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## Trend analysis of greenhouse gases over Europe measured by a network of ground-based remote FTIR instruments

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**Abstract.** This paper describes the statistical analysis of annual trends in long term datasets of greenhouse gas measurements taken over ten or more years. The analysis technique employs a bootstrap resampling method to determine both the long-term and intra-annual variability of the datasets, together with the uncertainties on the trend values. The method has been applied to data from a European network of ground-based solar FTIR instruments to determine the trends in the tropospheric, stratospheric and total columns of ozone, nitrous oxide, carbon monoxide, methane, ethane and HCFC-22. The suitability of the method has been demonstrated through statistical validation of the technique, and comparison with ground-based in-situ measurements and 3-D atmospheric models.

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