

Estimation of Species Discharged in Regions of Asian High Population Density into Stratosphere

Fei Xie¹ and Wenshou Tian² (CMS)

¹*College of Global Change and Earth System Science, Beijing Normal University, Beijing, China*

²*Key Laboratory for Semi-Arid Climate Change of the Ministry of Education, College of Atmospheric Sciences, Lanzhou University, China*

This study uses the Whole Atmosphere Community Climate Model version 4 (WACCM4) to simulate surface emissions in regions with Asian high population densities into the stratosphere. The emission and transport of tracers in the model helps to understand and analyze the behavior of chemical species which discharged in Asian in the atmosphere. Seven tracers are respectively released in seven different source regions with intensive human activity in Asian (one region one tracer). The seven regions are roughly divided into: JK (Japan and Korea), C (China), ISM (Indonesia, Singapore and Malaysia), TBC (Thailand, Burma, and Cambodia), IB (India and Bangladesh), PIA (Pakistan, Iran, and Afghanistan), and TSI (Turkey, Syria, and Iraq). When the same quantity of each tracer is discharged from the surface in each region, the total quantity of tracer from ISM entering the stratosphere is highest in one year. The quantities of tracers from TBC and IB are also important, but there are comparatively lesser amounts of these tracers from PIA, TSI, C and JK. It is also found that the quantity of Asian emissions entering the stratosphere is the highest in winter, followed by spring, fall, and then summer no matter the emissions from any region.

Key words: WACCM4; Surface emissions; Regions of Asian High Population Density; Transporting into stratosphere