

6.126 Inverse modeling of CH₄ surface fluxes using GOSAT observations - Level 4 product updates.

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Abstract:

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Greenhouse gases Observing SATellite (GOSAT) Level 4 (L4) product v1.03 – monthly regional surface CH₄ flux estimates by inverse modeling from GOSAT XCH₄ and ground-based CH₄ observational data by WDCGG and NIES datasets now cover the 3-year period starting from June 2009. The L4 product extension till September 2013 was made using the recent version of EDGAR emission inventory and extension of GFED v3.1 fire emissions. The products provide opportunity to study the interannual flux variability including events of CH₄ emissions from large-scale climate anomalies and forest fires in Russia and Amazonia in 2010. With adding GOSAT retrievals to the flux estimation (called GOSAT-L4), we found enhanced fluxes in tropical Africa (17% from a priori and 10% from flux estimates using ground-based observations only, called SURFACE), tropical and subtropical South America (12% and 9% respectively), and East Asia (21% and 6% respectively), but lowered fluxes in South and Southeast Asia (12% and 14% respectively). In 2010 raging fires occurred in Brazil and Bolivia under severe drought, and the highest biomass burning fluxes in central part of South America were estimated in 2010 during the simulation period 2010-2012. The intensity of the 2010 biomass burning flux was enhanced in GOSAT-L4 compared with a priori of GFED v3.1 and SURFACE. In Russia, two fire events occurred in 2010 and 2012 under very hot and relatively dry condition. The 2010 fires occurred over European Russia, and a large departure from the GFED estimates was not shown in both SURFACE and GOSAT-L4. The GOSAT-L4 biomass burning fluxes were similar to a priori, but lower than SURFACE (particularly in the eastern part of Siberia).