

The paper uses the field data on the alfalfa and modelling to study the CO<sub>2</sub> and water vapor exchange at leaf, canopy and boundary-layer scales. The observations carried out on one clear day were further perturbed by inducing a cloud passage, entrainment of dry air and advection of cold air by the model. In addition, the tendency equations were used to explain the revealed responses in the exchange rates.

The paper is generally very clearly written and brings an important insight by its original approach. I have only the following minor comments regarding the first part of the paper and Results and Discussion parts are clear in their message:

Lines 44-45: The scales are explained. Is there any certain horizontal larger scale for analyses, especially for advection?

Fig. 1:  $TR_{\text{leaf}}$  and  $A_n$  should be explained in Fig. caption. Why two arrows in the middle picture are not arrows but just triangles? To which solid and dashed lines are referred to in the caption? They are not lines but arrows.

Are there some more reasons for selection of that one day, beside that it is cloudless?

Was the measured LAI the total all-sided or half-sided or the projected one?

Table 2: why the unit for the thermal diffusivity is missing?

Table 3: why the cuticular minimum conductance is unitless? Why is the CO<sub>2</sub> compensation concentration value multiplied by the density of the air?

Lines 277-278: I don't understand the meaning of "but we did not...present in observations."