Development and application of the WRFDA-Chem 3DVAR system: aiming to improve air quality forecast and diagnose model deficiencies

Wei Sun[1,2], Zhiquan Liu[1*], Dan Chen[3*], Pusheng Zhao[3], and Min Chen[3]

[1] National Center for Atmospheric Research, Boulder, CO, 80301, USA

[2] National Space Science Center, Chinese Academy of Sciences, Beijing, 100190, China

[3] Institute of Urban Meteorology, China Meteorology Administration, Beijing, 100089, China

1. Bias for PM_{10} in NODA run
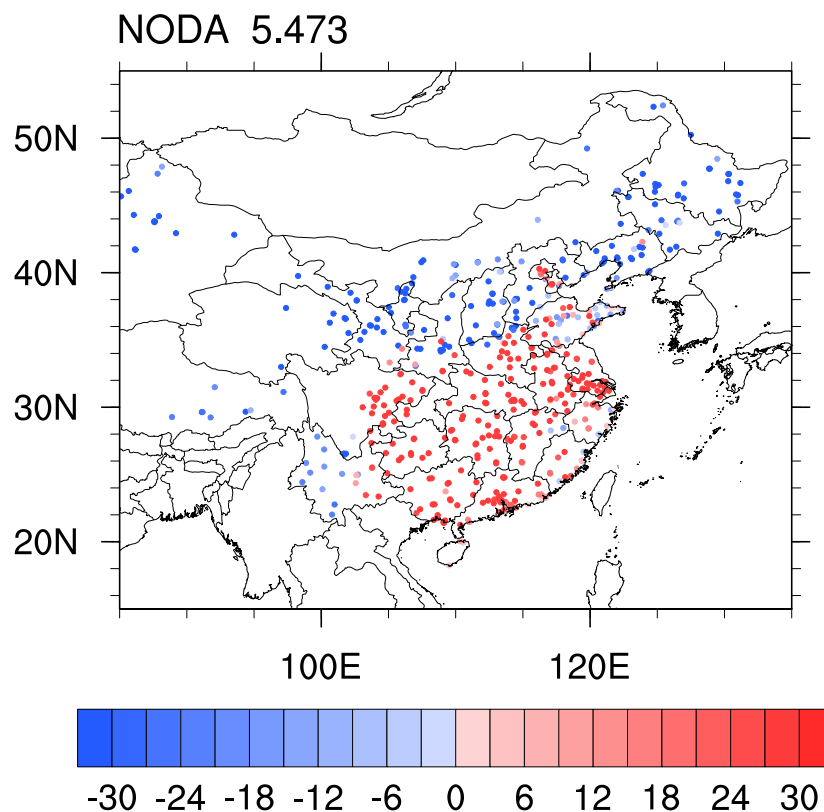
Fig. 1 Bias for PM_{10} at 531 stations in NODA experiment.

* Corresponding author: Dr. Zhiquan Liu (liuz@ucar.edu) and Dr. Dan Chen (dchen@ium.cn)

2. Threat score for air quality index

The threat score (TS) for air quality index (AQI) is calculated by

$$TS_i = \frac{H_i}{H_i + M_i + F_i} \quad (1)$$

where H, M, and F denotes the times of the hits, the misses, and the false alarms in the forecast of AQI, and i

denotes the AQI levels from 1 to 6. In result, the TS is acquired at each AQI level ranging from 0 to 1. The higher

(lower) TS represents the better (worse) forecast performance.