Many thanks to Anonymous Referee 3 for thoughtful comments and suggestions that have helped to improve the presentation and completeness in this manuscript. The comments from the referee are denoted by italic letters. Our responses and a brief summary of related changes to the manuscript are given below. The references to the manuscript, in particular substantial changes in the manuscript are highlighted in red.

1. ***The colorbars have been improved for most plots since I reviewed the paper last. I think the red/blue colorbar could also be used for Figure 11, I'm not sure why that one is different.***

   A. The colorbar is changed for Figure 12 (Figure 11 in the ACPD version).

2. ***Page 3, line 1-2: It's unclear to me what is meant by "We investigate how long ENSO related statistically relevant differences can be diagnosed". What is meant by long? You investigate the length of these relationships? Or is it meant to mean you look at differences over a long time period? It's not clear.***

   A. Typically, ENSO occurs in winter, but the influence of ENSO does not just exist in winter. We investigate the time period of ENSO influence. In the text (P.5 L.1), it's changed as " we investigate how the ENSO winter signal propagates into the following seasons".

3. ***Page 3, lines 14-15. Why this particular threshold of 0.9? What is the sensitivity to threshold? (i.e., how much do the results change for different thresholds?)***

   A. Usually, the threshhold should be 1. We use the threshold of 0.9 to get larger sample. The results don't change too much if we change it as 1 (see also Konopka et al., 2016). Below we show the differences in SF using the threshold with 1. Figure RL 1 and Figure RL 2 show the strength of the anticyclone might be slightly different with the results in the manuscript if we take 1 as the threshold. However, the meridional disruption during El Niño are weaker compared to La Niña winters, the anticyclone after La Niña events is stronger than after El Niño, and the differences between La Niña and El Niño composites persist from winter to early summer. These are the same conclusions as in the draft, so our results in the manuscript are robust.

4. ***Page 4, lines 3-4: Might explain more is the significance assessed using a 2-tailed student t-test, for example?***

   A. Figure RL 3 shows the statistical difference results (black dots) between El Nio and La Nia composites from the 2-tailed student t-test from MLS ozone at 380 K. The significantly different regions from the 2-tailed student t-test are less than the regions from the Monte Carlo (Figure 7 in the draft) significance test. But the results here also show significant difference in the regions of strong in-mixing. During the mature phase of the ASM anticyclone (JJA), the number of black dots decreases strongly like in the Monte Carlo significance test. So the statistical difference results from the Monte Carlo significance test are robust.

5. ***Page 7, lines 2-5: Do you have a sense for how robust these ENSO features are relative to internal variability? The reanalysis period is still relatively short to evaluate dynamical differences. See, e.g., Deser et al. (2017).***

   A. We agree that the reanalysis period is short. We don't really know how robust the ENSO features are relative to the internal variability. This needs further investigation, but is beyond the scope of this study. We plan to use CLaMS-climate coupling model in the future. So we will return to this point in the further work.

6. ***Figure 3/4/6- indicate in caption what the different colored dots mean, if anything. Figure 3 should also have something about the dashed region being significant (it's a bit confusing because in Fig. 4 the dashed region indicates significance, however, in Figure 3 the differences should be insignificant by JJA, correct?). Finally, in Fig 3 the x-axis is labeled as "Month" but Figure 4 says "Month after***

