
未来的气候在过去的4.2亿年中从未出现过

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《自然-通讯》发表的Future climate forcing potentially without precedent in the last 420 million years报道称，如果人类不减少化石能源的使用，地球系统将遭遇5亿年来从未出现过的地质先例。

地球气候在地质时标上的演变很大程度上取决于太阳总辐照度(TSI)和大气中温室气体含量的变化。来自英国南安普顿大学的Gavin L.

Foster及其同事发现，在过去的约4.2亿年内，缓慢增加的约 50 Wm^{-2} TSI(辐射强迫增加了约 9 Wm^{-2})几乎完全因大气中二氧化碳浓度的长期下降所抵消。这可能是由于硅酸盐风化的负面反馈和陆地植物的扩张共同确保了地球的长期宜居性。

如果人类不减少使用化石燃料，到二十一世纪中叶我们将面临的风险是，二氧化碳将达到自始新世早期(5000万年前)以来的最高值。如果二氧化碳继续上升，到二十三世纪，与此相关的强迫辐射的大幅度增加，以及地球系统会如何反应，都将成为过去五亿年间没有出现过的地质先例。

摘要：The evolution of Earth's climate on geological timescales is largely driven by variations in the magnitude of total solar irradiance (TSI) and changes in the greenhouse gas content of the atmosphere. Here we show that the slow 50 Wm^{-2} increase in TSI over the last 420 million years (an increase of 9 Wm^{-2} of radiative forcing) was almost completely negated by a long-term decline in atmospheric CO_2 . This was likely due to the silicate weathering-negative feedback and the expansion of land plants that together ensured Earth's long-term habitability. Humanity's fossil-fuel use, if unabated, risks taking us, by the

middle of the twenty-first century, to values of CO₂ not seen since the early Eocene (50 million years ago). If CO₂ continues to rise further into the twenty-third century, then the associated large increase in radiative forcing, and how the Earth system would respond, would likely be without geological precedent in the last half a billion years.(来源：科学网)

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