The aim of this work is to better quantify pollution precursor emissions (mainly NOx and NMHCs), their spatio-temporal variability from the interannual to the sub-seasonal scale for the 2008-2017 period, and to evaluate the impact on pollutant variability and trends. We use the PYVAR-CHIMERE inverse modeling tool, based on the CHIMERE chemical transport model and a 4D variational assimilation scheme, to derive optimized temporally resolved NOx gridded emission inventories at continental scale (with a spatial resolution of 0.5 degrees) from OMI satellite observations of NO2 tropospheric columns. First results covering one year of simulations are presented and discussed. CHIMERE optimized concentrations will be compared to real concentrations of NO2 collected and provided by Berkeley Earth (http://www.berkeleyearth.org), from 1525 surface stations in China.

**RESULTS:** optimized emissions

- Fixed error for R (matrix) at 60% = 30% (CHIMERE) + 30% (OMI)
- Scene dependent error for R (matrix): Mean OMI retrieval error, within 0.5 x 0.5 deg

**CHIMERE overestimates observed NO2 concentrations:**

- Old NOx inventory (EDGAR - HTAP 2010)
- Main anthropocentric NOx emissions in China are from transport and coal-fired power plants: rapid implementation of air quality control regulations.

The annual average of NOx concentrations from optimized emissions is weaker (down to -15%) over the biggest cities of China, especially over Beijing region, Shanghai and Hangzhou (Yangtze River delta), Guangzhou and Hong-Kong (Pearl River delta) and slightly stronger over the East China Sea.