

# ***Mixing and Transport in the Environment***

edited by **Keith Beven, Philip Chatwin, and John Millbank**, published in 1994 by John Wiley & Sons, ISBN 0-47194-142-5, 458 pages, \$ 86.95.

## **Review by Christopher G. Kendall**

This volume is dedicated in a memory of Catherine M. Allen, who in her short career, contributed much to the science of turbulence flow and its impact on sediment transport. The papers in this book are the products of a memorial conference for Dr. Allen which was entitled "Physical Mechanisms of Mixing and Transport in the Environment". Many of the papers found in this volume were presented at this meeting which was held in Lancaster University over a three day period in June 1992. Following a dedication to Dr. Allen, the book is divided into three parts: 1. Transport and dispersion in fresh water systems, 2. Transport and dispersion in tidal systems and 3. Developing theories of transport and dispersion.

The first part of the book then, deals with turbulent measurements in lakes and rivers. Many of the papers refer to sampling techniques, the use of drogues, sonar observations, electro magnetic current meters, models. In fact, there is a very nice balance between mathematical models and physical measurement and the need to tie these two approaches. The problem with the data associated with this topic is that they are inadequate and incomplete and the problem with models needed to explain turbulence is that they need these data to constrain them.

The next portion of the book deals with transport and dispersion in tidal systems. This series of papers deals with the Gulf of California, the Strait of Dover, semi-enclosed bays in the Gulf of St. Lawrence, the Bristol Channel, the Celtic Sea and English channel, the East coast of Britain. Most of these papers deal with a mixture of the technology of how, for instance, measurements are made to establish tidal mixing, the examination of the salinity of tidal bodies, or sediment distribution examined using an Acoustic Doppler Current Profiler plus an Optical Beam Transmittance System and the use of drogue, tide gauges, etc. Again these papers are a mixture of modeling and measurement. Final papers of the book deal with developing theories of transport and dispersion and to a large extent these are extremely mathematical, dealing with such things as quantitative models for environmental pollution, hydrodynamic derivation of an aggregated dead zone model, turbulence in the River Severn, continuous releases of dense fluid from an elevated point source, and a particle tracking model of sediment transport.

This book has been really carefully edited. The illustrations are clear. There are one or two color photographs showing the areal distribution of different water types in Esthwaite Water and various sonar graphs and SPN concentration profiles, but most illustrations are line drawing or analog traces of data output. If you are interested in sediment transport and turbulence this book is going to be important to you. The book is timely and it contains well referenced material and has a number of rigorous mathematical descriptions of turbulent behavior. There are a variety of articles in the book which reflect the different aspects and interests of the people who attended the memorial conference for Catherine Allen. However the editors have managed to impose their will on the themes and have managed to construct a coherent complete book on this topic. They should be congratulated for producing a well written text.