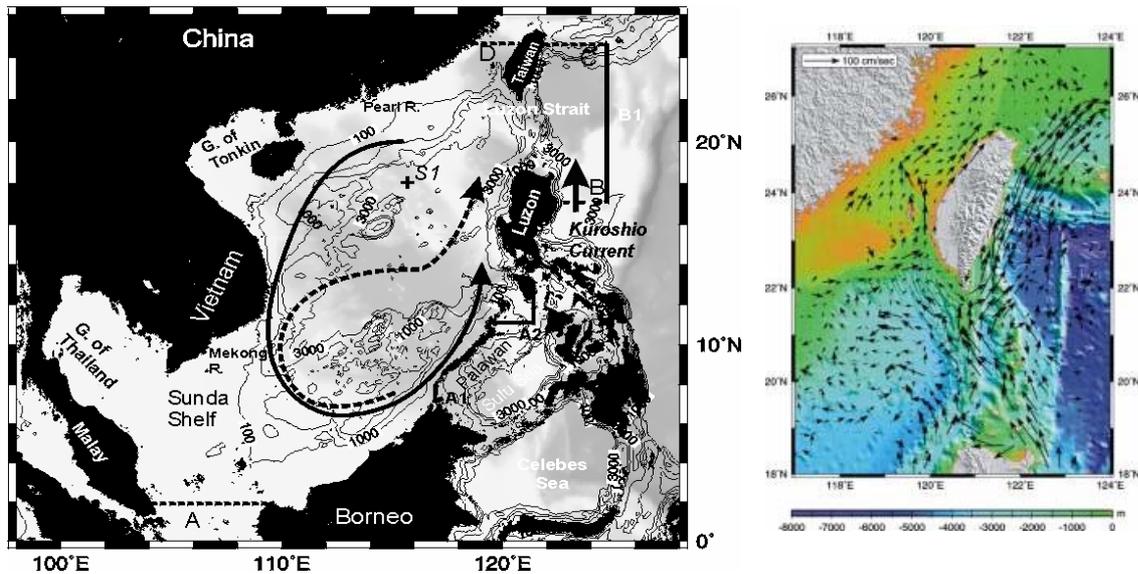


## South East Asia Time-Series Station (SEATS)



The SEATS station (S1) is located at 18°N, 116°E about 700 km southwest of Taiwan, in the South China Sea (SCS), the largest ice-free marginal sea in the world. It has a wide continental shelf to the south, with significant runoff from several large rivers, including the Mekong and Pearl Rivers, and a deep (>3 000 m) basin. The SCS is subject to physical forcing of the alternating SE Asian monsoons, typhoons, strong internal waves and ENSO. SEATS station is potentially sensitive to climate change because of its locality between the “third” pole, namely the Tibet Plateau and the western Pacific warm pool, two of the most important heat engines of the global climate.

The pilot study of the SEATS project took place west of the Luzon Strait with bimonthly cruises between August 1998 and June 1999. Because the hydrography of that area is strongly influenced by the Kuroshio intrusion through the strait and by the monsoon-driven upwelling off northwest Luzon, and on the recommendation of the members of the “northern Pacific Ocean Fluxes Workshop and Planning of Long-Term Observation of the South China Sea”, the location of SEATS was changed to the S1 station mentioned above in August 1999.

On the map, the solid arrow indicates the circulation under NE monsoon, and the dashed arrow indicates that under SW monsoon. Solid and dashed lines indicate, respectively, closed and open boundaries of the coupled physical-biogeochemical numerical model for the SCS. The National Center for Ocean Research completed the submarine topographic map of the South China Sea, by request of the Ministry of Communications and Transportation, Taiwan, RoC.

Ship-based hydrographic and biogeochemical surveys are conducted every 2–3 months. Moored ADCP and temperature-pressure sensors have been deployed since 1997. Moored light sensors and fluorometers have been deployed since October 2001.

The observational programme aims to understand how monsoonal forcing controls biogeochemical cycles in the SCS and how ENSO modulation of the monsoon strength influences them, to monitor how the episodic events (such as typhoons or mesoscale eddies) affect biogeochemical processes in the upper water column, and to link the present-day biogeochemical processes with paleo-records preserved in sediment cores for better understanding of the effect of climate change on the ocean biogeochemistry in the marginal sea. As there are various types of physical forcing, the SCS is an ideal site for the study of their effects on the ecosystem. It is also potentially sensitive to climate change due to its juxtaposition to the climate driving engines. The large shelf to interior ratio provides an opportunity to examine the influence of the margins on the interior properties. Compared with other oligotrophic ocean ecosystems, such as the Sargasso Sea and the north Pacific gyre, the SCS is unique for its very shallow mixed layer, resulting from a strong halocline. In addition, the SCS is subject to the action of strong internal waves. Physical disturbances, including low pressure fronts, monsoon, typhoons and internal waves, may easily reduce water column stability and enhance vertical mixing, and, in turn, the pumping of inorganic nutrients from deep water to the surface. Due to its strong physical forcing and high sediment influxes, the SCS is expected to be an important repository of the past climate records. Recently, active coring has been undertaken in this region in conjunction with two large programs in the study of paleo-oceanography, the Ocean Drilling Project and the IMAGES project. Preliminary results have shown significant variation in the organic carbon and carbonate contents and carbon isotopic composition, which are interpreted qualitatively as responses to changes in monsoon strength in the past.

Currently, SEATS is maintained by scientists and staff from the National Center for Ocean Research (NCOR), Taipei, Taiwan, RoC. Contact for SEATS is Kon-Kee Liu [liu@ihs.ncu.edu.tw](mailto:liu@ihs.ncu.edu.tw), now at the Institute of Hydrological Sciences, National Central University, Taiwan, RoC.

Additional information on SEATS is available at [www.ncor.ntu.edu.tw/english/SEATSweb.htm](http://www.ncor.ntu.edu.tw/english/SEATSweb.htm).