

Leg 184

Investigations of the East Asia Monsoon

February 1999 Scientists on an Ocean Drilling Program expedition to the South China Sea are exploring the Asian monsoon and its evolution over time. Knowledge of this interhemispheric system that is characterized by seasonally reversing wind and rainfall patterns is needed to better understand global climate and its influence on humans and their environment. The expedition, named ODP Leg 184, began on February 19 in Fremantle, Australia, and ends on April 13 when the Program's drillship, the *JOIDES Resolution*, arrives in Hong Kong.

The magnitude and evolution of the summer and winter monsoons are controlled by a variety of tectonic, atmospheric and oceanic processes, such as: (1) the uplift of the Himalayan Mountains variations in the distribution of solar radiation over the Earth; and (4) changes in the global amount of ice stored in glaciers. These factors either amplify or dampen the seasonal development of land sea heating, atmospheric pressure gradients, latent heat transport, and moisture convergence over the Asian continent.

The scientific mission of this expedition is to understand the relative importance of these controlling mechanisms in the initiation, evolution, and variability of the Asian monsoon at timescales ranging from decadal to tectonic over the past 30 to 40 million years. The South China Sea is an ideal location for this study because the seafloor sediments provide a record of the variability and intensity of both winter and summer monsoons. The winter monsoon is marked by high atmospheric pressure over northern Asia, northeast winds across the South China Sea (which intensify during cold surges of winds from the north), and enhanced precipitation in the Austral Asian equatorial zone. In contrast, the summer monsoon is dominated by a low-pressure system over Asia, strong southwesterly winds over the South China Sea, and high precipitation over southern and eastern Asia. The monsoonal wind and rainfall patterns

produce changes in the surface waters (temperature, salinity, nutrient content, fluvial sediment load) that in turn are recorded in the physical, chemical and isotopic composition of sediments raining down through the ocean and accumulating on the seafloor.

The scientists plan to recover seafloor sediments from six sites within the South China Sea, at water depths ranging from 1300 to 3200 m. Sediment samples and data collected by analyzing the walls of the drill hole will enable the scientific party to identify and determine monsoon variability over periods ranging from decades to millions of years. The sites are located in two geographic regions: a northern area about 340 km offshore Hong Kong, and a southern area, located northwest of Borneo (see map). The difference between the locations is that the Western Pacific Warm Pool, a large climatic and oceanographic feature, influences the southern area, but not the northern one. Conversely, the northern area receive great loads of sediment from the Pearl River, while the southern one does not.

EAST MEETS WEST: THE PEOPLE'S REPUBLIC OF CHINA

The People's Republic of China joined the ODP last spring as an associate member. In addition to rounding out our global community of Earth scientists, the PRC's most immediate and significant contribution to ODP has been their expertise in Earth sciences, specifically their familiarity with the monsoon climate regime and the marine geology of the South China Sea. This expedition includes several Chinese scientists from both sides of the Taiwan Strait, including a Co Chief Scientist, Pinxian Wang, from Tongji University in Shanghai. The other Co-Chief is Warren Prell, from Brown University, in Rhode Island, USA.

THE OCEAN DRILLING PROGRAM The Ocean Drilling Program is an international partnership of scientific institutions and governments dedicated to exploring the history, structure and evolution of the Earth. ODP operates the 471 foot scientific drillship, JOIDES Resolution. The U.S. National Science Foundation is the principal funder of the ODP, with substantial contributions from its international partners. These include the Federal Republic of Germany, Japan, the United Kingdom, the

Australia/Canada/Chinese Taipei/Korea Consortium for Ocean Drilling, the European Science Foundation Consortium for Ocean Drilling (Belgium, Denmark, Finland, Iceland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and Turkey), France and the People's Republic of China. The program is managed by the Washington DC-based Joint Oceanographic Institutions, Inc. Science operations are the responsibility of Texas A&M University. Lamont-Doherty Earth Observatory operates a databank and downhole logging.

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In addition, the ODP Web Site includes much additional information on this leg (Leg 184 Scientific Prospectus) and will carry weekly reports on progress as the leg proceeds.