

## Abstract

Barren grounds in coastal area are serious problems in Japan and throughout the world. Although several reasons were proposed to account for barren grounds, the shortage of dissolved iron has been especially focused in recent years. Supplying steelmaking slag and humus materials, such as compost, was proposed for restoring seaweed beds. Iron concentration in seawater could be increased if a mixture of slag and compost were supplied, since complexes, iron-humates, were produced from iron in slag and humic substances in compost. The field experiment was attempted on the side of Sea of Japan in Hokkaido and the restoration of seaweed bed from barren ground could be confirmed. This method contributes not only to restoration of coastal environment, but also to the efficient use of by-products and unutilized biomass. However, dependence of seaweed beds on water environment of coastal sea, such as dissolved iron concentration, should be understood more precisely so that this method is installed without negative impact on coastal ecosystem. In this study, two topics were investigated for understanding relationship between dissolved iron concentration and the growth of seaweed beds. The first was to evaluate the linkage between forest, river and sea based on iron. The dissolved iron concentration in seawater and river water, and the amount of humic substances and iron in soil were investigated in Okushiri Island, Hokkaido. The second was to develop a model of the seaweed growth in coastal ecosystem for evaluating the main possible factor that reduces seaweed beds. The importance of dissolved iron in seawater for the growth of seaweeds was found with this model. The model is useful for understanding the conditions of coastal environment and for deciding an appropriate method for restoration of seaweed beds from barren grounds.