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Nota di contenuto	Contents; Contributors; 1 What are Extreme Environments and What Lives in Them?; 1.1 History and Definition of the Terms 'Extreme' and 'Extremophile'; 1.2 Types of Extreme Environment; 1.3 Life in Transition; 1.4 One Man's Meat is Another Man's Poison; 1.5 Timing is Everything; 1.6 A Frog is not a Frog but Merely a Transient Phase Between a Tadpole and an Egg; 1.7 Friends and Neighbours; 1.8 Where to Next?; References; 2 Past Extremes; 2.1 Introduction; 2.2 Archaean Climate and Life (~3500 Ma); 2.2.1 Archaean climate; 2.3 Transition to the Land (~470 Ma); 2.3.1 The rise of the embryophytes 2.3.2 Embryophytes and the decline in atmospheric CO ₂ and the rise of O ₂ ; 2.4 Mass Extinction and Extreme Environments; 2.4.1 Permian/Triassic (P/Tr) boundary; 2.4.2 Cretaceous/Tertiary (K/T)

boundary (65 Ma); 2.5 Conclusion; References; 3 Polar Marine Ecosystems; 3.1 Introduction; 3.2 The Arctic Seas Versus the Southern Ocean; 3.3 Water Column; 3.4 Shallows; 3.4.1 Ice scour; 3.4.2 Climate change; 3.4.3 Water climate; 3.5 Continental Shelf; 3.5.1 Disturbance; 3.5.2 Size; 3.5.3 Reproduction; 3.5.4 Diversity gradients; 3.6 Below Ice Shelves; 3.7 Continental Slope; 3.7.1 Disturbance 3.7.2 Carbonate compensation depth 3.8 Isolated Islands; 3.9 Conclusions; References; 4 Sea Ice; 4.1 Introduction; 4.2 The Physics of Sea Ice; 4.3 Space in Ice; 4.4 Organisms Living in Sea Ice; 4.5 Mechanisms to Avoid Freezing; 4.6 Extracellular Polymeric Substances in Sea Ice; 4.7 Oxygen in Sea Ice; 4.8 Dimethylsulphoniopropionate in Sea Ice; 4.9 Biomarkers for Sea Ice Extent in Past Climates; 4.10 Concluding Remarks; References; 5 Polar Terrestrial Environments; 5.1 Introduction; 5.2 Terrestrial Ecosystems; 5.2.1 Habitats; 5.2.2 Permafrost; 5.2.3 Polar soils 5.3 Terrestrial Biota and Communities 5.3.1 Ice-free ecosystems; 5.3.2 Vegetation; 5.3.3 Invertebrate fauna; 5.3.4 Vertebrate fauna; 5.3.5 Exceptional ecosystems; 5.4 Physiology and Ecology; 5.4.1 Life history strategies; 5.4.2 Life under extreme stress; 5.4.3 Life cycles; 5.5 Colonization of the Polar Regions by Terrestrial Biota; 5.6 Arctic and Antarctic Comparisons; References; 6 High Altitude and Latitude Lakes; 6.1 Introduction; 6.2 Trophic Structure; 6.3 Seasonal Patterns of Primary Productivity; 6.3.1 Alpine lake primary production; 6.3.2 Arctic lake primary production 6.3.3 Antarctic lake primary production 6.4 Secondary Production: Bacteria and Viruses; 6.5 Secondary Producers: Protozoa and Invertebrates; 6.6 Survival Strategies and Adaptation in Extreme Lakes; 6.7 Future Directions; References; 7 Subglacial Lakes; 7.1 Introduction; 7.2 Geographic Range, History and Distribution; 7.3 The Extreme Characteristics of Subglacial Lakes; 7.4 The Predicted Diversity and Community Composition of Life in Subglacial Lakes; 7.4.1 Analogues for life in subglacial lakes; 7.4.2 Challenges for the study of life in subglacial lakes; 7.4.3 Likely organism groups 7.5 Existing Studies

Sommario/riassunto

From arid deserts to icy poles, outer space to the depths of the sea, this exciting new work studies the remarkable life forms that have made these inhospitable environments their home. Covering not only micro-organisms, but also higher plants and animals such as worms, fish and polar plants, this book details the ecological, biological and biogeochemical challenges these organisms face and unifying themes between environments. Equally useful for the expert, student and casual scientific reader, this book also explores the impact of climate change, rapid seasonal changes and pollution on these
