

Review of *Fluvial Processes* by M. Selim Yalin and A. M. Ferreira da Silva

2001, Kluwer Monograph of the International Association of Hydraulic Research, Delft, The Netherlands, 197 pp., ISBN 90-805649-2-3. Price: US\$55 (50 Euro).

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This book immediately caught my attention, given my fascination for river mechanics and sedimentation engineering. The authors suggest that this monograph concerns the understanding and quantitative formulation of fluvial processes and the associated alluvial forms. It is designed for researchers and graduate students of hydraulic engineering, water resources, and related branches of earth sciences. However, it may have some appeal to practicing professionals as well. The central theme of the book is that the initiation of large-scale alluvial forms is due to large-scale turbulence, the subsequent time development of the so-initiated alluvial forms being guided by the regime trend. The authors intentionally prepared this text in a deductive manner. The content of any chapter presupposes the knowledge of the content of the preceding chapters; hence, the text might not appear comprehensible if it is not read in sequence.

This relatively brief monograph has been subdivided into six chapters. The first chapter presents the basics of turbulent flow and sediment transport; the second deals with bed forms and flow resistance. The reader will quickly notice that these two chapters are very similar to their counterparts in previous books by the senior author, e.g., *River Mechanics*.

Chapter 3 concerns the regime concept and its thermodynamic formulation. The development of deltas, meandering, and braiding streams is discussed in Chapter 4 in light of the regime trend. Chapter 5 is devoted exclusively to the study of the geometry and mechanics of meandering streams. The computation of the bed deformation and migration-expansion of meandering streams is finally covered in Chapter 6.

This monograph can be viewed as the combination of two parts. The first part rehashes the treatments of turbulence, sediment transport, and bed forms by the senior author. The second part relates primarily to the second author's analysis of deformable channels. This second part deals with regime conditions, meandering, and braiding as well as modeling of deformable channels.

In general, the material is very well presented, well illustrated, and mostly analytical. Each chapter contains a large number of concepts that are very important in river mechanics and river modeling. In a sense, the title may be misleading because the treatment is far less descriptive of alluvial processes than it is theoretical. The authors clearly intended an audience of engineering graduate students. The monograph thus seems far less appealing to students in earth resources, forestry, and watershed sciences. The writing style is very concise, terse, and almost cryptic in places. The notation is consistent with that of previous books and articles by the senior author. It nevertheless poses some problems. For instance, what the authors call the Froude number in Eq. 1.18 is actually the square of the Froude number commonly used in all other hydraulics texts. Also, despite a nice treatment of resistance to flow, the simple Darcy-Weisbach friction factor is nowhere to be found in this text. The authors prefer a resistance factor c_f , which is different although proportional to the Chezy conveyance coefficient C . Once the difficulties of the authors' notation are overcome, the reader can find in this monograph a wealth of information on the analysis of deformable channels. The authors are quite thorough in their treatment of the subject. The analysis of bed forms that can also be found in previous texts of the first author remains interesting. The compendium of data lends support to the insightful analysis of bedform geometry and resistance to flow. The analysis of regime channel geometry is also sound, although many other similar formulations have been presented in the literature. There may be something missing on the book's attached CD because my copy contained less than 200 KB of information. It seems that the large database and problem solutions could well have been included in the CD. The solutions manual provides detailed solutions to interesting analytical problems, although very few are descriptive of geomorphic alluvial processes. The publisher provides a high-quality binding. The font size and type and overall typesetting are very appropriate. The price is perhaps a little high for this volume, but the binding will last forever.

In summary, this monograph is a welcome addition to the literature. It will suit readers interested in the mechanics of deformable channels. It is an advanced text mostly useful to graduates students in civil engineering. The strength of the book lies in the detailed analytical presentation of the mechanics of deformable channels. The weaknesses of this monograph probably lie in its unconventional notation and very terse description of fluvial processes. Overall, it contains a concise summary of the current state of knowledge at a price that most can afford.