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Development of Chinese Carbon Dioxide Satellite (TanSat)

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The Chinese carbon dioxide observation satellite (TanSat) project is the national high technology research and development program. It is funded by the ministry of science and technology of the people's republic of China and the Chinese Academy of Sciences. The TanSat is going to monitor the carbon dioxide in Sun-Synchronous orbit with XCO_2 precision of 1$\sim$4ppm over regional scale. Two detectors are under design, the main instrument is a high resolution grating spectrometer that measure reflected sunlight with the 0.76 μm O_2 A-band and two CO_2 bands at 1.61 and 2.06 μm, the second one is the Cloud and Aerosol Polarization Imager (CAPI), which is a wide field of view moderate resolution imaging spectrometer, it include 0.38, 0.67, 0.87, 1.375 and 1.64μm channels, with two polarization channels in 0.67μm and 1.64μm.
A full physical optimal estimation method has being developed to retrieve the column-averaged CO_2 dry air mole fraction (XCO_2), and the data from CAPI will be used to correct cloud and aerosol interference. Global and regional surface CO_2 flux will be derived from XCO_2 observations with inverse modeling.
Ground based validation network are being established around China. The CO_2 observation consist of 3 Bruker IFS125 and 3 Optical Spectrum Analyzer over Beijing, Shenzhen, Shangdong, Inner Mongol, and Hainan Island, etc. Currently, we are passing through the preliminary design review and will finish critical design review at the end of 2014, satellite readiness review and launching will be scheduled from Dec. 2014 to June 2015.