

China-Taipei

Taiwan had an active year for GEOTRACES-related activities in 2010. We held 2010 GEOTRACES Asia Planning Workshop in October in Taipei and held 2010 Western Pacific Geophysics Meeting, including a GEOTRACES session. Three scientific cruises were carried out to study trace metal sources and distribution in the water columns of the two major marginal seas, including a July cruise in the East China Sea and a summer (July) and a winter (December) cruises on the continental shelf of the northern South China Sea (Figure 13 and 14). In addition, Taiwan has been building a 2,700 ton new R/V, which is expected to be launched in 2012 and is able to equip trace metal clean sampling facility.

Personally, Prof. C.-A. Hu at Academia Sinica has been involved in Ra inter-calibration experiment in Asian region to study submarine groundwater discharge. The laboratories of Drs. D.-C. Lee and T.-Y. Ho at Academia Sinica have established double spike techniques for trace metal isotope composition analysis (including Cd, Zn, Fe, and Ni) in seawater and phytoplankton. In 2010, there were about 15 PIs who have been funded by Taiwanese National Science Council to carry out GEOTRACES related research. We have published about 20 papers in the GEOTRACES related topics in 2010. Some of the most GEOTRACES-related papers are listed here. We have found that anthropogenic aerosols are major source for many trace metals in the water column of the marginal seas (Ho et al. 2010) and are likely to be major trace metal source in the western North Pacific Ocean as well (Figure 15).

2010 GEOTRACES related publications in Taiwan

- Ho, T.-Y. *et al.* (2010) Trace metal cycling in the surface water of the South China Sea: Vertical fluxes, composition, and sources. *Limnology and Oceanography* 55: 1807-1820.
- Ho, T.-Y. *et al.* (2010) Determination of trace metals in seawater by an automated flow injection ion chromatograph pretreatment system with ICPMS. *Talanta* 82: 1478-1484.
- Hsu, S.-C. *et al.* (2010) Sources, solubility, and dry deposition of aerosol trace elements over the East China Sea. *Marine Chemistry* 120, 116-127.
- Hsu, S.-C. *et al.* (2010) Effects of acidic processing, transport history, and dust and sea salt loadings on the dissolution of iron from Asian dust. *Journal of Geophysical Research* 115, doi:10.1029/2009JD013442.
- Hung, C.-C. *et al.* (2010) POC/²³⁴Th ratios in particles collected in sediment traps in the northern South China Sea. *Estuarine, Coastal and Shelf Science* 88, 303-301.
- Hung, C.-C. *et al.* (2010) Comparative evaluation of sediment-trap and ²³⁴Th-derived POC fluxes from the upper oligotrophic ocean in the Gulf of Mexico and the East China Sea. *Marine Chemistry* 121, 132-144.
- Lin, I.-T. *et al.* (2010) Deep submarine groundwater discharge indicated by tracers of oxygen, strontium isotopes and barium content in the Pingtung coastal zone, southern Taiwan. *Marine Chemistry* 122, 51-58.
- Shen, C.-C. *et al.* (2010) Sea-level rise and coral-reef development of Northwestern Luzon since 9.9 ka. *Palaeogeography, Palaeoclimatology, Palaeoecology* 292, 465-473.
- Tseng, C.-M. *et al.* (2010) Development of a novel on-line flow injection mercury analyzer to determine gaseous elemental mercury over the northern South China Sea. *Journal of Analytical Atomic Spectrometry* 25, 526-533.
- Wei, C.-L. *et al.* (2010) Scavenging phenomenon elucidated from ²³⁴Th/²³⁸U disequilibrium in the surface water of the Taiwan Strait. *Terrestrial, Atmospheric and Oceanic Sciences* 21, 713-726.

