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The Relationship between CO Concentration and Biomass Burning over the North China Plain

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Carbon monoxide (CO) controls the greenhouse gasses (e.g., CH4, O3) indirectly through a chemical reactions. Therefore, CO is regarded as an indirect-greenhouse gas and thus it is important to understand its spatiotemporal variation.

Wang et al.,[JGR, 2002] suggested that the open crop residue burning in June over the North China Plain affects on CO concentration, and it was confirmed by field campaign at Mt.Tai and investigated by model simulations [Kanaya et al.,2013 and reference therein]. Besides, the recent rapid industrialization in China brought significant increase in emission of CO [Ohara et al., ACP, 2007].

In this study, we analyzed the relationship between fire outbreak and CO concentration over the North China Plain by using satellite data. The CO data are taken from Measurement Of Pollution In The Troposphere (MOPITT). We used the Version 5 product. The fires detected by satellite observations are expressed as the hotspot numbers that are derived from the MODIS thermal anomaly product [Takeuchi and Yasuoka, 2006], using the algorithm by [Giglio et al.RSE,2003]. Here we used the hotspot numbers as proxy of the fire detection index.

CO concentration in June increases accompanied by a large number of the hotspot counts, which is consistent as previous studies. On the other hand, CO concentration gradually increases in fall and winter with only few hotspot numbers. It implies that CO emissions are possibly from industrial activity, automobiles and coal burning for heating rather than biomass burning in fall and winter. In addition, the year-to-year variability of CO concentration in June and in fall and winter was different.

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