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3. Ice surface environments 3.1 Ice shelves; 3.1.1 Introduction; 3.1.2 Biology of ice shelf lakes; 3.2 Glaciers and ice sheets; 3.2.1 Supraglacial habitats; 3.2.2 Spatial variations in the biota in supraglacial habitats; 3.2.3 Cryoconite; 3.2.4 Carbon cycling and biological production; 3.2.5 Other debris habitats, including the ice margin; 4. Sea and lake ice; 4.1 Sea ice; 4.1.1 Introduction; 4.1.2 Adaptations; 4.1.3 Community structure and production; 4.2 Lake ice; 4.2.1 Introduction; 4.2.2 Community structure and production; 5. Subglacial environments; 5.1 Introduction
5.2 Biology of subglacial environments 5.2.1 Wet-based glaciers; 5.2.2 Blood Falls; 5.3 Life in glacial ice; 5.4 Subglacial lakes; 5.5 Lake Vida; 6. Astrobiology; 6.1 Introduction; 6.2 Extraterrestrial cryospheric environments; 6.2.1 Mars; 6.2.2 Europa: a Jovian moon; 6.2.3 Enceladus: a small Saturnian moon; 6.2.4 Titan: a large Saturnian moon; 6.3 Weaknesses of terrestrial analogues for extraterrestrial cryospheric environments; 7. Future directions; 7.1 Introduction; 7.2 Priority field sites for future research; 7.3 Remote sensing development; 7.4 Sensor technology; 7.5 Modelling
7.6 Molecular biology7.7 Elucidating the evolution of extremophile communities; Glossary; A; B; C; D; E; F; H; I; K; L; M; N; O; P; R; S; T; U; V; W; References; Index; A; B; C; D; E; F; G; H; I; J; K; L; M; N; O; P; Q; R; S; T; U; V; W; X; Z

Sommario/riassunto

Snow and ice environments support significant biological activity, yet the biological importance of some of these habitats, such as glaciers, has only recently gained appreciation. Collectively, these ecosystems form a significant part of the cryosphere, most of which is situated at high latitudes. These ice environments are important sentinels of climate change since the polar regions are presently undergoing the highest rates of climate warming, resulting in very marked changes in the extent of ice caps, glaciers, and the sea ice. Glacial systems are also regarded as an analogue for astrobiology