

Relationship between geomorphological characteristics and landcover changes in the drainage basins, and Coastal Erosion in Japan

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The coastal erosion become serious in Japan, especially in sand beaches. The main causes of coastal erosion are 1)reduction of debris flow in river system and 2)construction of harbor facilities. The location of coast line is maintained by dynamic equilibrium between sedimentation and erosion, and the reduction of supply from river leads to the dominance of erosion. The changes of surface condition in river basin is connected to the state of coast line.

We first analyzed for geomorphological characteristics in large river basins. 50 basins are selected and basin average relative height and volume of the basin are calculated. The number of dams and total storage capacity is also extracted and plotted on the map.

As for the records of coastal erosion, the table in Tanaka et al.(1993) are used and average amounts of coastal erosion during i)period I: Meiji to Showa(about 70 years), ii)period II: Showa to Heisei(15 years), and iii)period III: Meiji to Heisei(about 85 years) per prefecture are plotted on the map.

During period III, coasts are eroded in 11 prefectures among 38 prefectures. The prefecture which have retreating tendency are distributed north-east Japan along the Sea of Japan, and there are many prefectures that the coast get forwarded in Pacific side.

In the period II, retreating tendency is marked in 28 prefectures. 22 prefectures get increased tendency of coastal retreatment. The Japan sea side of north-east Japan have retreating tendency continuously.

Compared with coastal change map with geomorphological parameters, it is revealed that river basins with large relative height and volume are existed in the Japan Sea side of north-east Japan. The number of dams or storage volume is also large in the region, and trapped sediment is assumed to be large, which leads to the coastal erosion. As a result, the geomorphological parameters and existence of dams explain the coastal erosion in the macroscopic viewpoints.

We also analyzed for regional scale, targeted to small beaches in Chibasaki, Tateyama, Iwai and Hota. As a result, construction of harbor facilities surely influence to the coastal erosion, however, erosion can be also recognized before the construction. It suggests the effect of basin change that cause to the reduction of debris transport by river system.

Coastal erosion is a result of the many changes in surface condition in the basin behind the coast. The main cause may be different when treat different spatial scales. In this study, large scale analyses explain the location of eroded coast in macroscopic viewpoint, and individual causes which cause the erosion can be understood by the examination for the beach scale.