

海岸植生を考慮した飛砂の運動機構の混相流的取り扱いと飛砂制御に関する研究

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1997 Fiscal Year Final Research Report Summary

Mechanism of blown sand with vegetation of coastal area from multi-phase flow dynamics and methods of blown-sand control

Research Project

Project/Area Number

08650593

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

Nagoya University (1997)
Kanazawa University (1996)

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Keywords

blown sand / coastal vegetation / wind over vegetation / coastal morphology / saltation / multi-phase flow / turbulence model

Research Abstract

Blown sand is dominantly transported in saltation, of which mechanism has been studied by coupling dynamics of saltating particles with wind dynamics with particles. As for the former, the fact that individual saltations are continued by collision and repulsion at the bed one another has been focused on. While for the latter, the fact that the momentum of wind is provided into acceleration of particles has been focused on, and spatially averaged drag force and its work done as additional production of turbulent energy due to dispersive obstacles have been taken into account in the analysis. The result can explain the properties of blown sand and wind well.

Next, non-equilibrium transport of blown sand and development of wind-velocity profile have been discussed in order to apply the theory to the actual situation where the vegetation exists and sand bed is deformable. Some simple examples have been tested in a wind tunnel to verify the theory.

On application of the idea to the fields, the measurement of blown sand transport rate is important. When one uses a horizontal sand trap is employed, it should be long enough in the wind direction, but usually it is difficult to know the wind direction in advance. In this study, a sand trap with longitudinal and transverse meshes are employed. The amount of sand deposited in each mesh is distributed dependent of wind intensity and direction. Based on the theory of blown-sand motion clarified by this study, a method to know the wind direction and blown-sand transport rate from the distribution of sand deposition in each mesh is derived, and accuracy of this method has been certificated by wind tunnel tests.

Research Products (14 results)

All Other

All Publications (14 results)

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