



## **Sources of uncertainty in future soil organic carbon storage.**

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It is now widely accepted that the natural carbon cycle has a key role to play in determining future climate. As climate changes, this will affect the ability of the carbon cycle to take up and store anthropogenic carbon. However, great uncertainty surrounds the magnitude of this sensitivity to climate. Much of this uncertainty comes from the terrestrial biosphere and in particular the storage of carbon in soil organic material. Therefore it is vitally important to understand the factors which will determine future soil carbon storage and their inherent uncertainties. We show that significant uncertainty in future soil carbon storage comes from many sources, such as climate uncertainty, uncertainty in vegetation productivity, uncertainty in soil carbon structure and its sensitivity to changing temperature and moisture. Understanding and reducing this uncertainty is key to improving reliability of future climate projections and their utility for informing climate mitigation policy.