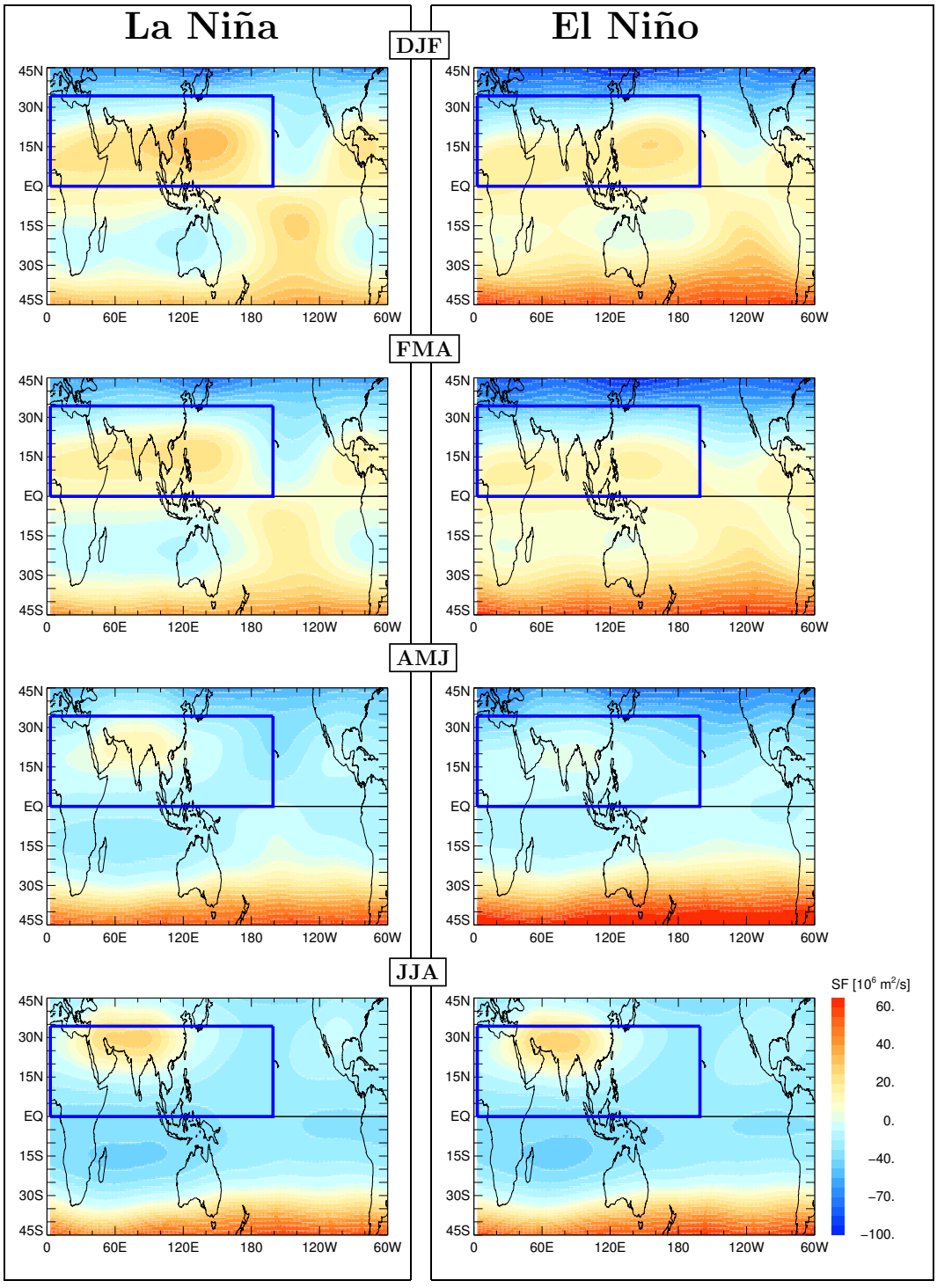

Figure RL 1: Climatologies (composites) of the stream function (SF, in 10^6 m^2/s) at θ=380 K calculated from ERA-Interim (1979-2015) for months following La Niña (left) and El Niño (right) winters until summer (from top to bottom). The blue rectangles mark the locations of strong anticyclone in NH.

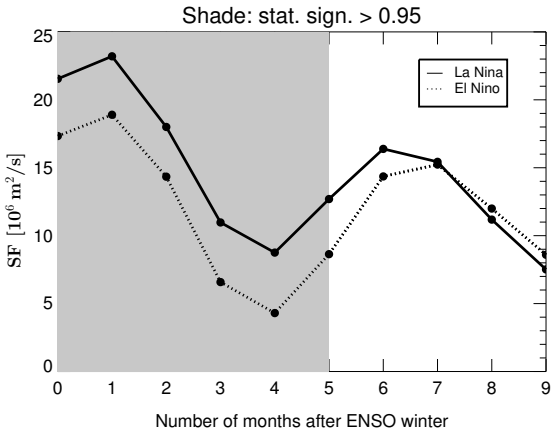

Figure RL 2: The average value of the stream function in the domain of [0° N, 35° N; 0° E, 160° W] for La Niña (solid line) and El Niño (dotted line) composites at θ=380 K. The grey shading region denotes the period with statistically significant differences between the two composites.

DJF". Month makes more sense to me if these are indeed the months; does "Month after DJF" imply that 0=March?? Or does 0=JFM? It would help to label the axis tick marks with exactly what is meant.

A. The colored dots in Figure 3/4/6 meant different month or season. We changed all of them to black color in revised paper because the x-axis includes the time information. The dashed lines in Figure 3 were supposed to help to recognize the onset date difference between El Nina and La Nina. Probably it's confusing, so the hatching is removed now. The climatology of U wind is calculated from monthly composite, so the x-axis label marks the month information in Figure 3. The x-axis label represents the season information in Figure 4/6 because the climatologies are calculated from the seasonal composites. To make the figures easy to understand, we changed the x-axis labels and captions in Figure 4/6.

