Reply to reviewer 2

We are grateful to the reviewer for the encouraging comments and careful revisions which helped to improve the quality of our paper. In the following we quoted each review question in the square brackets and added our response after each paragraph.

[1. My biggest concern is about tracking the ozone source using O3/CO correlations. Previous studies showed that positive and negative correlations reveal difference ozone production/transport mechanism in troposphere. However, this needs some other factor such as weather and air pollution conditions to be excluded. As to this paper, ozone production might be halted under cloudy conditions on June 14, 2014 just before the typhoon's landing. However, CO is continuously emitted. As a result, there may be a negative O3/CO correlation with high CO abundances. I think this scenario should be cleared before linking this event with STE, though the weather condition might favorite a descent from the upper troposphere. Fig 5 shows descent at 20:00h June 13 and ascent. However, it is not clear that was the case for the whole period 12:00h June 13 - 12h June 14 (the period for Fig 6b) because the last panel in Fig 5 shows the ascent at 20:00h June 15.]

Reply 1: We thank the reviewer for the great suggestions. We agree with the reviewer. The O3 production from photochemical reaction might be less in cloudy days comparing to sunny days. In our study, the correlations between O_3 and CO are used to identify the contributions of anthropogenic sources and UTLS downward transport to the tropospheric O_3 changes in the different periods. Furthermore, an O_3 episode with high nighttime O_3 was observed before typhoon landing over 12-14 June, Therefore, the correlation analysis include the O_3 episode in Fig. 6.

[2. Page 24627: Line l18, remove the word "stratospheric".]

Reply 2 : Following the reviewer's suggestion, we modified it in the revised version.

[3. Page 24628: Line 21-25, this sentence needs to be re-worded.]

Reply 3: Thanks for the suggestions. We have re-worded it with the following sentences in the revised manuscript:

"By using the hourly O_3 measurement data over XQR, the normal and anomalous patterns of diurnal O_3 changes could be represented by the surface O_3 averages over June 2014 excluding 12–14 June and over 12–14 June 2014 respectively (Fig. 3d)."

[Page 24633: Line 3-4, what are the "implications"? The authors should specify it even too many details are not necessary.]

Reply 4: Followed the sentence, we have added "Tropical cyclones, as an important STE mechanism, could exert an enormous impact on air mass and energy transports in the troposphere, as well as redistribution of tropospheric ozone." In the revised manuscript.