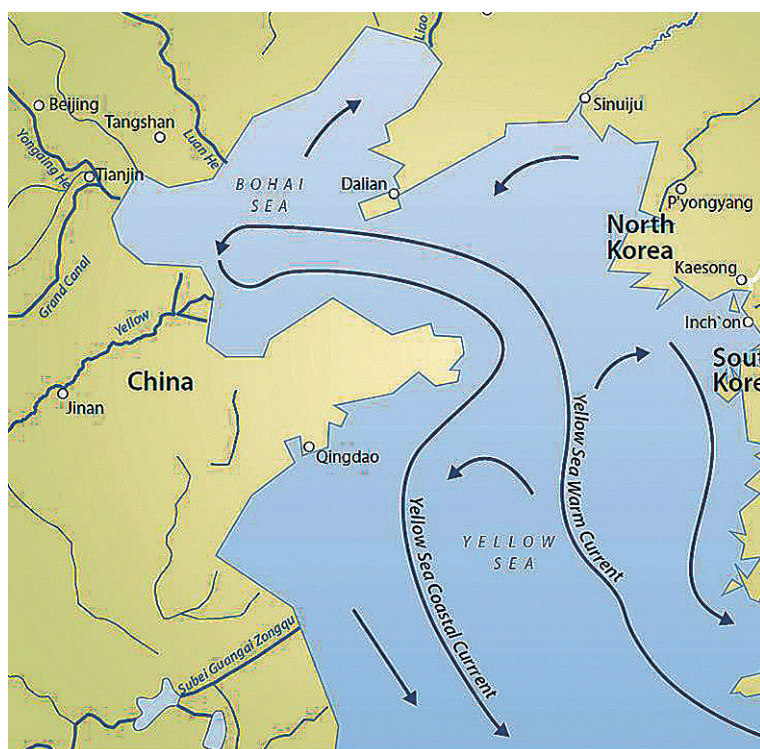
### Hydrology

Water circulation in the Yellow sea is mainly comprised of the Yellow Sea Warm Current and the Yellow Sea Coastal Current. The Yellow Sea Warm Current is a branch of the Tsushima Warm Current, which comes from the East China Sea carrying relatively high salinity (>33 ppt) and high-temperature (>12 °C) water flowing into the Bohai Sea in the winter as can be seen in the right figure.<sup>4</sup>

### < Surrounding environment >

#### Habitat

The natural wetland ecologies of the three bays, with their associated river systems and estuarine deltas are important features of the Bohai Sea as they provide other wild animals. The wetlands also purify and reduce the pollution load, modulate the climate and prevent floods, droughts and disasters. Over 150 species of birds including 97 species of waterfowls are observed in the natural wetland sanctuaries of the Bohai Sea.<sup>1</sup>



Currents in the Yellow and Bohai Sea<sup>4</sup>

## History and Culture

### < History and Culture >

Until the early 20th century, Bo Hai was often called the Gulf of Chihli.<sup>5</sup>

The Bohai Sea has always been North China's direct gateway for communicating with the world and the Bohai Straits, located between the western cape of Laotieshan in Liaodong Peninsula and the north end of Penglai Island, is the strategic passage through Bohai Sea and North China. This has made Bohai Sea and its coastal ports historical maritime defense areas.<sup>1</sup>

## Social Environment

### < Population >

The total population of the Bohai Sea region in year 2000 (including the provinces of Liaoning, Hebei and Shandong and the municipality of Tianjin), reached 208 million, accounting for 15.81% of the national population.<sup>1</sup>

### < Land use >

Directly used land area accounts for 51.8% of the Bohai Sea region. Of this figure, 36.6% is arable, 15.2% is for construction, and 40.7% is vegetation.<sup>1</sup>

### < Industry >

Fisheries, ports, petroleum, tourism and sea salt production and manufacturing are the major industries of the Bohai Sea.<sup>4</sup>

#### Fisheries

Fisheries and marine aquaculture in the Bohai Sea not only provide a source of seafood, but also sustain the livelihood of numerous fishermen around the Sea. Furthermore, the Bohai Sea is an important spawning and nursery ground for migratory species from the Yellow Sea and East China Sea. It is estimated that 40% of these species' fisheries resources exist in the Bohai Sea, and it is the biggest mariculture base in China.<sup>4</sup>

