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Nota di contenuto	Cover; Title Page; Copyright; Contents; Preface; 1: The Chemical Forms of Silicon in the Marine Domain; 1.1. The element "silicon"; 1.2. Orthosilicic acid; 1.3. Particulate silicas; 1.3.1. Lithogenic silica; 1.3.2. Biogenic silica; 2: Techniques for Studying Stocks and Fluxes; 2.1. Techniques for the chemical analysis of silicon; 2.1.1. The sequential digestion method; 2.1.2. The extraction kinetics method; 2.1.3. The correction by aluminum method ; 2.2. Techniques for the analysis of silicon fluxes; 2.2.1. Labeling with radioactive isotopes; 2.2.2. Labeling with stable isotopes 2.3. Silica deposit labeling and cellular imaging 2.4. Isotopic fractionation of silicon and utilization of ³⁰ Si as a tracer in oceanography; 2.4.1. Demonstration of the isotopic fractionation by the diatoms; 2.4.2. Utilization of ³⁰ Si as a tracer in oceanography; 2.4.3. The interest of analyses of the isotopic ratio of silicon; 3: The Marine Producers of Biogenic Silica; 3.1. Radiolarians; 3.2. Silicoflagellates; 3.3. Diatoms; 3.4. Silicification within the scope of nanoplankton and picoplankton; 3.5. Siliceous sponges; 3.6. The functions of biogenic silica 3.7. The evolution of the siliceous organisms and the oceanic cycle of

the silicon3.8. Sedimentary opal deposits; 4: Cellular Mechanisms of Silica Deposition by Diatoms; 4.1. Influence of orthosilicic acid availability on uptake and diatom growth; 4.1.1. General formulations and kinetics information; 4.2. The chemical form of dissolved Si available for diatoms; 4.2.1. The model of Riedel and Nelson [RIE 85]; 4.2.2. The model of Del Amo and Brzezinski; 4.2.3. The membrane transporters; 4.3. Cellular mechanisms of orthosilicic acid uptake 4.4. Intervention of specific proteins in the deposition mechanism4.4.1. The Hecky et al. conceptual model; 4.4.2. Frustulins and silaffins; 4.4.3. Frustule synthesis, a complex physiological process; 4.5. The stoichiometric ratios Si/C/N of diatoms; 4.5.1. Stoichiometry in diatoms and limitation by iron; 4.5.2. The influence of trace metals on the uptake of orthosilicic acid; 5: Dissolution of Biogenic Silica and Orthosilicic Acid Regeneration; 5.1. Reactivity of the particulate silica and dissolution constants; 5.2. Processes of control of the dissolution in aqueous phase 5.2.1. Variation of the solubility of opal with depth5.2.2. Influence of pH; 5.2.3. Role of temperature; 5.2.4. Relationship with bacterial degradation process; 5.2.5. Influence of aluminum concentration; 5.3. The solubility of opal in natural conditions; 6: The Control of Biogeochemistry by Silicon at Global Scale; 6.1. The preservation of calcite in ocean sediments; 6.1.1. Control of alkalinity by organic production; 6.1.2. The CaCO₃/C_{org} ratio (rain ratio); 6.1.3. The distribution of orthosilicic acid in the Global Ocean; 6.2. The central role of the Southern Ocean 6.2.1. Subantarctic Mode Water (SAMW)

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