

Astrobiology and the Risk Landscape

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Abstract

We live in the epoch of explosive development of astrobiology, a novel interdisciplinary field dealing with the origin, evolution, and the future of life. While at first glance its relevance for risk analysis is small, there is an increasing number of crossover problems and thematic areas which stem from considerations of observation selection effects and the cosmic future of humanity, as well as better understanding of our astrophysical environment and the open nature of the Earth system. In considering the totality of risks facing any intelligent species in the most general cosmic context (a natural generalization of the concept of global catastrophic risks or GCRs), there is a complex dynamical hierarchy of natural and anthropogenic risks, often tightly interrelated. I shall argue that this landscape-like structure can be defined in the space of astrobiological/SETI parameters and that it is a concept capable of unifying different strands of thought and research, a working concept and not only a metaphor. Fermi's Paradox or the "Great Silence" problem represents the crucial boundary condition on generic evolutionary trajectories of individual intelligent species; I briefly consider the conditions of its applicability as far as quantification of GCRs is concerned. Overall, such a perspective would strengthen foundations upon which various numerical models of the future of humanity can be built; the lack of such quantitative models has often been cited as the chief weakness of the entire GCR enterprise.