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Nota di contenuto	The Biogeochemistry of Submerged Soils; Contents; Preface; Acknowledgements; 1 Introduction; 1.1 Global Extent of Submerged Soils and Wetlands; 1.2 Biogeochemical Characteristics; 1.3 Types of Submerged Soil; 1.3.1 Organic Soils; 1.3.2 Mineral Soils; 1.3.3 Relation between Soils and Landform; 2 Transport Processes in Submerged Soils; 2.1 Mass Flow; 2.2 Diffusion; 2.2.1 Diffusion Coefficients in Soil; 2.2.2 Propagation of pH Changes Through Soil; 2.3 Ebullition; 2.4 Mixing by Soil Animals; 3 Interchange of Solutes between Solid, Liquid and Gas Phases; A. WATER; 3.1 Composition of the Water 3.1.1 Acid and Bases3.1.2 Speciation; 3.1.3 Equilibrium Calculations; 3.2 pH Buffer Capacity; 3.3 Equilibrium with the Gas Phase; 3.3.1 Floodwater CO(2) Dynamics; 3.4 Gas Transport Across the Air-Water Interface; 3.4.1 CO(2) Transfer Across the Air-Water Interface; B. SOIL;

3.5 The Solid Surfaces in Soils; 3.6 The Solid Surfaces in Submerged Soils; 3.6.1 Organic Matter in Submerged Soils; 3.7 Solid-Solution Interactions; 3.7.1 Adsorption; 3.7.2 Precipitation; 3.7.3 Co-Precipitation in Solid Solutions; 3.7.4 Inhibition of Precipitation; 3.7.5 Equations for Solid-Solution Interactions
4 Reduction and Oxidation4.1 Thermodynamics and Kinetics of Redox Reactions; 4.1.1 Electron Activities and Free Energy Changes; 4.1.2 Redox Potentials; 4.1.3 Relation between pe and Concentration of Redox Couples; 4.1.4 pe-pH Diagrams; 4.1.5 Energetics of Reactions Mediated by Microbes; 4.2 Redox Conditions in Soils; 4.2.1 Changes with Depth in the Soil; 4.2.2 Changes with Time; 4.2.3 Calculated Changes in pe, pH and Fe During Soil Reduction; 4.2.4 Measurement of Redox Potential in Soil; 4.3 Transformations of Nutrient Elements Accompanying Changes in Redox; 4.3.1 Transformations of Carbon 4.3.2 Transformations of Nitrogen4.3.3 Transformations of Sulfur; 4.3.4 Transformations of Phosphorus; 4.4 Oxidation of Reduced Soil; 4.4.1 Kinetics of Fe(2+) Oxidation; 4.4.2 Simultaneous Diffusion and Oxidation in Soil; 5 Biological Processes in the Soil and Floodwater; 5.1 Microbiological Processes; 5.1.1 Processes Involved in Sequential Reduction; 5.1.2 Nitrate Reduction; 5.1.3 Iron and Manganese Reduction; 5.1.4 Sulfate Reduction; 5.1.5 Methanogenesis; 5.1.6 Aerobic Processes; 5.2 Macrobiological Processes; 5.2.1 Net Primary Production and Decomposition; 5.2.2 The Floodwater-Soil System 5.2.3 Floodwater Properties5.2.4 Floodwater Flora; 5.2.5 Fauna; 5.3 Is Biodiversity Important?; 6 Processes in Roots and the Rhizosphere; 6.1 Effects of Anoxia and Anaerobicity on Plant Roots; 6.1.1 Adaptations to Anoxia; 6.1.2 Armstrong and Beckett's Model of Root Aeration; 6.2 Architecture of Wetland Plant Root Systems; 6.2.1 Model of Root Aeration versus Nutrient Absorption; 6.2.2 Root Surface Required for Nutrient Absorption; 6.3 Nutrient Absorption Properties of Wetland Plant Roots; 6.3.1 Ion Transport in Roots; 6.3.2 Ion Transport in Wetland Roots; 6.4 Root-Induced Changes in the Soil
6.4.1 Oxygenation of the Rhizosphere

Sommario/riassunto

Submerged soils and the wetlands they support are of huge practical importance: in global element cycles, as centres of biodiversity, in global food production. They are also uniquely interesting scientifically because of their peculiar biogeochemistry and the adaptations of plants and microbes to it.This book describes the physical, chemical and biological processes operating in submerged soils and governing their properties. It describes the transport processes controlling the fluxes of gases and solutes through the soil; the interchange of solutes between solid, liquid and gas phases; r