#### Ports development and marine transport

The number of ports or harbors around the littoral area of the Bohai Sea ranks first in the country. In the littoral area of the Bohai Sea, 66 harbors have been completed, including 48 fishing harbors.<sup>4</sup>

#### Oil exploitation

The Bohai Sea is rich in offshore oil and gas resources. The major oilfields are the Shengli, Dagang and Liaohe Oilfields. The Bohai Sea area now has an annual output of 2.21 million tons of oil and 375 million m<sup>3</sup> of gas.<sup>4</sup>

#### Tourism

The coastal areas of the Bohai Sea boast many beautiful natural sports, favorable environmental condition, and a natural marine landscape characterized by seawater, sand-beaches and islands, which provide ideal resorts for tourism and leisure travel.<sup>4</sup>

#### Salt production

The Bohai Sea provides an inexhaustible supply of table salt, thus making the salt industry an ancient and eternal marine industry in the littoral Bohai Sea. In 2000, the littoral area of the Bohai Sea had a total of 16 salt-fields with a total salt-pan area of 273,470 ha and a sea-salt output of 664.76 million tons, making it the largest salt industrial production base in China.<sup>4</sup>

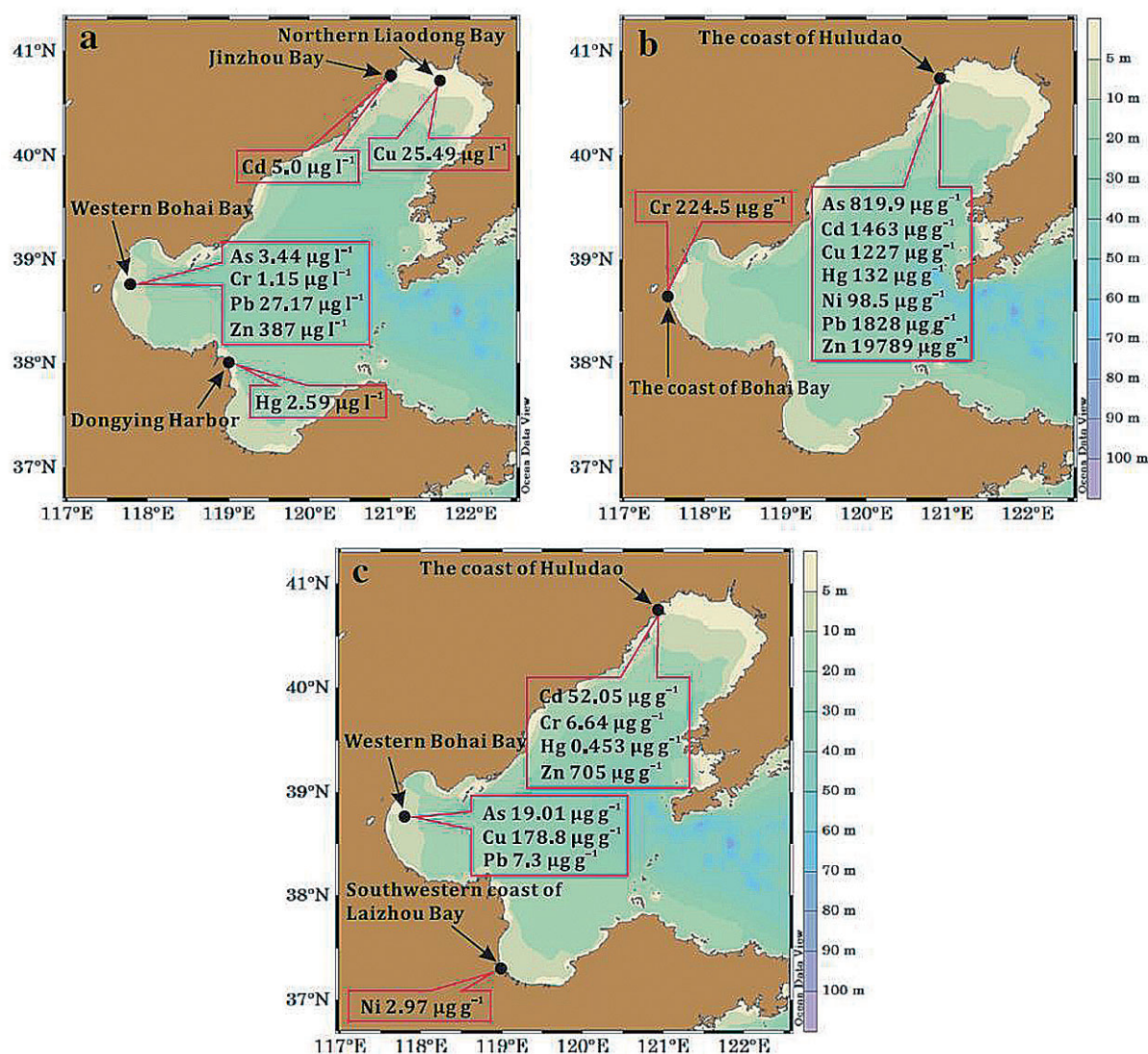
## Environmental Problems

### < Water and sediment quality >

Despite years of effort to protect and manage the environment and natural resources of the Bohai Sea region, deterioration continues. Many irreversible ecosystem changes have taken place. Innovative management approaches and constant actions must be taken to arrest the adverse trend, maintain the resource base and bring economic growth into the track of sustainable development.<sup>6</sup>

The Bohai Sea nearshore areas are seriously polluted, indicating the severity of the region's environmental problem. The major pollutants include organic matter, active phosphate, petroleum hydrocarbons, inorganic nitrogen and some heavy metals. Pollution caused by inorganic nitrogen is the most serious.<sup>1</sup>





Map of the distributions of the maximum levels of trace metals recorded in waters (a), sediments (b) and mollusks (c) in the Bohai Sea<sup>7</sup>

