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Infrared remote sensing of atmospheric composition at the Jungfraujoch station since 1950

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Abstract

It is in the early 1950s that researchers from the University of Liège have recorded the first atmospheric infrared solar spectra at the Jungfraujoch scientific station, in the Swiss Alps, at a time when climate change was not a matter of worry. These pioneering observations have allowed to confirm that methane and carbon monoxide were ubiquitous constituents of the Earth's atmosphere. The recording of atmospheric spectra resumed in the mid-1970s, stimulated by rising concerns related to possible stratospheric ozone depletion. Since then, this monitoring activity has been conducted at that site without interruption, allowing to gather high-quality data crucial for the characterization of the Earth's atmosphere and of the changes affecting it, resulting from anthropogenic activities or natural causes.

In this talk, we present some recent results relevant for the verification of international environmental treaties such as the Montreal Protocol on substances that deplete ozone, and the Kyoto Protocol for the limitation of greenhouse gases emissions. We further illustrate contributions of our monitoring program relevant to study air quality and precursors of tropospheric ozone. Finally, we evoke a new DFG project involving University of Leeds, Universität Bremen (lead) and the University of Liège that will digitize and exploit the early spectra for in-depth investigation of atmospheric composition in the early 1950s.