



Development of a solid state sensor for the detection of stratospheric methane and hydrogen

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Methane and water are important trace gases in the stratosphere and by discussing their sources, sinks, chemistry and transport a case is made for improved measurements in the lower stratosphere and upper troposphere. Various methods of measuring water vapour and methane are described and a novel technique for measuring combustible hydrocarbons and hydrogen is introduced. It is demonstrated that methane and hydrogen can be catalytically oxidising into a stoichiometric amount of water vapour which can then be measured using a frost point hygrometer. The catalyst will need to be kept at 450°C to get 100% oxidation of the available methane. The experiment results are complimented with modelling of the oxidation process in the reactor. A laboratory instrument with suitable characteristics to form the basis of a balloon sondé is presented as well as a prototype balloon instrument.