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Poster
The 2019-2020 Australian bushfire season is recognized as one of the most severe on record, causing unprecedented impacts on the natural environment and compromising air quality. Additionally, extensive greenhouse gas emissions introduced unknown uncertainties into bottom-up estimations. This study employs an inverse analysis of atmospheric methane from GOSAT and surface observations during 2010- 2021 in Australia to evaluate methane emissions for each bushfire season and examine the characteristics of methane emissions during the 2019?2020 bushfire season. We utilize the high-resolution (0.1 °×0.1 °) inverse model NIES-TM-FLEXPART-VAR (NTFVAR), incorporating input anthropogenic emissions from EDGAR v.7, wetland emissions from VISIT, biomass burning emissions from GFAS, soil and chemical sinks, oceanic, geological and termite sources. The model optimizes six emission categories, including coal, oil and gas, agriculture, waste, biomass burning, and wetlands. The inversion results indicate that the prior fluxes overestimated methane emissions in Australia and dampened emission variability during bushfire seasons. Validation of the inversion using ship observations in the Pacific Ocean, New Zealand, and aircraft observations in Australia, which are independent of our inverse simulations, demonstrates significant improvements in the optimized fluxes. The inverse analysis of atmospheric observations for Australian bushfire seasons contributes to a better understanding and independent evaluation of methane emission budgets for the coming global stocktake.
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