Initial results of actual GOSAT SWIR data processing with PPDF-based method of greenhouse gases retrieval

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We present initial results on actual GOSAT SWIR data processing with PPDF-based method that corrects atmospheric light scattering through account for optical pathlength modification (PPDF is an abbreviation for "photon pathlength probability density function).

The retrieval procedure includes constrained minimization of the residual between the modeled and observed GOSAT spectra. The constraints are mainly imposed on gas vertical profiles within the maximum a posteriori method using covariance matrices based on NIES atmospheric tracer transport model. The state vector includes vertical profiles of carbon dioxide and methane mixing ratios; correction factors for prior temperature and water vapor profiles; altitudes of the cirrus and aerosol layers parameters. Surface pressure is taken from climatological data set. In addition, we retrieve three polynomial coefficients for each spectral region to account for low-frequency part of the spectra and stretch factor to allow for wave number grid variations.

Two spectral regions were utilized (6200 – 6270 cm-1 from band 2 and 4800 – 4880 cm-1 from band 3) for CO2 estimation depending on the retrieval strategy. The tapping of both regions permits simultaneous gas and PPDF retrievals. The case of Band 2 only required independent PPDF estimations that were obtained on the base of three-dimensional aerosol transport radiation model SPRINTERS.