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Air Pollutant Emissions from Anthropogenic Sources in China: Current Status and Future Projections

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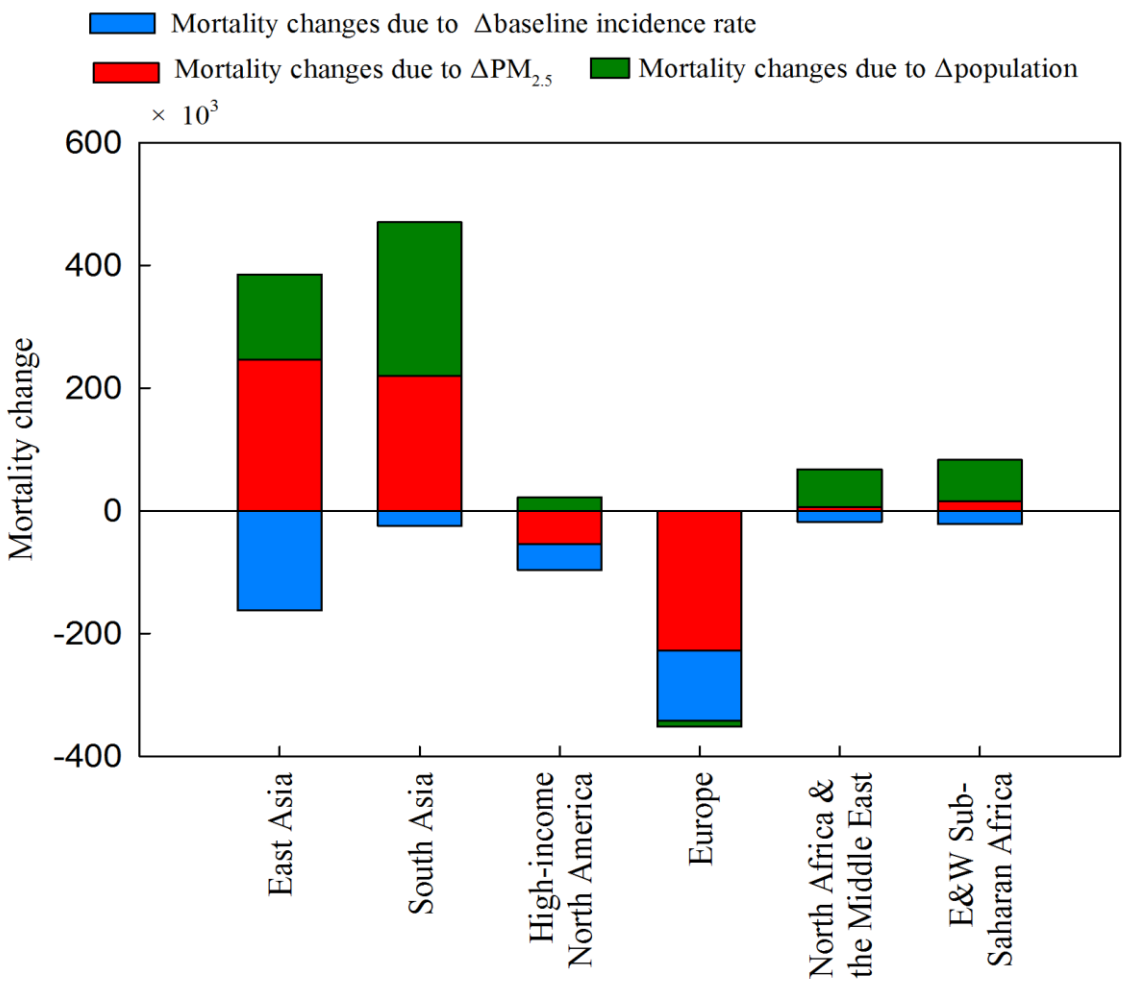
November 20, 2015

