

Regional analysis of the impact of river basin modifications on neighboring coasts

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2006 Fiscal Year Final Research Report Summary

Regional analysis of the impact of river basin modifications on neighboring coasts

Research Project

Project/Area Number

17560455

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

水工水理学

Research Institution

Kanazawa University

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Project Period (FY)

2005 - 2006

Keywords

Coastal Erosion / Regional Analysis / Sediment Budget / Sediment Discharge / Longshore Bar

Research Abstract

Long-term and large-scale morphological changes in the integrated watershed from the Tadori River basin to the Ishikawa Coast, Japan have been examined based on survey records across a broad time scale spanning over 40 years. Contemporary data for coastal and riverbed evolution was compiled and compared in order to assess implications of anthropogenic modifications of the river basin. Focus is placed on the influence of sand extraction and dam constructions on the sedimentary deficit resulting in accelerated coastal erosion. The morphological response near the river mouth indicates that the reduced sand discharge from the river has profound implications on the morphodynamic behavior under various time scales, including periodical sand bar migration. The collation between existing records of the integrated

watershed shows that the persistent sand mining, flood control operation, and retention of sediment in terrestrial reservoirs has led to a serious imbalance of the coastal sediment budget : this has resulted in the decrease of coastal sediment volume at approximately 5×10^5 m³/year in the study area of 21.5 km² when the erosion was most accelerated.

Furthermore, an effective method is proposed in order to quantify the co-existing morphological changes of various time scales. The proposed method is based on the EOF (Empirical Orthogonal Function) technique combined with a preconditioning operation using temporal moving-average. The method has been applied to the long-term variations of the cross-shore seabed profile near Tedori River mouth, Japan. The results show that suitable moving-average operation prior to EOF analysis enables effective mode decomposition. Both the long-term transition of eroding regimes and the periodic features of bar migration are clearly captured.

Research Products (10 results)

All	2007	2006	2005
All	Journal Article		

[Journal Article] Pre-conditioned EOF Study for Long-Term Morphodynamics on Eroding Coast	2007	▼
[Journal Article] Intertidal Multiple Sand Bars on Meso-Tidal Beach	2007	▼
[Journal Article] Long-Term Field Observation on Sand Bar Migration near Tedori River Mouth, Japan	2007	▼
[Journal Article] Intertidal Multiple Sand Bars on Meso-Tidal Beach Proceedings of the 30th International Conference on	2007	▼
[Journal Article] 石川海岸松任地区における沿岸砂州の長期変動特性	2006	▼
[Journal Article] A field study on the long-term migration of sand bars in Mattou coast, Japan	2006	▼
[Journal Article] 手取川河口周辺における海底地形の長期変動に対する河川土砂管理の影響	2005	▼
[Journal Article] A Field study on the morphological change near Tedori River mouth, JAPAN	2005	▼
[Journal Article] A field study of the influence of sand dredging and dam construction on 'the long-term morphological change near Tedori river mouth	2005	▼
[Journal Article] A Field study on the morphological change near Tedori River mouth, JAPAN	2005	▼

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