

Atmos. Chem. Phys. Discuss., author comment AC2  
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## Reply on RC2

Qingqing Yin et al.

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Author comment on "Measurement report: Long-term variations in surface NO<sub>x</sub> and SO<sub>2</sub> mixing ratios from 2006 to 2016 at a background site in the Yangtze River Delta region, China" by Qingqing Yin et al., Atmos. Chem. Phys. Discuss.,  
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We thank for the constructive comments and suggestions. We revised our manuscript according to the comments and suggestions. The following list the point-to-point response to the comments. The changed texts were highlighted with yellow color.

### Response to comments by referee # 2

#### General comments

The authors present a concise study on long-term trends of NO<sub>x</sub> and SO<sub>2</sub> in the region of the Yangtze River Delta based on data acquired at the global GAW station Lin'an.

They interpret diurnal, seasonal and long-term changes and put them in context with trends measured in several other regions or cities in China and across the globe.

They assess correlations with meteorological parameters and emissions by different sources.

To identify source regions a potential source analysis of NO<sub>x</sub> and SO<sub>2</sub> is applied on the YRD region.

Changes in average diurnal patterns of NO<sub>x</sub> and SO<sub>2</sub> from 2006 to 2016 were found and attributed to long-term changes of vehicle emissions and industrial emissions, respectively.

#### Specific comments

I.30, I.307, table 1: Why not denoting it SO<sub>2</sub>/NO<sub>x</sub> or Sulph./Nitrog.? S/N might be mixed up with signal-to-noise ratio.

Response: Accepted. We use SO<sub>2</sub>/NO<sub>x</sub> instead of S/N in the revised version.

I.85: For NO<sub>x</sub>: The method of NO<sub>2</sub> to NO conversion is missing and must be explained. Furthermore, were corrections for humidity (respective quenching for CLD technique) and ozone reaction within the inlet line applied on the presented data?

Response: In model 42C-TL trace-level chemiluminescent analyzer, NO<sub>2</sub> is converted to

NO by a molybdenum NO<sub>2</sub>-to-NO converter heated to about 325°C. The converter efficiency was checked annually using gas phase titration (GPT). If the converter efficiency is less than 96%, replace the converter. We add the information in the revised paper. Please see Page 3, line 89 for the revision.

I.97: Item (4) might describe more specifically what kind of checks, testings are done and what self-diagnosis does comprise of or even better give a reference where it is explained in more detail. For example, I'm wondering what self-diagnosis means: Is it applying internal thresholds for operating parameters and, if yes, which one and what are the consequences for the instrument or measurements? Is this automatically done by the instrument or by the data acquisition system?

Response: Mostly, the instrument self-diagnosis is applying internal thresholds for operating parameters, which can alert people to carry out manual testing, checking, and maintenance on the instrument. It can't be described in a few words. Technical report from U.S. Environmental Protection Agency can be a reference here. We add a reference of US EPA (2017) in the text.

US EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Quality Monitoring Program, EPA-454/B-17-001, 2017.

I.215: Is it adequate to call it already "effect" if this is an investigation of correlations? Is causality approved yet?

Response: Thanks. We have corrected "effect" to "correlation". Please see Page 8, line 218 for the revision.

I.328: Reference for a change of (specific) air pollution control measures?

Response: You might mean what specific air pollution control measures causing the disappearance of the NO<sub>x</sub> peak at 1:00 A.M? PLS see our response to referee #1, question 8.

Technical corrections

Figure 2: P (hPa), factor 10 missing?

Response: Thanks. The factor of 10 is missing. The unit is kPa. Please see Page 21, Figure 2 for the revision.