Interactive comment 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 coast regions of China”.

General comments:

The manuscript tried to quantify the impact of the unknown HONO source on the concentrations and budgets of HONO, HO_x radicals and RO_2 radicals in the eastern coast of China by utilizing a model simulation and parameterized unknown HONO source strength. To fulfil this meaningful aim, reasonable parameterization of HONO source and uncertainty analysis of the results are important. However, the uncertainty analysis is not found in the manuscript and the parameterization is not fully justified. Hence, this manuscript is recommended to be published in Atmos. Chem. Phys. unless both parameterization justification and uncertainty analysis are well addressed.

Specific comments:

1. parameterization justification:

A. HONO emission is considered. In page 812, line 6-7, you stated that an emission ratio of 2.3% for HONO/NO2 used in other study is relatively high. However, in page 814, line 15, you choose to use the same ratio of 0.023 in your model. Please explain.

B. You noticed that HONO chemistry is different near the surface and over the surface within 1000 m. Is this difference explained by the NO_2, $J(NO_2)$ and aerosol surface density? Why NO_2 heterogeneous reactions on ground surface is not considered in your model?

C. In page 811, photo-enhanced heterogeneous reactions and photolysis of surface-adsorbed HNO_3 are summarized as HONO sources. Why these two sources are excluded in your model?

D. The unknown source strength ($19.60*NO_2*S/V$) is fitted using HONO measurement globally. Is it good for China eastern coast?

2. uncertainty analysis

   A. How the uncertainty in parameterization on HONO source impact the model simulation? What kind of improvement have you made compared to previous model work?

   B. How the model itself and these inputs affect the model output?

   C. The model-observation difference is quite considerable in Fig. 4-6. How to make sure your results is a trustful one?

3. In page 809, line 15-17: other OH primary sources, such as HCHO photolysis, is widely accepted. Add them!

4. In page 809, line 27: if daytime HONO could reach ppb level, it is within the detect limit of most HONO measurement instruments. Do you mean specific instrument here?

5. In page 813, line 10-14: ambient HONO is correlated with NO2 as a result of secondary HONO formation instead of HONO direct emission since HONO

photolysis lifetime is only about 15 min in the noontime. So why the correlation is the reason for that HONO/NOx ratio is used as a HONO emission factor?

6. In page 814, line 4-7: an annular denuder and an absorption photometer were used for HONO measurement. How are their results comparing to, such as DOAS? How are they compared to each other?