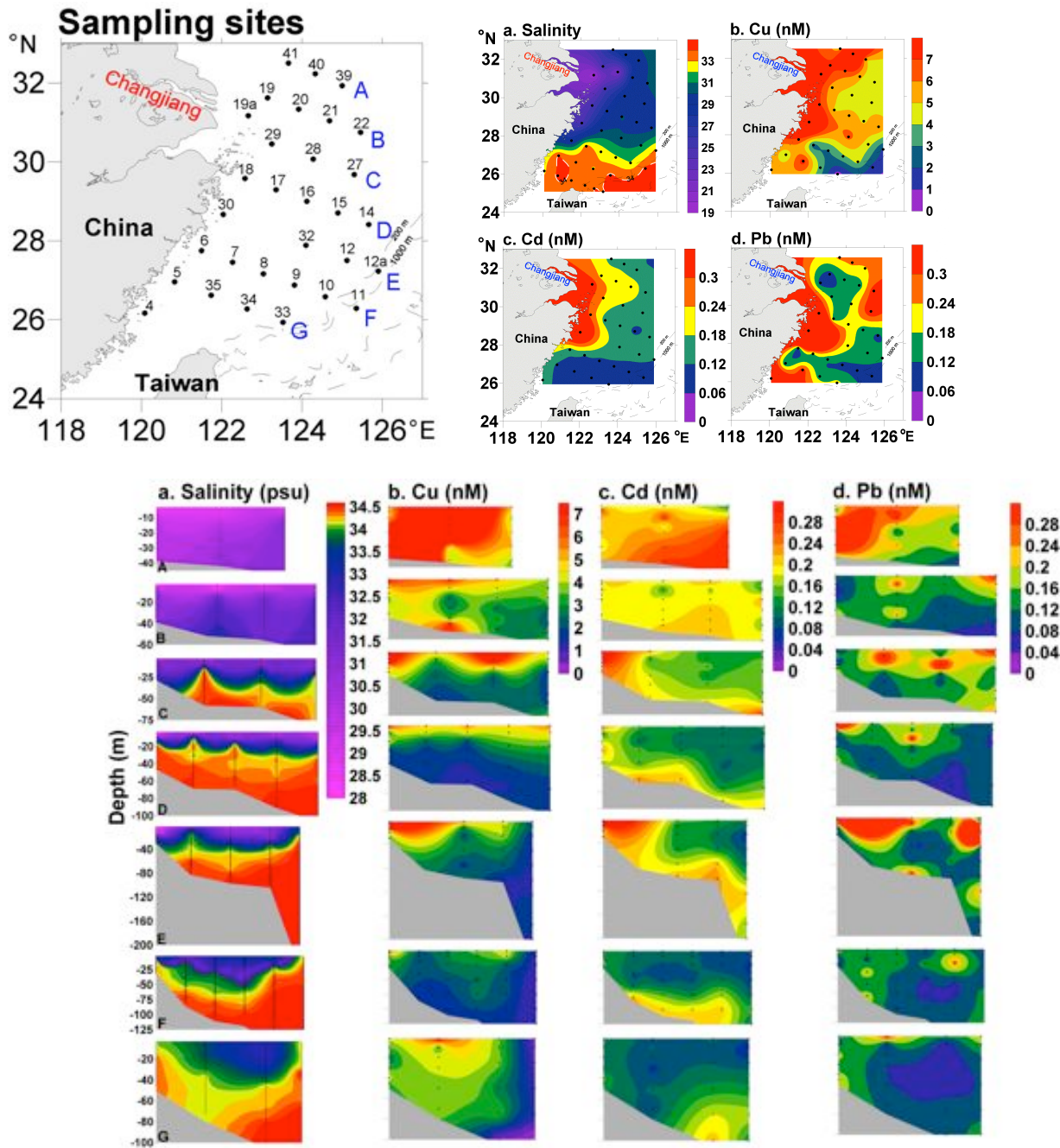


Figure 13. The distribution of some dissolved trace metals in the East China Sea in July in 2010 (Liu and Ho, unpublished data). Trace metals analyzed include: Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd and Pb. The concentrations shown in the up-right panel are surface concentrations. The sampling stations (up-left panel) are separated to 7 transects, A, B, C, D, E, F, and G.

