

Turbulence: Perspectives on Flow and Sediment Transport

edited by **N.J. Clifford, J.R. French, J. Hardisty**, published by Wiley in 15th of January, 1994, ISBN 0471939005, 360 pages.

Review by Christopher G. Kendall

This book is based on a series of papers presented at a meeting held in at Hull on 8 April 1992. New instrumentation and the firm foundation of earlier work in this field has led to recent advances in our understanding of the timing and manner of sediment transport and its relationship to near-bed turbulent flow. The papers in the book, as at the symposium, report on these advances and are intended to encourage interdisciplinary research in the study of turbulence and sediment transport in a variety of natural settings.

The book is divided into 14 chapters which include papers on the monitoring and modeling of turbulent flows and sediment transport associated with these turbulent flows and their relationship to the turbulent frequencies. Papers include discussions of the interaction between turbulent flow structure, sediment transport, bedform development and the monitoring and examination of the geophysical boundaries to turbulence. Other papers discuss high frequency velocity records obtained with spherical and discoidal electromagnetic current meters and space-time correlations of velocity measurements at a roughness transition in a gravel-bed river. There is also a paper on shear layer turbulence at an unequal depth channel confluence of two rivers in Quebec. There are also studies on turbulence and cohesive sediment transport in the Parrett estuary; high frequency flow and suspended sediment measurements in a tidal wetland channel; vorticity and sandwaves; frequency analysis of sand transport in a turbulent air flow; sand transport response to fluctuating wind velocity; and turbulent wind profiles above ablating snowpatches.

These papers combine the theoretical physics of turbulence with the methods for monitoring the phenomenon in a variety of natural and laboratory settings. The book is not heavily mathematical but does deal with the mathematical relationships associated with turbulence, illustrating these by both graphical means and photographs of the instrumentation. This book attempts to focus physics on explaining the effect of turbulence on sediment transport directly in its natural settings. Though the information in this book is state-of-the-art, the writing style is clear enough that undergraduates, advanced graduate students and experts can gain an understanding of this topic

The book is well illustrated with black and white photographs, numerous clear graphs, and it is well referenced. The type is clear, the writing varies from author to author of each paper, but nevertheless it is readable. It connects a variety of disciplines within the earth science, engineering, and fluid dynamics. The importance of the book is that it shows how to go about the measurement and modeling of turbulence and sediment transport in the field settings including those that range from fluvial, tidal, aeolian and the lab. Those of you who are in need of an understanding of turbulence and its relationship to sediment transport will find this is an important book. The editors are to be congratulated on bringing all these papers together in such a short time.