（学位第３号様式）

学 位 論 文 要 旨

氏　名	Yoshihisa TSURUNARI
題　目	Environmental monitoring on the nearshore area ecosystem （沿岸生態系を取巻く環境モニタリング手法）

Terrestrial nutrients are transported into a nearshore zone to maintain a local ecosystem. Thus, development and application of an engineering method that can estimate quantity of nutrients supply to nearshore zone is necessary for a proper coastal management. In addition, nearshore current and sediment character which also affect a local ecosystem might be controlled by topography; however accurate sounding system is expensive and rarely applied to biological and ecological research. Therefore, new inexpensive but reasonably accurate method has been developed.

This study focused on a tidal flat, which is one of the major coastal environments, to apply the engineering techniques to estimate the terrestrial nutrients supply by a river discharge and groundwater discharge, and to monitor a nearshore topography and sediment characteristics. Then, aquatic GIS are applied to make the research results open to the public.

In Chapter2, An inexpensive GPS fish finder which is built with side scan sonar function is applied to measure near-shore zone topography. To estimate a survey error by the GPS fish finder, a survey using a total station has been conducted to achieve qualified highly accurate topography data set. The survey data using a total station and GPS fish finder are compared. Then, it is found that an survey data accuracy using GPS fish finder is as much as 1.2 to 1.6 times of the error that is accepted by the legal survey criteria, therefore this survey techniques using GPS fish finder cannot apply to a legal survey, however this survey technique can apply to an environmental study that require reasonably accurate topography such as for an ecosystem study.

In Chapter3, local benthic ecosystem would be affected by the change in sediment size and composition, as well as nearshore topography including a river mouth. Therefore, these key factors have been examined. Sub-aerial topography and sediment characteristic had been surveyed for four years since 2009 to 2012 in this research. In addition, time history of river discharge and significant wave characteristics which affect sediment transport and topography change are estimated.

In Chapter4, Previous field study on nearshore nutrients supply by Kamo shows that groundwater discharge around a shoreline is one of the major nutrients transport mechanism into the tidal flat, as well as the discharge from Omoi river. Therefore, further research on nutrient supply and fresh water discharge from hinter land region into the Shigetomi tidal flat has been conducted. A Water Budget Method is applied to estimate the freshwater discharge rate and volume in the Omoi river basin. Precipitation of the river basin was estimated to be $17.556 \times 10^7 m^3$/year from which the volume of river discharge was $8.697 \times 10^7 m^3$/year (50%), the quantity of ground water was estimated as much as $6.771 \times 10^7 m^3$/year (39%), and the quantity of evaporation was $2.088 \times 10^7 m^3$/year (11%), respectively Concentration of PO_4-P in the ground water was nearly the same as that in the river water.

Finally, it is emphasized that the developed techniques to estimate the terrestrial nutrients supply is unique concept and technical tool which can apply to most of coastal environment.