The revision of the manuscript led me to change the title. The title “What we learn from the latitudinal and longitudinal…” has been replaced by ‘The moist adiabat, key of the climate response to anthropogenic forcing”, which seems more relevant because it is much more synthetic: the whole article is focused on properties of the moist adiabat.

Former figures 3 were wrong; they are replaced by Figures 4a, b. A new figure 4c is added. These modifications do not alter the reasoning which remains nearly unchanged. Nevertheless, more explanations have been added in 4.1, supported by the new figure 4c.

Reviewer #1

Of course, all corrections have been made except:

1) Figures 5 and 6: the months chosen are not the same, February and August in figure 5, January and July in figure 6 because they are intended to show the lowest and highest temperatures over the year. The figures are independent, they represent the SAT and the SST and any comparison between the two would not make physical sense.
2) Line 407: Obviously we are not talking about the same variable because the values of albedo and extraterrestrial solar flux are indisputable (A≠0.3 and F0=1365.8 W/m2).

References to websites are removed.

Submitted references are replaced by published papers.

As concerns the difference between anthropogenic forcing and anthropogenic forcing efficiency, further explanation is given in paragraph 4.4.

Regarding the variables referring to temperatures, an effort has been made to clarify. An index to specify different temperatures in a same formula is introduced. Now the moist adiabat at the altitude z=0 is written $T_{z=0}$; SAT and SST have a special meaning.

Heat fluxes are represented with a capital letter Q. Differential heat fluxes are resulting from a temperature anomaly and they are represented with a letter q in lower case. Differential heat flux q is a fractional part of the corresponding heat flux Q (Appendix B).

I did not notice any error in the formulas, nor the presence of redundant terms. The steps for obtaining the formula related to the latent heat flux have been explained.

Reviewer #2

This paper studies the latitudinal and longitudinal distribution of anthropogenic forcing efficiency using the environmental adiabatic lapse rates. I found the manuscript interesting considering the importance of anthropogenic emission impacts on radiative forcing. However, I found the paper is a little hard to read where the definition, significance, and calculation methods for some key variables (e.g. cross-wavelet power) are missing. The method to disentangle the impacts of variability of climate and anthropogenic forcing on surface air temperature can also be further justified.

Major Comments:

Anthropogenic forcing efficiency: How to define and calculate the anthropogenic forcing efficiency? How the author disentangles the impacts of variability of climate and anthropogenic forcing? Are there any literature to support?

Further explanations are given in 3.1. I'm sorry, the only references available are mine. All this work is based on very recent results.

Missing definitions: There are a couple places where the definition and calculation methods of the key variable are not clear. For example, cross-wavelet power and coherence phase in Figure 2, It can make the manuscript more readable by including these clarifications.

Further information is given in 3.2.

Minor comments:

Ln 41: The reference in [3] should be written as AUTHOR, et al.

I don't understand, Stephens G. L. is the only author?

Ln 58: Definition of should be written out when the first time it appears.

Corrected

Ln 85: Appendix C is references before Appendix B.

Corrected

Ln 105: Can the author be clearer about the 'sensitive heat fluxes resulting from the low-pressure system'?

Excuse me, it is a mistake of carelessness in the translation from French to English. It is actually sensible heat.

Ln 110: This is the place where Appendix B appears the first time.

Section 2 Data: I recommend the detailed web links moved to the references.

Corrected

Ln 129: What is anthropogenic component Ts?

Ts is removed

Ln 161 and Ln 162: Please write out RRH and ENSO.

Corrected

Ln 172: Table 1 is not referenced here.

Corrected

Ln 245: 'Figure 4' is in difference font size.

Ln 247: Please write out 'CAPE' the first time it appears in the text.

Corrected

Ln 273: I didn't see related formula in appendix C

Corrected $T_{z=0}$ is the moist adiabat at the altitude z=0 (the equation of the moist adiabat is given in the Appendix C).

Color bar in Figure 5 and Figure 6 is missing.

NOAA does not provide color bars but the corresponding values are explicitly written in the figures.

Ln 304: How is anthropogenic forcing efficiency defined?

Further information is given in 4.4

Ln 369: ‘MALR(T)’---Typo?

Typo is “MALR” (corrected)