Hammerschmidt C R, Fitzgerald W F (2006). Methylmercury cycling in sediments on the continental shelf of southern New England. Geochimica et Cosmochimica Acta, 70: 918—930

Hammerschmidt C R, Fitzgerald W F (2008). Sediment-water exchange of methylmercury determined from shipboard benthic flux chambers. Marine Chemistry, 109: 86—97

Hammerschmidt C R, Fitzgerald W F, Lamborg C H, Balcom P H, Visscher P T (2004). Biogeochemistry of methylmercury in sediments of Long Island Sound. Marine Chemistry, 90: 31—52

Hammerschmidt C R, Fitzgerald W F, Balcom P H, Visscher P T (2008). Organic matter and sulfide inhibit methylmercury production in sediments of New York/New Jersey Harbor. Marine Chemistry, 109: 165—182

Some issues on water resources system of the Changjiang River Delta in China

Dong WANG [1*], Ying WANG [2], Jichun WU [1], Lachun WANG [2] & Yunliang SHI [2]

[1] Department of Hydrosciences, Department of Earth Sciences, Nanjing University, Nanjing 210093, China
*E-mail: wangdong@nju.edu.cn

[2] the Key Lab of Ministry of Education of Coast & Island Development, Nanjing University, Nanjing 210093, China

Water resources system is a complicated large system, which contains certain regional background, as well as specific framework, function and dynamic balance. The Changjiang River Delta is a very important area in China. As the local water resources are concerned, the Delta is an area lack of water as a matter of fact. The water resources system of the Delta experiences a long, intricate and degenerate period. The lacking of water due to resources shortage in 1950's changes into that due to water quality from 1980's. Furthermore the status of water shortage sharpens gradually. The representations are summarized as follows: firstly, the discharge amount of wastewater and polluted water is large all along. Secondly, the pollution status of rivers, which involve the Changjiang River, the Grand Canal, the rivers in city and the rivers in small towns and villages, is noticeable. Thirdly, water quality of Taihu Lake is worth of more attention. Therefore, the countermeasures on the reconditioning and regulating of water resources system in the Delta demands the following new strategies, such as to treat the rivers, the lakes and the seas as an overall system, to improve, harmonize and counterpoise water resources system carrying capacity, to implement the integrated management of water resources, which means the integrated management of drainage area along with the regional area, especially the integrated management of city water, and to carry on water saving and scientific using to increase the efficiency of water use, and so on. Consequently, human can coexist with water harmoniously in the Delta. And the objective to ensure the sustainable social and economic development with the sustainable usage of water resources can be implemented.

Simulation of coastal currents and river discharges in the South-eastern Black Sea

*Ercan KÖSE, Coşkun ERÜZ, Kadir SEYHAN

Faculty of Marine Science, Karadeniz Technical University, Trabzon, Turkey
E-mail: ekose@ktu.edu.tr

In this study, development and evaluation of buoyant river plumes under the influence of the coastal currents and the guidance of topography in the south eastern Black Sea coast (Solak1 and SÜrmene) rivers were analyzed. For simulation, the rivers are inputted as source of zero salinity in computer based simulation model CARDINAL, which uses depth averaged shallow water equation for two-dimensional conditions and the equations of non-steady boundary layer for three-dimensional conditions. The river plumes are examined with realistic topography and idealized wind conditions. In order to check accuracy of the simulation, temperature, salinity, current speed and directions were measured in 22 stations and then density was calculated by using UNESCO formulae. Comparison of the measurements and modeling of currents showed good agreement. When both buoyancy and wind are employed as external forcing, the circulation is influenced by the opposing tendencies for stratification. The present findings suggest that transport of low salinity waters depends on buoyancy in the vicinity of rivers and wind components away from river mouths.

