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The Climate change caused by the land-plants invasion

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Land-plants invaded continents during the Mid-Paleozoic. Their spreading and diversification have been compared to the Cambrian explosion in terms of intensity and importance in the Earth life history. If prior studies were focused on the roots system development and its weathering impact, here we used a coupled climate/carbon/vegetation model to investigate impacts of their colonization on surface climate. The simulated climate predicts a significant CO2 drawdown due to an enhanced hydrological cycle which is paradoxically associated with a very small temperature change. Indeed the greenhouse reduction linked to CO2 is counter-acted by a large warming provided by the surface albedo reduction caused by the appearance of an extended plant-cover. If the CO2 is consensually assumed as the main driver of the Phanerozoic climate, this paper demonstrates that, during the land-plants invasion, the soil properties modifications have supplanted the carbon as the primary factor governing the climate.