Geophysical Research Abstracts
Vol. 15, EGU2013-854, 2013
EGU General Assembly 2013

Estimating global fluxes of CO_2 for 2009-2010 using station and space-borne (GOSAT) observation data with empirical orthogonal functions

Ruslan Zhuravlev (1), Alexander Ganshin (1), Shamil Maksyutov (2), Sergey Oshchepkov (2), Yukio Yoshida (2), and Boris Khattatov (3)

(1) Central Aerological Observatory, Department of Upper Atmospheric Layers Physics, Russian Federation (ruslan.zhuravlev@gmail.com), (2) National Institute for Environmental Studies, Tsukuba, Japan, (3) Fusion Numerics International, Boulder, CO, USA

Inverse problem of atmospheric transport has been applied to estimate surface fluxes of CO_2 for 2009-2010 using station and space-borne (GOSAT) observation data. In this work two different XCO_2 retrievals were used for flux inversion. Flux adjustments for each kind of sources are represented as a linear combination of main flux components according to surface gas exchange. For atmospheric transport simulation we used coupled Eulerian-Lagrangian model (GELCA model). Due to a huge amount of observation data per month (6000-8000) we used Fix-Lag Kalman Smoother for solving inverse problem that allows us to estimate monthly fluxes successively according to assimilation window. Results were presented as 2D fields of monthly surface fluxes for each kind of sources with 1 by 1 degree resolution and estimated annual total global fluxes. Model concentrations with optimized CO_2 fluxes have been compared with independent station measurements over Siberia. Our calculations show the significant uncertainty reduction of fluxes in case of including GOSAT observations.