and tidal stream (direction and speed at the depth of 30 m) was monitored by an Acoustic Doppler Current Profiler (ADCP) at all times during the voyage, and the number of ships at the periphery of the sailing route was recorded by using an Automatic Identification System (AIS).
Results: The total amount of PAHs was measured in each sample and found to range between 30.4—120.2 ng/L. The highest concentration was observed in sample #3, which was collected along the eastern shore of Taiwan. Ten different PAHs were detected in total, and acenaphthylene was observed in all samples. The three highest PAHs (26.1—67.2 ng) concentrations of acenaphthylene were observed in sample #4—6. In sample #1—3 and 8, naphthalene (23.0— 52.0 ng) was the highest compound. Benz(a)anthracene (3.3—27.8 ng) was found in sample #1, 3, and 5—7, and was the highest PAHs in sample #7. The chemical composition of PAHs varied considerably after passing the center of the South China Sea, and benzo(a)pyrene, the most toxic compound in 16 PAHs, listed by USEPA, was detected in sample #7—8 (2.3—2.4 ng).
Discussion: Sample #3 collected along the eastern shore of Taiwan showed the highest total PAHs concentration and the nearby sample of sample #4 exhibited the lowest. The difference in the total amount of PAHs in these two samples was about four times. According to the ADCP, the current from Taiwan to the sea lane apparently changed to the opposite direction, namely from the Pacific Ocean to mainland China, at the border of sampling areas sample #3 and sample #4. Such a significant distinction in local ocean drift caused this big difference in the total amount of PAHs in the two adjacent samples. As a result, the degree of contamination in the enclosed sea coastal area is likely to be influenced by the presence of a pollutant source such as a big city or an upstream industrial belt, rather than by the depth of the sea. The high density of ships observed by AIS along the sea lane suggested that exhaust smoke from those ships was also responsible for the pollution.

The contribution of atmospheric deposition of nutrients to the Yellow Sea

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Atmospheric deposition is one of vital paths for chemical substance into the ocean, and an important source of nutrients, such as nitrogen, phosphorus and iron. Using the data of the total suspended particles (TSP) and size-segregated particles, Air Pollution Index (API), the deposition fluxes of aerosols and nitrogen over the Yellow Sea and Qingdao coastal seas were estimated, and the impacts of the dust weather on the seasonal varieties and spatial distributions of the aerosols and nitrogen were also discussed.
In 2002-2007, the dry deposition fluxes of aerosols and total nitrogen (TN) over the Yellow sea attenuated with longitude from west to east, and were about 544.2-1400.1 mg/m^2/month and 9.17-23.6 mg N/m^2/month respectively. The wet deposition fluxes of TN varied between 16.5-436.1 mg N/m^2/month. The ratio of dry deposition to total deposition for TN was about 33%. The wet deposition fluxes of total inorganic nitrogen (TIN) was 15.0-393.9 mg N/m^2/month, contributed more than 66% of TN. The ratio of dry deposition to total deposition for TIN varied between 1.5-63%. The wet deposition of nitrate and ammonium were about 1.6-9.5 and 3.0-17.3 mg N/m^2/month, respectively. The average ratios of dry deposition of nitrate and ammonium to total deposition were 28% and 18% respectively.
The levels of dry deposition fluxes of aerosols and nitrogen over the Yellow Sea were about 1482.9-2641.0 mg/m^2/month and 9.19-16.6 mg N/m^2/month during dust period, respectively. They were about 2558.5 mg/m^2/month and 16.1 mg N/m^2/month over Qingdao coastal seas. The impact of the dust weather on the dry deposition of aerosols mainly focused on the coarse particles with the diameters above 3.3μm. The effect of dust weather on ammonium was larger than on nitrate.
River and atmosphere are both important sources for nutrients in the Yellow Sea. Compared with riverine input, the contribution of atmospheric deposition to total inputs of NO_3^-+NH_4^+ from the two sources was about 31.1%-35.5%.

Evaluation of water quality change and inflowing pollutant loads in the Gwangyang Bay of southern coast, Korea

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