NUMERICAL SIMULATION OF WATER ENVIRONMENT IN RADIAL SAND RIDGES AREA OF THE YELLOW SEA

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Radial sand ridges on the Yellow Sea seafloor are distributed over the middle part of Jiangsu coast, stretching for 200 km latitudinally and 90 km longitudinally (WANG, Y., 2002). There are more than 70 sand ridges radiating from Jianggang (see fig. 1), most of which come out of water and become shoals at low water level. These sand ridges are of different heights and in different shapes, and form a peculiar geomorphology, which is unique in the world.

When land pollutant sources are discharged into different positions of the radial sand ridges area where the tidal effects are primary, a different rate of seawater exchange occurs in different positions between the near shore and open sea of the sea area, which results in the environmental problems, such as seawater pollutes and ecological disorders. Many researchers have shown interest in the impact of the distribution of tidal wave and tidal current on the radial sand ridges for a long time. However, the numerical simulation of water environment in this sea area is relatively scarce.

In order to reveal hydrodynamic condition and pollutant dispersion in radial sand ridges area of the Yellow Sea and to find the perfect position of pollutant discharge in this area, two-dimension vertically averaged shallow water models for tide movement and for pollutant dispersion have been established for simulating the current field and concentration field. Here, numerical simulation of dispersion of land pollutant sources doesn't include that of heavy metal and drift pollutant. The variable grids technology and wet-dry judgment criterion (Flather, 1975) are used in calculating.

Tide current and tidal induced residual current have the dominant effect on the transportation and dispersion of pollutant in coastal sea area. The transportation and dispersion of the pollutant, which is discharged into water body, is similarly to movement of water particle. Both of them have the Lagrange characteristic. So, the tidal induced Lagrange residual current field and the Lagrange tracking of water particle of some typical positions in the area are simulated. The diluted concentration distributions of envelope curves are present and the ranges of effect are compared in different points.

Based on the numerical results of the tide current field, the pollutant dispersion field and Lagrange tracking are employed to analyze the dispersion and transportation mechanism of pollutant and the ability of ocean self-purifying. Through comparing with the hydrodynamic condition and the diluted concentration distribution of envelope curves in

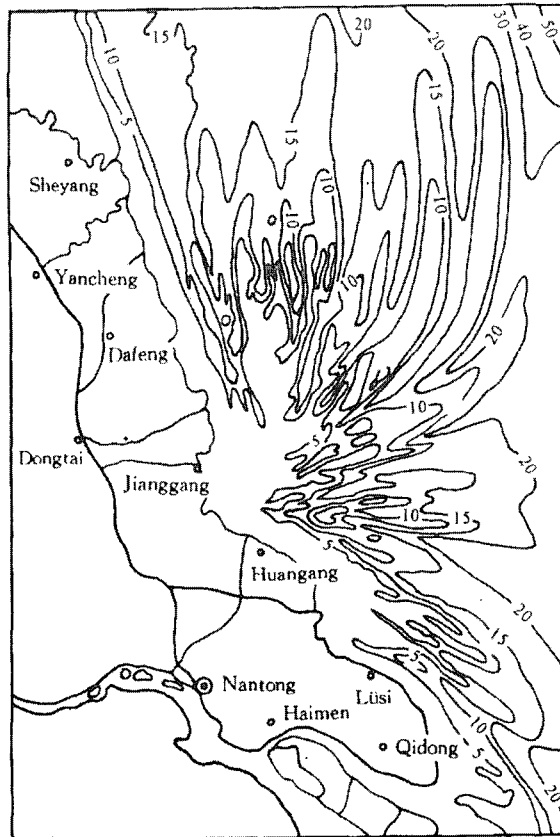different points, a perfect position of pollutant discharge in this area is obtained.

Fig.1 Radial sand ridges area of the Yellow Sea

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