Background

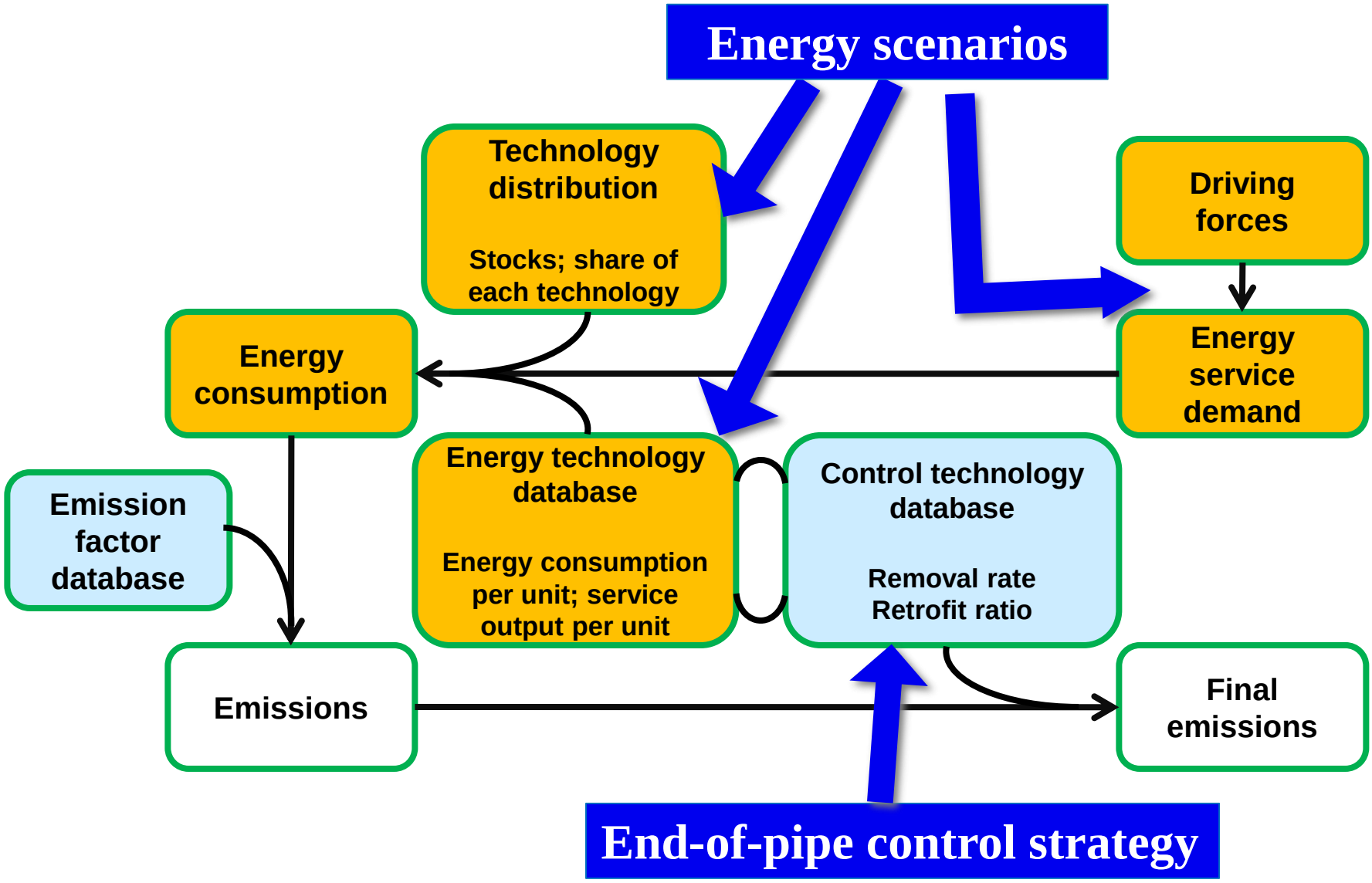


$PM_{2.5}$-mortality changes from 1990 to 2010

Decreasing trends in $PM_{2.5}$-mortality are noted in Europe and North America. In contrast, in East and South Asia, the increased health risk from the deterioration of air quality offsets the benefits from the improvement of living condition and the quality of medical care.

