Comparison of two high alpine CO$_2$ records from the Jungfraujoch area (Switzerland)

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Content

- Sphinx laboratory and East ridge building
- Comparison of CO$_2$ time series between both sites
- Possible parameters influencing local CO$_2$ measurements
Sphinx 3570 m a.s.l.  East ridge 3690 m a.s.l.

~1 km

120 m

**East ridge:** CRDS instrument (Picarro G2301-i)

**Sphinx:** NDIR instrument (Maihak S710)
Daily number of visitors for 2015

2015: 1'070'000 visitors
2016: 920'000 visitors

Source of data: Jungfraubahn train company
CO$_2$ results from East Ridge

- More stable in autumn – winter

- $\sim 1.6$ ppm y$^{-1}$
Data are in good agreement with ER, however ...
Significant offset of +0.25 ppm

Comparison: Sphinx – East Ridge

- Normal distribution
- Significant offset of +0.25 ppm
- No influence of air temperature, relative humidity, wind speed and sunshine duration

25-30 July 2015
- Diurnal cycles
- Similar night values

Poltera et al., 2016
Diurnal variations – Summer 2016

20-27 July 2016
11-21 January 2015

Related to general circulation and not to local influence
Diurnal variations – Winter 2016

16-21 January 2016
Visitors influence?

The chart shows the influence of visitors on CO₂ levels over the course of the day. The x-axis represents hours, while the y-axis shows the change in CO₂ levels (ΔCO₂, ppm). The data is categorized by season and all-year data, with different colors indicating each category. The chart highlights the peak influence of visitors during certain hours, suggesting a potential correlation between visitor activity and CO₂ levels.
It has already been shown that polluted air masses reached JFJ even if the PBL remains below.
Conclusions

- CO₂ values show good agreement between the two sites.
- Diurnal CO₂ cycles are in general not seen at the East Ridge.
- Possible influence of visitors on CO₂ measurements at Sphinx laboratory...
  ...but it is difficult to clearly disentangle the difference between local pollution (from visitors) and mixing processes resulting from variations in the PBL height.
- We showed the suitability of the East Ridge building as new spot to perform high-quality atmospheric measurements.
- Based on these observations, visitors have been asked not to smoke on the terrace.
Thank you for your attention