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Ground-based remote sensing of CO2 and CH4

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The ground-based remote sensing spectrometry in the infrared has been established as a powerful tool for investigating the composition of the atmosphere. About 20 different trace gases can be detected, including many compounds related to the stratospheric ozone chemistry, like O3, HCl, HNO3, and ClONO2, or important tropospheric trace gases like CO, CH2O, OCS, HCN. Recently the measurement and analysis methods have been further developed to measure also long lived trace gases, like CO2 or CH4, with a precision high enough to follow the variabilities of the tracers. The remote sensing observations of these compounds add important information to the existing in-situ networks existing so far and help to better understand the global budgets. The remote sensing observations from the ground will also be the link to the future satellite projects, yielding global data sets. Since total column measurements are less sensitive to the vertical transport than in-situ observations, the interpretation by models is simpler. In our presentation we will discuss the measurement and analysis technique of CO2 and CH4, and how average tropospheric volume mixing ratios are derived. The results will be compared with appropriate model data.