变暖导致土壤二氧化碳排放量增加 30% | Science Advances（转）

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GEOCHEMISTRY

Five years of whole-soil warming led to loss of subsoil carbon stocks and increased CO_2 efflux

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Subsoils below 20 cm are an important reservoir in the global carbon cycle, but little is known about their vulnerability under climate change. We measured a statistically significant loss of subsoil carbon (−33 ± 11%) in warmed plots of a conifer forest after 4.5 years of whole-soil warming (4°C). The loss of subsoil carbon was primarily from unprotected particulate organic matter. Warming also stimulated a sustained 30 ± 4% increase in soil CO_2 efflux due to increased CO_2 production through the whole-soil profile. The observed in situ decline in subsoil carbon stocks with warming is now definitive evidence of a positive soil carbon-climate feedback, which could not be concluded based on increases in CO_2 effluxes alone. The high sensitivity of subsoil carbon and the different responses of soil organic matter pools suggest that models must represent these heterogeneous soil dynamics to accurately predict future feedbacks to warming.

近日，研究人员指出，经过 4.5 年的土体变暖后，20 cm 以下土壤的碳损失率高达 33%，土壤的二氧化碳排放量增加了 30%。

在全球碳循环系统中，20 cm 以下土壤是重要的碳汇，但人们对其在气候变化下的脆弱性知之甚少。来自美国劳伦斯伯克利国家实验室、达特茅斯学院、瑞士苏黎世大学等机构的研究人员，测量了针叶林地块经过 4.5 年的土体变暖（4℃）后下层土壤碳含量的变化及土壤的二氧化碳排放量。

研究结果显示，变暖对不同土层的有机碳储量有不同的影响。20 cm 以下土壤的碳损失约 3.21 kg/cm^2，损失率高达 33%，主要来自有机颗粒物的分解。相比之下，20 cm 以上土壤碳储量在统计上没有显著增加。气候变暖导致土壤的二氧化碳排放量增加了 30%。该研究指出，模型预测应将 20cm 以下土壤中有机碳的高温度敏感性、土壤的非均质动力学等考虑在内，才能准确预测未来土壤对气候变暖的反馈。

近日，该研究成果以“Five years of whole-soil warming led to loss of subsoil carbon stocks and increased CO_2 efflux”为题发表在 Science Advances 上。

原文链接：https://mp.weixin.qq.com/s/FtuO5jUKx095naokbbZ7GQ