### Water quality (Bohai Bay)

Recent investigations show that a large part of the coastal waters of Bohai Bay have been polluted with concentrations of pollutants. The pollution has deteriorated the ecology and reduced biodiversity of the waters. From 1983 to 1993, the number of fish species decreased from 85 to 75 in the estuary.<sup>8</sup>

### < Other Environmental Problems >

#### Red Tides

Red-tide occurs frequently with serious economic losses. In the 1990s, 10 red-tide events occurred annually. The duration of the events became longer and the areas covered became larger. In 1998, the most serious red-tide events occurred in Liaodong Bay, Bohai Bay and Laizhou Bay, causing half a billion Yuan of direct economic losses to the marine aquatic products.<sup>1</sup>

#### Oil Spills

Oil spill events in Bohai Sea have been frequent since the 1980s. In 1991, about 70 oil spill events caused by ship-breaking, collision, and sinking, as well as oil well blowout, resulted in serious oil pollution at sea and related drainage basins.<sup>1</sup>

#### Coastal Erosion

Coastal erosion has become a major problem in the region, causing coastline retreat, subterranean seawater invasion, lowland flooding and the salinization of paddy fields.<sup>1</sup>

**< Environmental Protection Measures >****Blue Sea Action Plan for the Bohai Sea**

The action plan was ratified by the State Council in 1999, when the comprehensive treatment project of Bohai Sea was kicked off. The project covers three provinces and one municipality surrounding Bohai Sea and participated by the provinces and municipalities in the economic ANNEXES 91 zone surrounding Bohai Sea. The overall targets of the project are the natural resource exploration of Bohai Sea, sustainable development of ecological environment and sustainable, healthy development of the social economy in the economic zone surrounding the Bohai Sea. The main focuses are pollution control, environmental treatment, restoration of natural resource environment, ecological environmental remedy and disaster prevention and control. The key actions are estuary wetland protection and ecological remedy, pollution prevention in the bay, healthy aquatic farming, habitat remedy in the tidal areas and warning and prevention of red tides, oil spillage and marine ice.<sup>9</sup>

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