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Poster
African ecosystems are highly vulnerable to changes in climate and have been exposed to rapid land-use changes. Because of their critical role in global carbon cycle, understanding the response of their carbon fluxes to climate and environmental changes is of great interest. However, this remains challenging due to extremely sparse conventional CO2 observations. This presentation introduces newly developed one-way nested regional CO2 flux inversion system over Africa within the Carbon Monitoring System - Flux (CMS-Flux). The system assimilates surface and column CO2 observations from Orbiting Carbon Observatory-2 (OCO-2) satellite, and optimizes fluxes at 0.5°x0.625° resolution. This high-resolution regional inversion system has the potential to reduce observation representativeness and transport errors associated with coarse resolution global inversion system (4°x5°), which contribute to the uncertainties in flux estimates. As a case study, we investigate whether the regional inversion can outperform the global inversion in capturing the spatiotemporal patterns of terrestrial CO2 flux anomalies from the South African drought in 2019 and the East African flood in 2020, respectively, compared to 2021. Furthermore, we will discuss how seasonally and regionally varied observation coverage and wind direction affect inversion performance.
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