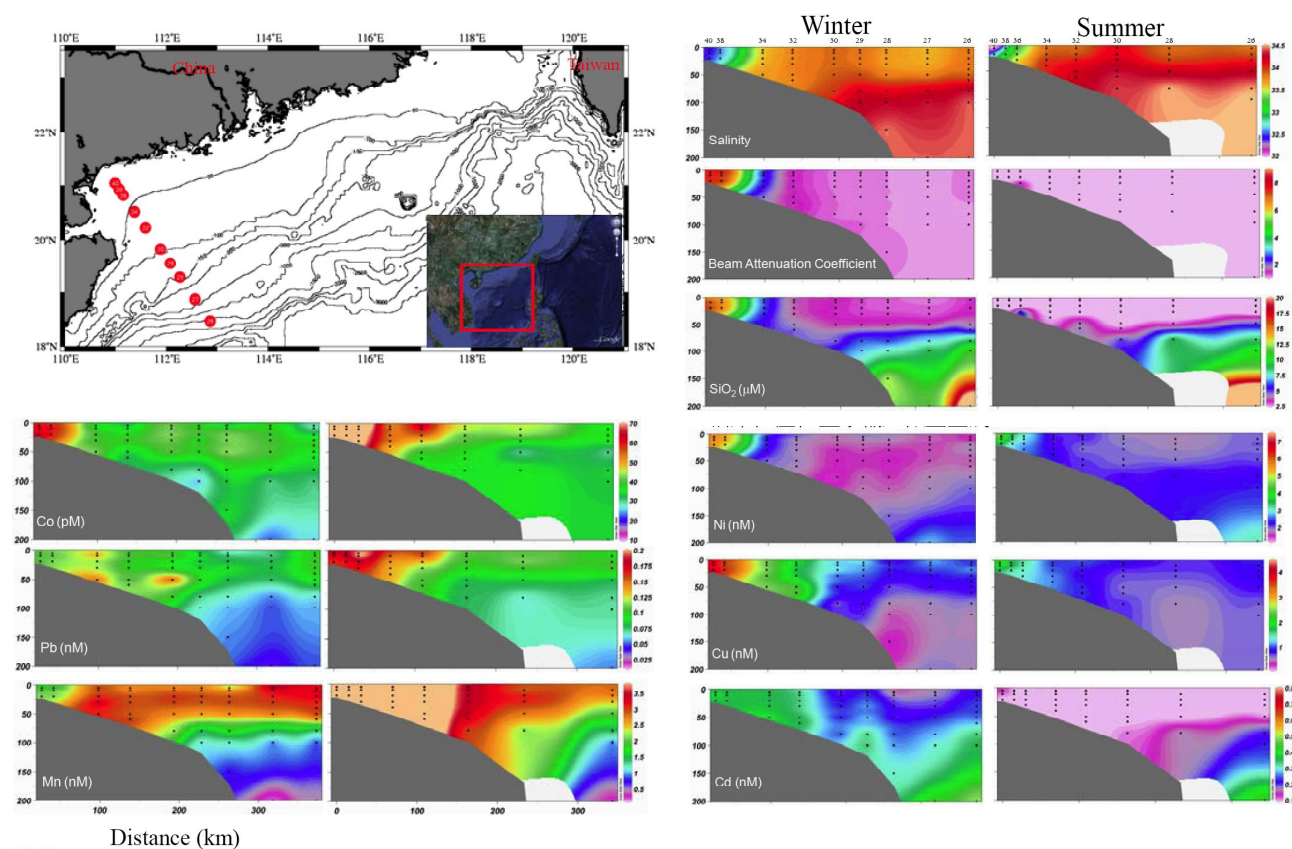


Figure 14. Seasonal variability of some dissolved trace metal distribution in the water column of the continental shelf of the northern South China Sea. The sampling sites are shown as the red circles in the map of the up-left panel. The cruises were carried out in July (summer) and December (winter) in 2010. Trace metals analyzed include: Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd and Pb. (Ho et al. unpublished data).

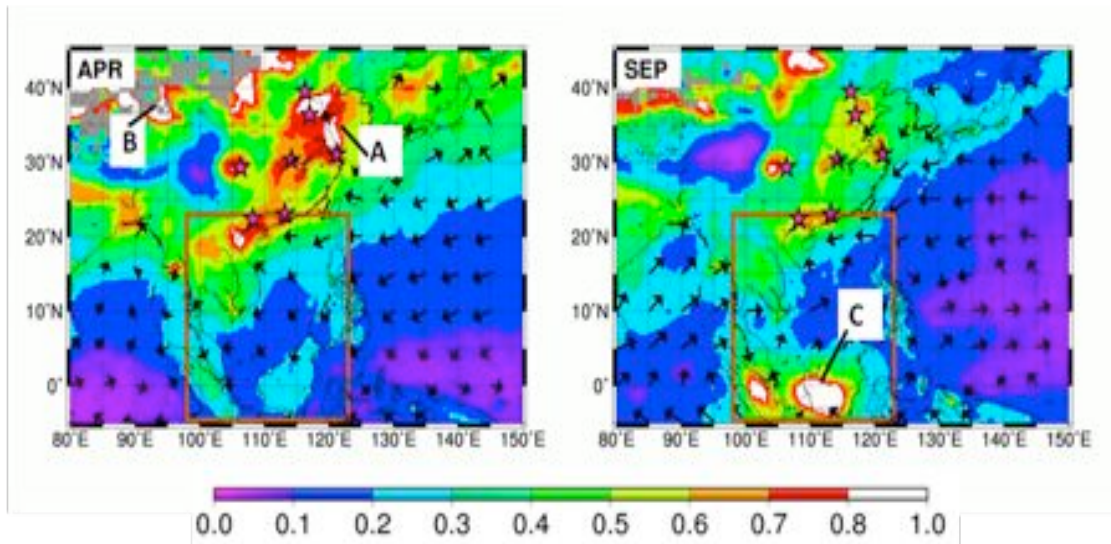


Figure 15. Terrestrial aerosol sources to the western North Pacific and the marginal seas as observed by three-year (2002–2004) averaged total AOT (Aerosol Optical Thickness) data from the NASA MODIS sensor. A: anthropogenic aerosols from Eastern China; B: desert dust; C: biomass burning from Indo China. QuikSCAT ocean-surface wind vectors are overlaid. Major Chinese cities are annotated in stars. (I.-I. Lin, unpublished data)