Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-644-RC2, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Large-Scale Vertical Velocity, Diabatic Heating and Drying Profiles Associated with Seasonal and Diurnal Variations of Convective Systems Observed in the GoAmazon2014/5 Experiment" *by* Shuaiqi Tang et al.

E. Souza (Referee)

enio.souza@ufcg.edu.br

Received and published: 26 August 2016

The authors study the behavior of some convective fields during the GoAmazon experiment, focusing on the contrast between a rainy period and a dry period. Besides, a discussion on the diurnal cycle for some cases is presented. The article worth publication after some revisions.

In line 95, the authors mention the ECMWF analysis but no word about the horizontal

resolution. If the resolution is good enough, kinectic energy plays a non-neglectable role in the energy equation, and Q1 should be expressed in terms of potential temperature instead of static energy (see formulation in Yanai and Tomita, 1998, J. of Climate, p. 463).

Another important point is the radiative heating Qrad. In studies with less time resolution, an average value can be used. One can also argue that Qrad is small compared to Q1 and Q2. However, since this study addresses both the diurnal cycle and the vertical structure of the convective heating, and Qrad do undergoes a strong diurnal cycle and presents a vertical structure that impacts on the intensity of convection, the diurnal cycle of Qrad should be properly taken into account. That variable can be easily obtained from any numerical model.

The authors use domain-mean precipitation instead of point precipitation. In my opinion that is an outstanding advance of this study, since it provides a good framework to comparison with numerical model results for the region. Returning to the discusion of the previous paragraph, the vertical integral of Q1-Qrad, divided by the latent heat of evaporation, gives an estimative of the precipitation rate (see Eqn. 12a, by Yanai et al., 1973). This information could be easily obtained, and a comparison with the observed precipitation rate (investigating both the intensity and the correlation) could be performed.

In line 215, the authors point latent cooling due to ice melting as responsible for the minimum of Q1 observed around 600 hPa. What do the authors have to say about cumulus congestus whose top are around that level? That is a region of re-evaporation of water droplets and strong radiative flux divergence.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-644, 2016.