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GOSAT Level-1 processing algorithm: latest version and updating plan

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To monitor the global column concentration of carbon dioxide (CO_2) and methane (CH4) from space, the Greenhouse gases Observing SATellite (GOSAT) was launched on January 23, 2009, and has started the operational observation. During four years operational periods, the radiometric, geometric and spectroscopic characterizations of TANSO have been continuously conducted with updating the Level-1 processing algorithm. The latest version of v150 was applied the analog circuit non-linear response correction of band-1 and the correction procedure for improper scan-interval. Newly applied correction methods were supported to derive the accurate XCO_2 and XCH4 from Level-2 processing. In parallel, the re-processed products of Level-1 by v150 were conducted for the last 3 years observation data. The evaluated Level-2 data based on v150 suggested us that these products still have following features; the bias offset on M-gain products against H-gain products, the bias difference between land and ocean products, the higher Chĩ2 for band-2 data caused by scan-interval correction and the biases on brightness temperature at 15-um region against AIRS or IASI products. The main cause of these features is imperfect calibration of TANSO-FTS instruments. In addition, the non-linear mechanism on analog circuit for band1 was identified through the ground-based experiment. The second source of non-linear response excites the artificial signals on absorption lines. Also, the polarization parameters, emissivity of black body and obscuration ratio for TIR will be updated. To improve the spectral quality, we will plan to apply the correction procedure and updated calibration parameters on upcoming Level-1 products. In this presentation, the detail of processing algorithm and parameters derived four years operation will be presented.