Wang et al., 2015, in preparation

Methodology for emission projection

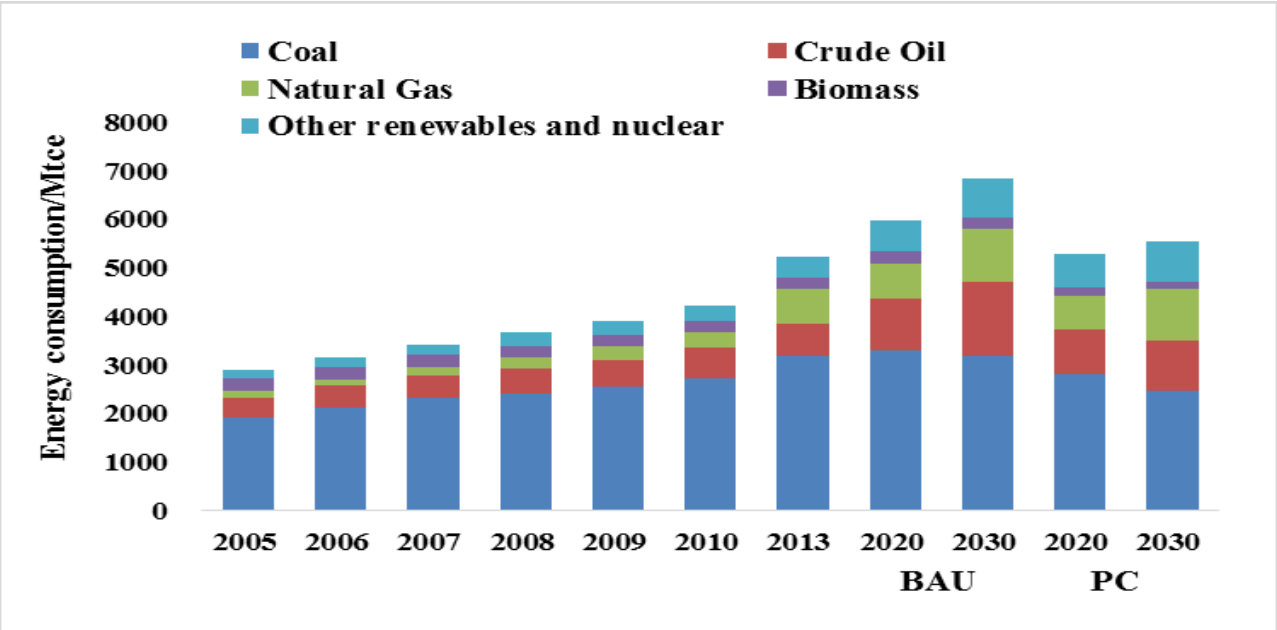


Definition of emission scenarios

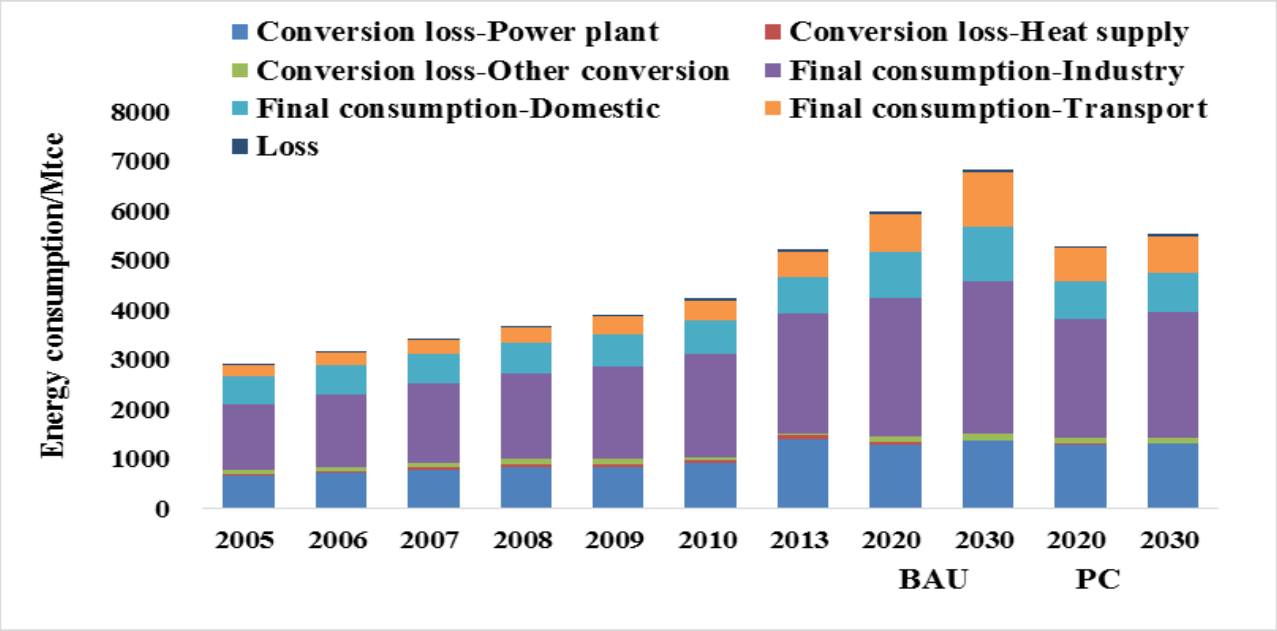
Energy scenarios	Energy scenario definition	Emission scenarios	Emission scenario definition
BAU	The BAU scenario is based on current legislations and implementations status (until the end of 2012)	BAU[1]	For end-of-pipe control strategy, it is designed based on the “Twelfth Five-Year Plan for Environmental Protection” and the “Air Pollution Prevention and Control Action Plan”.
		BAU[2]	For end-of-pipe control strategy, it assumes that the technically feasible control technologies would almost be fully applied by 2030, regardless of the economic cost.
PC	assumes new energy-saving policies will be released and enforced, including life style changes, structural adjustment and energy efficiency improvement.	PC[1]	The PC[1] scenario assumes the same energy saving policy as PC scenario and the same end-of-pipe control strategy as BAU[1].
		PC[2]	The PC[2] scenario is an aggressive scenario using the same energy saving policy as PC scenario with nearly maximum feasible reductions of emissions.

