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Global Carbon Budget from Atmospheric Perspective

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Abstract

Increasing atmospheric CO₂ levels are the main driver of climate change. This increase is the result of CO₂ emissions on the one hand, and CO₂ uptake by vegetation and oceans on the other hand. It is therefore not only important to know the changing emissions well, but also how the land and ocean sinks of carbon will change in the future. To know how the atmospheric CO₂ levels are changing, the the annually updated 'global carbon budget' estimates all components in the carbon cycle. With atmospheric inverse models, we can estimate the sinks of CO₂ and their interannual variability, to learn about the response of the sinks to e.g. droughts or other events. Furthermore, other atmospheric gases can act as a tracer to separately estimate individual components in the total atmospheric CO₂ signal. In this talk, I will give an overview of the atmospheric CO₂ inversions in the global carbon budget, and I will discuss the added value of combined CO₂ and oxygen measurements as a tracer for ocean, vegetation uptake as well as fossil fuel emissions.