

Making the sky blue: The early history of life and the rise of complex life

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The young Earth, soon after its formation at 4.57 billion years ago, was a significantly different planet to that which we live on today – the sun was much fainter, the Moon would have looked much larger as it was much nearer, and there was little in the way of continental crust. More specifically, the planet itself was much hotter, the oceans were full of dissolved iron and silica, and both it and the atmosphere had no oxygen, making the seas look green and the sky look orange: how could life have thrived in this alien environment, what kind of life was it, and, more importantly, did it?

In the past decade, claims and counterclaims for the existence of early life have swirled through the literature, provoking some to claim that the oldest evidence for life now stands at only a relatively recent 1.8 billion years ago, rather than the 3.5 billion years that was widely considered to be the case only a decade ago. However, this reactionary claim has been modified since, and it seems to have settled back to 3.5 Ga, with even a suggestion of life at 3.8 billion years ago in some of the very oldest rocks on Earth.

This talk will provide an overview of the habitats of the earliest life on our planet and the possible types of life that might have inhabited the young Earth, and show how the evolution of life – from simple prokaryotes to more complex forms – evolved in parallel with the changing dynamic regime of the Earth through time, with the end result being the development of a mature planet at around 2.3-2.2 billion years ago, complete with a regular supercontinent cycle, an oxygenated atmosphere, and eukaryotic life.