



## Book reviews

*Chemical Water Treatment. Principles and Practice*, H. Roques, VCH Verlagsgesellschaft, Weinheim, Germany, 1996, Hardback xiii + 620 pp., DM 258, ISBN 1-56081-518-3.

Chemical water treatment practice, an important subject affecting human health, has evolved steadily over the past century. However, current water treatment practice does not often incorporate recent advances in aqueous geochemistry and kinetics of mineral formation. This monograph integrates recent geochemical equilibrium and kinetic advances into a discussion of conventional engineering approaches to water treatment.

Much laboratory data presented in the monograph have come from two decades of water treatment process research in the Environmental Chemistry and Engineering Laboratory at the French National Applied Sciences Institute of Toulouse (INSA). French water treatment practice is emphasized when discussing specific treatment details, but practice in other nations is included where appropriate. Water treatment processes involving chemical reactions are examined from thermodynamic, kinetic, and engineering perspectives. Emphasis on calcium carbonate formation and dissolution reactions in aqueous solution serves as a basis for discussion of a range of water treatment procedures.

The author divides the text into four parts. Aqueous geochemistry of the carbonate–carbon dioxide system is the first. The discussion of aqueous geochemistry includes a review of solution speciation and calcium carbonate solid phases encountered in water treatment processes. Graphical presentations of calcium carbonate–carbon dioxide equilibria, developed from solubility relationships, are used extensively. Results are summarized in plots of master variables, which are intended for use in water treatment practice. Among the graphical representations are those based on the well-known results of Langlier and of Pourbaix. Discussion of kinetic aspects of water treatment processes focuses on formation and dissolution of calcium carbonate in solution.

The remaining three sections, containing 12 chapters, cover treatment processes applied to natural waters and waste waters. Water treatment processes dealing with reactions of calcium carbonate and other minerals (i.e. iron and manganese removal procedures) are analyzed. Illustrations of water treatment reactor design are well integrated with the discussion. Graphical representations of water composition variables are presented for evaluation of water treatment problems such as aggressivity and material corrosion.

Common water treatment additives and their use are examined in two chapters.

Additives, such as inhibitors and complexation agents, reduce or prevent carbonate scaling. Acid treatment, silica removal and specific waste water treatments to remove phosphorus and cyanide are described in separate chapters containing theoretical and practical information. For example, 19 different chemical procedures are presented for removal of cyanide contaminants. The majority of these procedures involves chemical oxidation. The final chapters examine oxidation of organic pollutants in water and treatment procedures for boiler water and cooling water.

The monograph serves as a complete reference to aqueous geochemistry of water treatment processes. Translation of the text is satisfactory, and the production quality of the monograph is excellent. This text is appropriate for an upper level graduate course in a Geology, Environmental Chemistry, Environmental Engineering, or Civil Engineering program involving natural water chemistry and water treatment procedures. References are up to the mid-1980s.

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*Amazonian Deforestation and Climate*, J.H.C. Gash, C.A. Nobre, J.M. Roberts and R.L. Victoria (Editors), Wiley, Chichester, xviii + 611 pp.

This book describes the results of field and laboratory research undertaken during the four-year course of the Anglo-Brazilian Climate Observation Study (ABRACOS). The field sites were at three widely separated localities in Eastern, Central and Western Amazonia, and in each of these localities extensive areas of undisturbed forest and pasture were selected for intensive study by joint teams of researchers from Brazilian and British research institutes and universities. At the outset, the objectives of the project were primarily meteorological: to collect field data for use in calibrating the land-surface sub-models of the General Circulation Models (GCMs) used in climate prediction. This necessarily included hydrological research on the water use by forest and tropical pastures, and as the project developed other sub-projects also came to be added, widening its scope. These included research on the carbon cycle of the Amazon forest; interception of rainfall; isotopic composition of water vapour within the forest canopy; convective boundary layer growth; estimation of leaf area index and total biomass of regenerating forest; the urban climate of the city of Manaus; and others.

The book contains 32 papers presented at an end-of-project symposium held in Brasilia in September 1994. It is in three parts, with each part introduced by a review paper. Part 1 contains 11 papers (205 pages) about hydrological, soils and microclimate studies within ABRACOS, with an excellent introductory review by L.A. Bruijnzeel; Part 2 has 10 papers (177 pages) on plant physiology and vegetation, with an introductory review by E. Medina and E. Cuevas; and Part 3 has nine papers (177 pages) on atmospheric boundary layer, meso- and large-scale meteorology, with



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Journal of Hydrology  
Volume 195, Issues 1-4, August 1997, Pages 385-386

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doi:10.1016/S0022-1694(97)89474-7  
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Available online 8 June 1998.

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