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	Introduction; 4.2 Geological nitrogen cycle; 4.3 Components of the global nitrogen cycle; 4.4 Nitrogen redox chemistry 4.5 Biological reactions of the nitrogen cycle4.6 Atmospheric nitrogen chemistry; 4.7 Summary and areas for future research; References; 5. The Global Sulfur Cycle; 5.1 Introduction; 5.2 The global sulfur cycle from two perspectives; 5.3 The evolution of S metabolisms; 5.4 The interaction of S with other biogeochemical cycles; 5.5 The evolution of the S cycle; 5.6 Closing remarks; Acknowledgements; References; 6. The Global Iron Cycle; 6.1 Overview; 6.2 The inorganic geochemistry of iron: redox and reservoirs; 6.3 Iron in modern biology and biogeochemical cycles; 6.4 Iron through time 6.5 SummaryAcknowledgements; References; 7. The Global Oxygen Cycle; 7.1 Introduction; 7.2 The chemistry and biochemistry of oxygen; 7.3 The concept of redox balance; 7.4 The modern O2 cycle; 7.5 Cycling of O2 and H2 on the early Earth; 7.6 Synthesis: speculations about the timing and cause of the rise of atmospheric O2; References; 8. Bacterial Biomineralization; 8.1 Introduction; 8.2 Mineral nucleation and growth; 8.3 How bacteria facilitate biomineralization; 8.4 Iron oxyhydroxides; 8.5 Calcium carbonates; Acknowledgements; References; 9. Mineral-Organic-Microbe Interfacial Chemistry 9.1 Introduction9.2 The mineral surface (and mineral-bio interface) and techniques for its study; 9.3 Mineral-organic-microbe interfacial processes: some key examples; Acknowledgements; References; 10. Eukaryotic Skeletal Formation; 10.1 Introduction; 10.2 Mineralization by unicellular organisms; 10.3 Mineralization by multicellular organisms; 10.4 A brief history of skeletons; 10.5 Summary, Acknowledgements; References; 11. Plants and Animals as Geobiological Agents; 11.1 Introduction; 11.2 Land plants as geobiological agents; 11.3 Animals as geobiological agents; 11.4 Conclusions
Sommario/riassunto	2012 PROSE Award, Earth Science: Honorable Mention For more than fifty years scientists have been concerned with the interrelationships of Earth and life. Over the past decade, however, geobiology, the name given to this interdisciplinary endeavour, has emerged as an exciting and rapidly expanding field, fuelled by advances in molecular phylogeny, a new microbial ecology made possible by the molecular revolution, increasingly sophisticated new techniques for imaging and determining chemical compositions of solids on nanometer scales, the development of non-traditional stable