



## **Tropospheric CH<sub>4</sub> signals as observed by NDACC FTIR at globally distributed sites and comparison to GAW surface in-situ measurements**

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We present lower/middle tropospheric column-averaged CH<sub>4</sub> mole fraction time series measured by nine globally distributed ground-based FTIR (Fourier Transform InfraRed) remote sensing experiments of the Network for the Detection of Atmospheric Composition Change (NDACC). We show that these data are well representative of the tropospheric regional-scale CH<sub>4</sub> signal, largely independent of the local small-scale signals of the boundary layer, and only weakly dependent on upper tropospheric / lower stratospheric (UTLS) CH<sub>4</sub> variations.

We estimate a typical precision for daily mean values of about 0.5% and a systematic error of about 2.5%. The theoretical assessments are complemented by an extensive empirical study. For this purpose, we use surface in-situ CH<sub>4</sub> measurements made within the Global Atmosphere Watch (GAW) network and compare them to the remote sensing data. We briefly discuss different filter methods for removing the local small-scale signals from the surface in-situ datasets in order to obtain the in-situ regional-scale signals. We find good agreement between the filtered in-situ and the remote sensing data. The agreement is consistent for a variety of time scales that is interesting for CH<sub>4</sub> source/sink research: day-to-day, monthly, and inter-annual