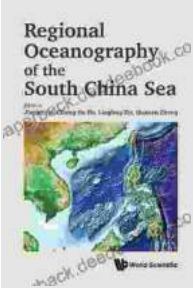
Regional Oceanography of the South China Sea: A Comprehensive Guide

The South China Sea is a semi-enclosed marginal sea of the Pacific Ocean, bordered by China, Taiwan, the Philippines, Malaysia, Brunei, Indonesia, Singapore, Thailand, Cambodia, and Vietnam. It is the largest marginal sea in the world, with a surface area of approximately 3.5 million square kilometers. The South China Sea is a region of significant economic and strategic importance, and it is also a hotspot for marine biodiversity.

The oceanography of the South China Sea is complex and dynamic, and it is influenced by a number of factors, including the monsoon winds, the Kuroshio Current, and the Indonesian Throughflow. The South China Sea is also home to a number of unique oceanographic features, such as the Spratly Islands and the Paracel Islands.

In this article, we will provide a comprehensive overview of the regional oceanography of the South China Sea. We will discuss the physical, chemical, and biological characteristics of the South China Sea, and we will also examine the major oceanographic processes that occur in the region.



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by William J. Roberts

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The physical oceanography of the South China Sea is characterized by a number of key features, including:

- **Surface circulation:** The surface circulation of the South China Sea is dominated by the monsoon winds. During the summer monsoon, the winds blow from the southwest, and the surface currents flow in a clockwise direction. During the winter monsoon, the winds blow from the northeast, and the surface currents flow in a counterclockwise direction.
- **Kuroshio Current:** The Kuroshio Current is a warm, fast-flowing ocean current that originates in the North Pacific Ocean. The Kuroshio Current enters the South China Sea through the Bashi Channel, and it flows along the eastern coast of Taiwan and the Philippines. The Kuroshio Current is a major source of heat and nutrients for the South China Sea.
- **Indonesian Throughflow:** The Indonesian Throughflow is a warm, salty ocean current that flows from the Pacific Ocean into the Indian Ocean through the Indonesian archipelago. The Indonesian Throughflow is a major source of heat and salt for the South China Sea.
- **Spratly Islands:** The Spratly Islands are a group of small, low-lying islands located in the central South China Sea. The Spratly Islands are the subject of a territorial dispute between several countries, including China, Taiwan, the Philippines, Malaysia, Brunei, and Vietnam.

- **Paracel Islands:** The Paracel Islands are a group of small, low-lying islands located in the northern South China Sea. The Paracel Islands are the subject of a territorial dispute between China and Vietnam.

The chemical oceanography of the South China Sea is characterized by a number of key features, including:

- **Salinity:** The salinity of the South China Sea is generally higher than that of the open ocean. This is due to the evaporation of water from the sea surface and the influx of freshwater from rivers. The salinity of the South China Sea is also affected by the Kuroshio Current, which brings in warm, salty water from the North Pacific Ocean.
- **Temperature:** The temperature of the South China Sea is generally warm, with surface temperatures ranging from 25 to 29 degrees Celsius. The temperature of the South China Sea is affected by the monsoon winds, which bring in cold air from the north during the winter monsoon.
- **Dissolved oxygen:** The dissolved oxygen levels in the South China Sea are generally low, especially in the deep waters. This is due to the decomposition of organic matter and the lack of vertical mixing.
- **Nutrients:** The nutrient levels in the South China Sea are generally low, especially in the surface waters. This is due to the lack of vertical mixing and the high rate of primary production.

The biological oceanography of the South China Sea is characterized by a number of key features, including:

- **Primary production:** The primary production in the South China Sea is high, especially in the coastal areas. This is due to the abundance of nutrients and the warm, shallow waters. The primary production in the South China Sea is dominated by phytoplankton, which are microscopic plants that drift in the water column.
- **Zooplankton:** The zooplankton in the South China Sea are diverse and abundant. Zooplankton are small animals that drift in the water column, and they feed on phytoplankton. The zooplankton in the South China Sea are important for the cycling of nutrients and the food chain.
- **Fish:** The South China Sea is home to a wide variety of fish species. The fish in the South China Sea are important for both commercial and recreational fishing.
- **Marine mammals:** The South China Sea is home to a number of marine mammals, including dolphins, whales, and porpoises. Marine mammals are important predators in the South China Sea, and they play a role in the food chain.

The major oceanographic processes that occur in the South China Sea include:

- **Monsoons:** The monsoons are the dominant force that drives the oceanography of the South China Sea. The monsoons cause the surface circulation to reverse direction twice a year, and they also affect the temperature, salinity, and dissolved oxygen levels in the sea.
- **Kuroshio Current:** The Kuroshio Current is a major source of heat and nutrients for the South China Sea. The Kuroshio Current also

transports larvae and other marine organisms into the South China Sea.

- **Indonesian Throughflow:** The Indonesian Throughflow is a major source of heat and salt for the South China Sea. The Indonesian Throughflow also transports larvae and other marine organisms into the South China Sea.
- **Upwelling:** Upwelling is the process by which cold, nutrient-rich water from the deep ocean is brought to the surface. Upwelling occurs in the South China Sea along the coast of Vietnam and the Philippines. Upwelling is important for the primary production in the South China Sea.
- **Downwelling:** Downwelling is the process by which warm, nutrient-poor water from the surface ocean is brought to the deep ocean. Downwelling occurs in the South China Sea along the coast of China and Taiwan. Downwelling is important for the cycling of nutrients in the South China Sea.

The South China Sea is a complex and dynamic marine environment. The oceanography of the South China Sea is influenced by a number of factors, including the monsoon winds, the Kuroshio Current, the Indonesian Throughflow, and the unique oceanographic features of the region. The South China Sea is a region of significant economic and strategic importance, and it is also a hotspot for marine biodiversity. Understanding the oceanography of the South China Sea is essential for managing the resources of the region and for protecting the marine environment.

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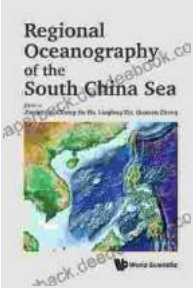

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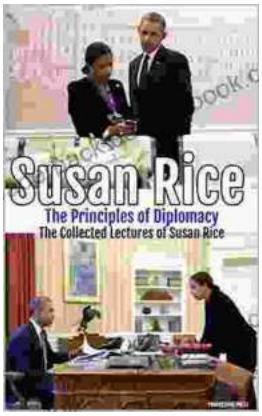

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