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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The ENSO signal in atmospheric composition fields: emission driven vs. dynamically induced changes" *by* A. Inness et al.

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This comment is posted by Meiyun Lin (Princeton University). The role of emission driven versus dynamically induced changes in atmospheric composition in association with ENSO is a very interesting topic. The following two publications particularly addressed this question, and thus are highly relevant to many discussions in your paper.

Meiyun Lin, L.W. Horowitz, S. J. Oltmans, A. M. Fiore, Songmiao Fan (2014): Tropospheric ozone trends at Manna Loa Observatory tied to decadal climate variability, **Nature Geoscience**, 7, 136-143, doi:10.1038/NGEO2066.

Meiyun Lin, A.M. Fiore, L.W. Horowitz, A.O.Langford, S. J. Oltmans, D. Tarasick, H.E. Reider (2015): Climate variability modulates western US ozone air quality in spring via deep stratospheric intrusions, **Nature Communications**, 6, 7105, doi:10.1038/ncomms8105

Despite large El Nino enhancements to wildfire activity in equatorial Asia, the model sensitivity experiments in **Lin et al (2014, Nature Geosci)** indicate that wildfire emissions are not the main driver of ENSO-related ozone variability observed at Mauna Loa, Hawaii (Figure 3). The dynamically induced eastward extension and equatorward shift of the subtropical jet stream during El Nino plays a key role on observed interannual variability of springtime lower tropospheric ozone at Mauna Loa. These shifts enhance long range transport of Asian ozone and CO pollution towards the eastern North Pacific in winter and spring during El Nino.

Lin et al (2015, Nature Communications) demonstrated a connection between springtime western US ozone air quality and jet characteristics associated with strong La Nina winters. They showed more frequent late spring deep stratospheric ozone intrusions when the polar jet stream meanders southward over the western United States as occurs following strong La Nina winters. Their finding again reflects the dynamically-driven changes in atmospheric composition in association with ENSO.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 13705, 2015.