Remotely-sensed suspended sediment dynamics in the Yangtze River Estuary

Fang SHEN [1*], Yunxuan ZHOU [1], Suhyb SALAMA [2], Bob(Z) SU [2] & Xuezhong JIANG [1]

[1] State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai 200062, China E-mail: fshen@sklec.ecnu.edu.cn

[2] International Institute for Geo-Information Science and Earth Observation (ITC), 7500 AA Enschede, The Netherlands

The Yangtze River estuary is a typical example of extremely turbid water-suspended sediment dominated case II water. Suspended sediment concentration (SSC) presents remarkable variability of temporal-spatial distribution with the alternations of semi-monthly spring/neap tidal cycle and irregular semi-diurnal flood/ebb tide in the estuary. Moreover, the concentration distribution is greatly influenced by fluvial sediment discharges with dry/wet season variation. The range of SSC is generally about from 100mg/l to even 2500mg/l more or less. However, costly conventional investigations can not be conducted frequently so that it is hard to better understand sediment dynamics in temporal-spatial distribution. Remote sensing approach, offering unique advantages of synoptic, regular and repetitive views of study areas, has demonstrated great capabilities and potentials in SSC retrievals. ENVISAT/MERIS sensor from European Space Agency is currently more suitable for coastal water application than others due to its high spatial resolution and numbers of visible wavebands. However, MERIS-derived SSC magnitude with standard algorithm is greatly underestimated in the estuarine water through the comparison to field-truth data. Two main reasons could involve atmosphere " over-correction" and the SSC retrieval algorithm of MERIS that is applicable for lower turbid water (e.g. European coastal water) and does not work well in extremely-turbid sediment dominated water (e.g. the Yangtze River estuarine water). In this work, an effort to re-process MERIS Top-Of-Atmosphere (TOA) radiance, by employing radiative transfer model of atmospheric correction (e.g. MODTRAN) so as to subtract atmosphere contribution and work out water-leaving reflectance, and quantitatively retrieve SSC from MERIS data with the regional algorithm based on field measurements in situ and tank experiments is made. By comparison, it is found that the relative errors between MERIS-retrieved SSC and simultaneously in situ measured SSC are less than 0.5-0.8. Furthermore, a series of MERIS images captured during spring/neap tidal cycle, flood/ebb tide in wet/dry season from 2003 to 2007 are processed and retrieved into a series of SSC thematic mappings. Synoptic overviews from those mappings will be helpful to the sediment dynamics in the Yangtze River estuary.

Tide, tidal current and sediment transport in the Mahakam Estuary, east Kalimantan, Indonesia

Idris MANDANG [1]* & Tetsuo YANAGI [2]

[1] Interdisciplinary Graduate School of Engineering Science, Kyushu University, 6-1 Kasuga, Fukuoka, 816-8580 Japan * E-mail: idris@riam.kyushu-u.ac.jp

Faculty of Science, Mulawarman University, Indonesia * E-mail: idris_mdg@yahoo.com

[2] Research Institute for Applied Mechanics, Kyushu University, 6-1 Kasuga, Fukuoka, 816-8580 Japan

The Mahakam Delta, located on the east coast of Kalimantan, Indonesia, is an active delta system which has formed in humid tropical environment under condition of relatively large tidal amplitude, low wave-energy, and large fluvial input. The Mahakam estuary is influenced by tide and tidal current from the Makassar Strait. In this study, we developed a numerical model to study the dynamics of tide, tidal current and cohesive sediment transport in this region.

A fully three-dimensional finite difference baroclinic model system for hydrodynamics and cohesive sediment transport is described. The hydrodynamic model is based on the hydrostatic and Boussinesq approximations. The simulation of cohesive sediment transport processes is performed solving the 3D-conservative advection-diffusion equation. The model was run for 15 days (27 June 12 July 2000) driven by tidal forcing at the open boundary and river discharge at the upstream. The observed temperature, salinity, and suspended sediment data were available for the start of the simulation. Good agreement was found between model results and observed temporal and spatial variations in water elevation, currents, and suspended sediment concentration (SSC) in the Mahakam Estuary.

The calculated elevation and current velocity agree well with the observed elevation (maximum amplitude of about 0.6 m) and currents velocity (maximum amplitude of about 0.15 ms^{-1}) in the Mahakam Estuary. The root mean squared error in the model elevation and current velocity are 0.15 m and 0.05 ms^{-1}, respectively. Wave form is changed from the mouth of the estuary to upstream. The natural oscillation period of the Mahakam Delta T_n is 19 hrs. T_n is near the period