Potential contribution from bioenergy with CCS to SDG13: an Earth system modelling perspective

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Renewable energy will play a key role in transformation of the energy sector to reduce CO\textsubscript{2} emissions. Integrated Assessment Modelling scenarios reaching the temperature targets of the Paris Agreement rely on large scale deployment of Bioenergy with Carbon Capture and Storage (BECCS). BECCS are a key contributor to reducing emissions and achieving net negative emissions in such scenarios. The potentials of large scale BECCS deployment in reaching the 1.5°C target is evaluated using Earth system model simulations in the work presented here. Fully coupled carbon cycle and interactive biogeochemistry is used to assess different rates of BECCS deployment, alongside assuming strong mitigation. BECCS at large scale influence not only the global carbon cycle, but also the feedbacks between the atmosphere and land surface. Changing the land cover to biocrops affects the terrestrial store of carbon, and also the physical properties of the land surface, i.e. biogeophysical forcing, which leads to important feedbacks in the climate system. Renewable energy from BECCS may have implications on several of the SDGs, in particular #13 Climate, #7 Energy, #15 Life on land, as well as #2 Hunger. It is found that it remains a challenge to achieve the 1.5°C target, relying strongly on bioenergy with CCS, and the mitigation potential depends on geographical location, and availability of suitable land areas.