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Remote-sensing of the atmospheric composition at the Jungfraujoch station: an iconic program initiated in the early 1950s

It is in 1950 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 first allowed to confirm that methane and carbon monoxide were ubiquitous constituents of the Earth's atmosphere, even at this unpolluted and remote place. After a period devoted to the characterization of the solar photosphere, 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. Nowadays, more than thirty atmospheric constituents are monitored, allowing to extend on a daily basis precious multi-decadal time series that are unique worldwide.

In this paper, we first remind about the successive steps which led to establishing the observational program of the Liège team at the Jungfraujoch and we highlight some important historical findings. Then we present recent results relevant to the Montreal and Kyoto Protocols, or related to the monitoring of air quality.