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FTIR retrieval of the full seasonal cycle of arctic total column CO_2 and CH_4

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Fourier Transform InfraRed (FTIR) Spectrometry is used to measure the total column amount of atmospheric trace gases via solar absorption spectroscopy, e.g. within the Total Carbon Column Observing Network (TCCON). During winter in the high Arctic, the sun is permanently below the horizon. We deployed a new near-infrared detector in our instrument in Ny Ålesund (79°N) to increase sensitivity in low light conditions and use the sunlight reflected by the moon as an infrared light source above the atmosphere to perform absorption spectroscopy. At autumn equinox we are able to take both sunlight and moonlight spectra, thus validating the new approach. Here we present the successful retrieval of total column dry air mole fractions of CO_2 and CH_4 in the 2012/2013 and 2013/2014 winters and their validation with TCCON.