7. ***Page 2, line 30: "only few"->"few" or "only a few"***

   A. It's changed in the text (P.2 L.32).

8. ***Page 5, Line 26: should be "mainly in the western Pacific"***

   A. It's changed in the text (P.7 L.5-6).

9. ***Page 8, Line 3: "is by a factor" -> "is a factor"***

   A. It's changed in the text (P.8 L.17).

10. ***Page 10, Line 4: "are by more than three times" ->"are more than three times"***

    A. It's changed in the text (P.10 L.21).

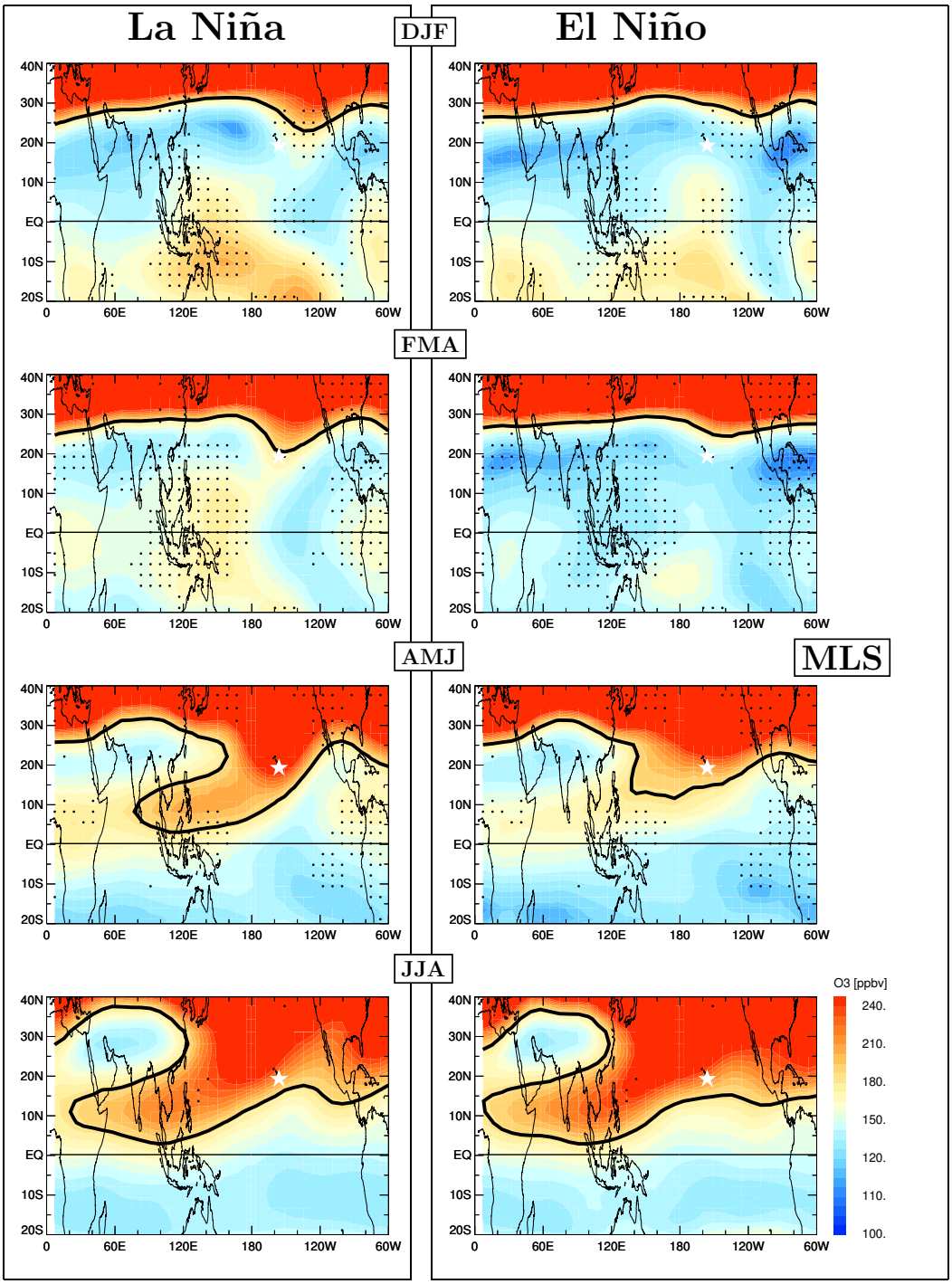

Figure RL 3: Seasonal ozone climatology derived from MLS observations (2004-2015, version 4.2) at θ=380 K for La Niña and El Niño composites from winter to summer months (from top to bottom). Regions with statistically significant differences are marked by the black dots. The black isolines represent ozone with 185 ppbv, which mark the tropopause.