Projection of energy consumptions in China

Energy consumption by fuel

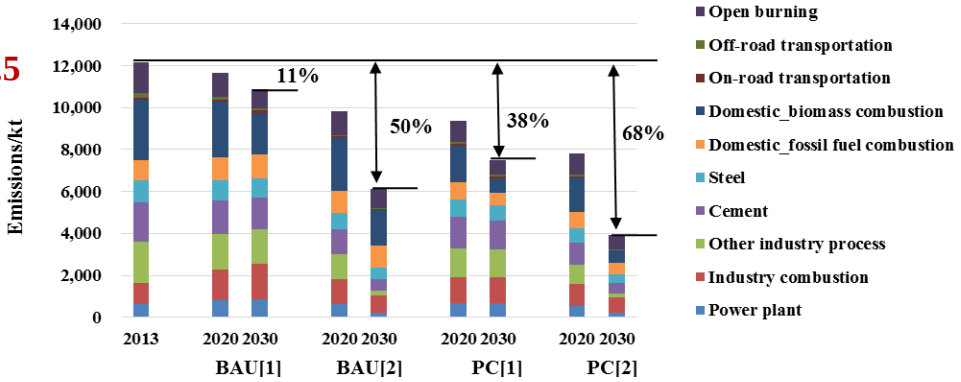


Energy consumption by sector

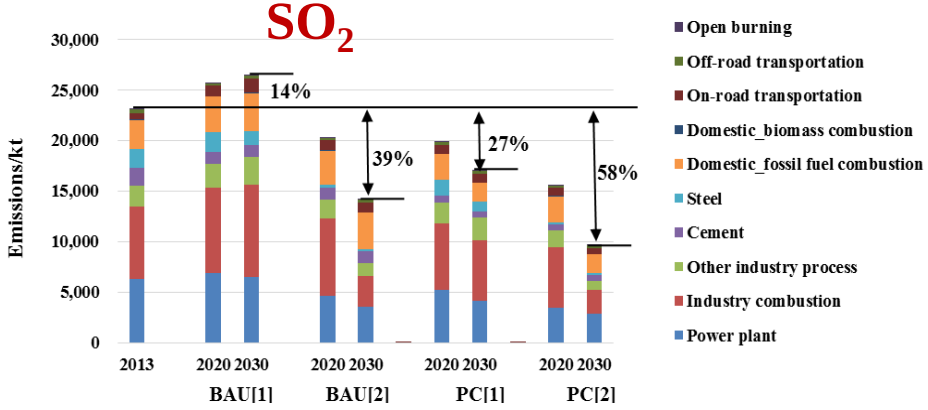


