A review report on "Impacts of an unknown daytime nitrous acid source on its daytime concentration and budget, as well as those of hydroxyl, hydroperoxyl, and organic peroxy radicals, in the coastal regions of China" **by Tang et al. 2015.**

In this manuscript, the authors are trying to quantify and investigate the impact of unknown daytime HONO sources on the HOx budget in the eastern coast of China.

The authors should address the following issues before the Manuscript can be considered for publication.

Major concerns:

- **Page 808, lines 20 to 23:**
  The authors concluded that HONO photolysis reaches a maximum of 10 ppb/h while that of HO2+NO is 9.38 ppb/h, which is very unlikely. The total OH initiation sources (including that of HONO) may contribute between 15-25% of the total OH production rates. OH production rate from HO2+NO makes typically between 60-85% of the total OH production. HONO photolysis is an initiation source of OH and does not exceed (as a net source, after subtracting OH+NO=HONO) ~3 ppb/h as maximum (e.g., Kleffmann et al., 2005; Elshorbany et al., 2009) and can reach as high as 80% of the total OH initiation sources but NOT the total OH production rate.

  Hofzumahaus et al. (2009) investigated the OH budget in one of this study's domains (PRD) and measured maximum OH production rates of about 35 and 2 ppb/h from HO2+NO and HONO photolysis, respectively. How the authors would explain these large differences between their model results and these measurements.?

- **Page 808, lines 24 to 28:**
  What is this OH production rate, daytime mean? Even then, HONO contribution is almost similar to HO2+NO (about 4 ppb/h). That is also very unlikely, see above. Further the loss terms due to CO is very high. If CO loss term is very high in the region, you would probably have also so much VOC loss and therefore also high HO2+NO to compensate, given the high NOx levels in eastern China.
  Page 813, line 13: By referring to the mentioned study, it is HONO/NOx and not HONO/NO2.

- **Page 813, lines 17:**
  The authors mentioned they used data from 13 field measurement campaigns around the globe. Why data from around the globe if the study domain is located only on eastern coast of China?

- **Page 815, lines 1:**
  Which studies? Please write the reference(s).

- **Page 815, line 5:**
  Figure 2 is not clear at all; references are almost not readable.
  Which good correlation the authors mean? The slop and the correlation coefficient in these two plots are calculated based on the high NO2 points!
  The low NO2 points do not correlate at all and should have been plotted in another plot? And would have probably results in negative slope.

  Also, How the authors define the data selection criteria (for Fig 2), e.g., did the authors used J-values near sunrise and sunset?, What type of data (mean, median, max, min,..etc.), measurements techniques,..etc..?

- Since the study of the impact of the unknown HONO sources is limited to China, why do not you limit the analysis and the parameterization to these regions. This way, the authors would be able to better parameterize this unknown source, given the knowledge of all controlling factors, e.g., surface areas, topography, radiation and dynamics. Limiting the parameterization to the measurement location would also help elucidate and shed some light on the sources and nature of this unknown source.

- The authors need to first determine the correct parameterization for this region before investigating the impacts on HOx, which would also require reasonable estimation of HOx budgets.

References

Elshorbany, Y. F., Steil, B., Brühl, C., and Lelieveld, J.: Impact of HONO on global atmospheric chemistry calculated with an empirical parameterization in the EMAC model, Atmos. Chem. Phys., 12, 9977-10000, doi:10.5194/acp-12-9977-2012, 2012.

Hofzumahaus, A., Rohrer, F., Lu, K., Bohn, B., Brauers, T., Chang, C. C., Fuchs, H., Holland, F., Kita, K., Kondo, Y., Li, X., Lou, S., Shao, M., Zeng, L., Wahner, A., and Zhang, Y.: Amplified Trace Gas Removal in the Troposphere, *Science*, **324** (5935), 1702–1704, 2009.

Kleffmann, J., Gavriloaiei, T., Hofzumahaus, A., Holland, F., Koppmann, R., Rupp, L., Schlosser, E., Siese, M., and Wahner, A.: Daytime Formation of Nitrous Acid: A Major Source of OH Radicals in a Forest, Geophys. Res. Lett., 32, L05818, doi:10.1029/2005GL022524, 2005.