

Interactive comment on “Revealing the sulfur dioxide emission reductions in China by assimilating surface observations in WRF-Chem” by Tie Dai et al.

Anonymous Referee #3

Received and published: 17 January 2021

The manuscript used the Four-Dimensional Local Ensemble Transform Kalman Filter (4D-LETKF) and WRF-Chem to dynamically update the SO₂ emission grid by grid over China by assimilating the ground-based hourly SO₂ observations. The topic is relevant and useful, and the results help reduce the uncertainty of emission inventory and improving the forecasting of SO₂. I recommend this paper for publication after the following points are addressed. 1. Since the implementation of strict emission mitigation strategies in 2013, there is a large reduction of SO₂. These reductions are primarily caused by the relocation and/or phased out of power plants and high-emitting industrial factories. In Fig. 6, the SO₂ both with MIX and the inverted emissions were underestimated around Gansu. It is not clear that the system works well when the

Printer-friendly version

Discussion paper



prior emissions were underestimated. And if the locations of emission sources have been relocated, such as the factories or power plants are built/abandoned, does the assimilation method works well? 2.In fig. 10, FR_CM with inverted emission and H50kmT1h10Ps recalculation were similar. And the results show that the simulated SO₂ with inverted emission were always less than observation for all sites. Cloud that be explained? 3.Please add a) b) c) . . . etc. in figure 5, 8 and 10. And the legend of Fig.11 NCP (red line) was an error. 4.P9L265 Please add the last access date.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1259>, 2020.

[Printer-friendly version](#)[Discussion paper](#)