The study **"Analysis of high gas concentration and flux measurements at Swiss Beromunster tall tower" by Plach et al.** presents analysis on spatial and temporal variability of the greenhouse gases (GHGs) concentration and their fluxes at a tall tower 212 m above the ground level a.g.l. Measurements of GHGs at tall towers are very important since are used on inversion modelling to derive the emissions and verify the national GHG inventories created using bottom-up approaches.
The results are well presented (specially schematics), the idea is very good, however, my concern is on the approach of main method that all data are classified – transport scale. My comments are below:

Main weakness of the study – classification of the transport scale: the whole measurements, concentrations of CO_2, CH_4, CO and H_2O and the CO_2 and H_2O flux, taken from only the highest inlet 212 m a.g.l. are classified based on the atmospheric boundary layer height (which is relative to the site where tower is located) and the potential temperature gradient. The first concern is how accurate the automatic lidars and ceilometers located 100 km away (in complex terrain) represent the local boundary conditions of site where tower is located? Regarding, the calculated potential temperature gradient is not mentioned from which heights the temperature measurements are taken for this calculation. Are there wind speed measurement available at tower? – as the atmospheric mixing is driven by the vertical wind-speed gradients as well.

The method to classify the local, distant, and regional scale has weaknesses:

1. **Local → ABL height ≤ 520 m a.g.l (tower height 212 m a.g.l.) and dT/dz ≥ 10 K km^{-1}**
   I suspect that you are measuring the **local emission** if the **ABL is lower** than **concentrations/flux obtained from inlet at 212 m a.g.l.** – if the ABL would be exactly at 520 m a.g.l. then YES but if it is under inlet height than measurements would be from the **free troposphere**. If you would include the concentrations from lower inlet heights (e.g. 12 and 45 m a.g.l.) for the analysis than it would make more sense but still with caution always looking what is the ABL height.
2. **Distant → ABL height ≥ 520 m a.g.l (tower height 212 m a.g.l.) and -10 K km^{-1} ≤ dT/dz ≥ 10 K km^{-1}**
   In this group are classified the early morning / late evening measurements, mostly called as 'transitional time' when there is happening the formation/breakup of the nocturnal inversion layer or in the times of turbulences were as a contribution to the concentrations will be also the concentrations from the previous days (from the residual layer) and not sure in that case if it is distant source contribution - this is more something as transitional times where the mixing/suppression beginnings.
3. **Regional** → ABL height ≥ 520 m a.g.l (tower height 212 m a.g.l.) and dT/dz ≤ 10 K km^{-1}. I would recommend that dT/dz to be at least less than 0 K km^{-1} if the wind speed gradients are not included.

Once the method for classifying the transport scale is revised and resubmitted, I will be happy to look again into the manuscript for the revision. The results section is not investigated into detail as to me would not make much more sense as the main method needs revision.

I have also added few technical comments:

Technical comments

Introduction: the method section (each section 2.1, 2.2, 2.2.1 and 2.3) is already introduced in the introduction in quite a lot of details and then repeated in method section. I would suggest rearranging the introduction section and mostly focus on describing the problem that you are interested in, why that is a problem and how you are going to solve that problem therefore narrowing it to introduce your aim of this research.

Line 82 and 84: the abbreviations FFP and CFP for Flux Footprint and Concentration footprint respectively are introduced but then again are introduced on line 101. **Line 98-99** Same is the eddy covariance (EC) and the ABL…is introduced in introduction and repeated in method section.

Section 2.2.1: it is described how the GHG concentrations are measured; it says that the ambient air from each height is sampled for 3 min following with the 1 min which is used to avoid contributions from the previous level. How many measurements within an hour are made in each height? 3 / 4 measurements? Are these measurements spread in that way that would represent correct way the atmospheric state for that particular hour. Could you give more technical details on this.

Section 2.2.3: The automatic lidars and ceilometers are located 100 km away from the tower. **Line 154** states that despite the distance the two sites are comparable climates and ABL characteristics – is there any study on this, can you show an example. Usually, in complex terrain the local conditions (formation of ABL) are quite unique for each site and especially under stable conditions.