Current and future emissions in China

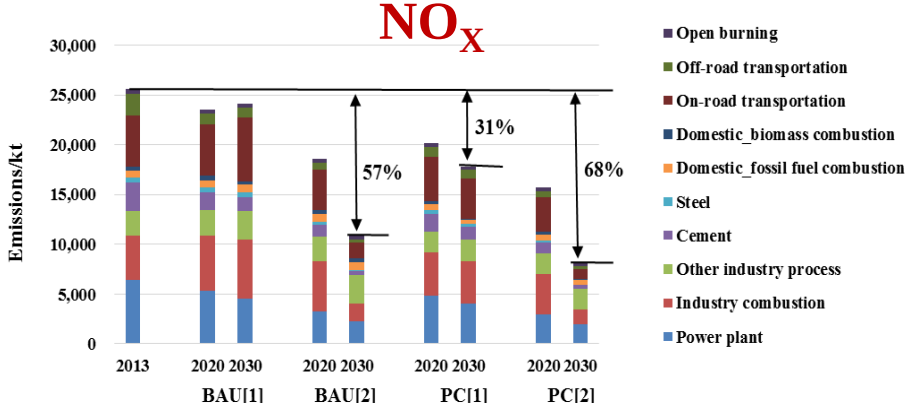
$PM_{2.5}$



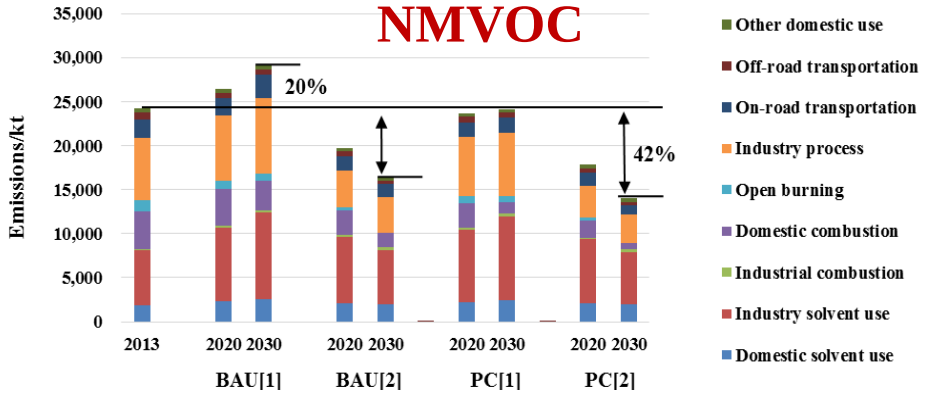
SO_2



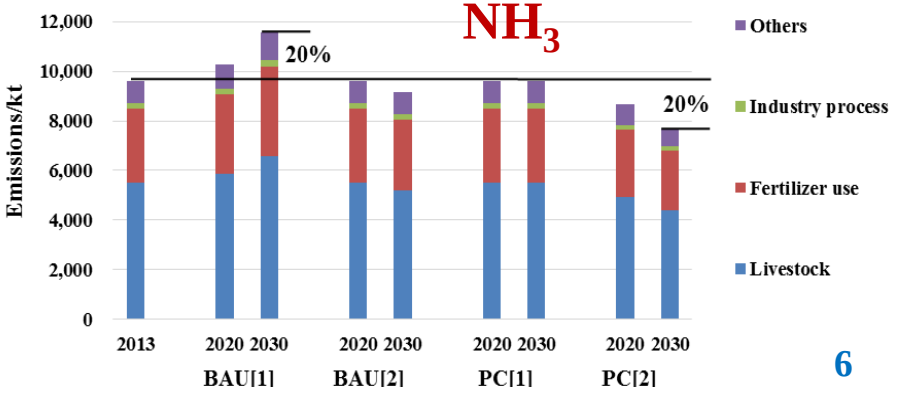
NO_X



NMVOC



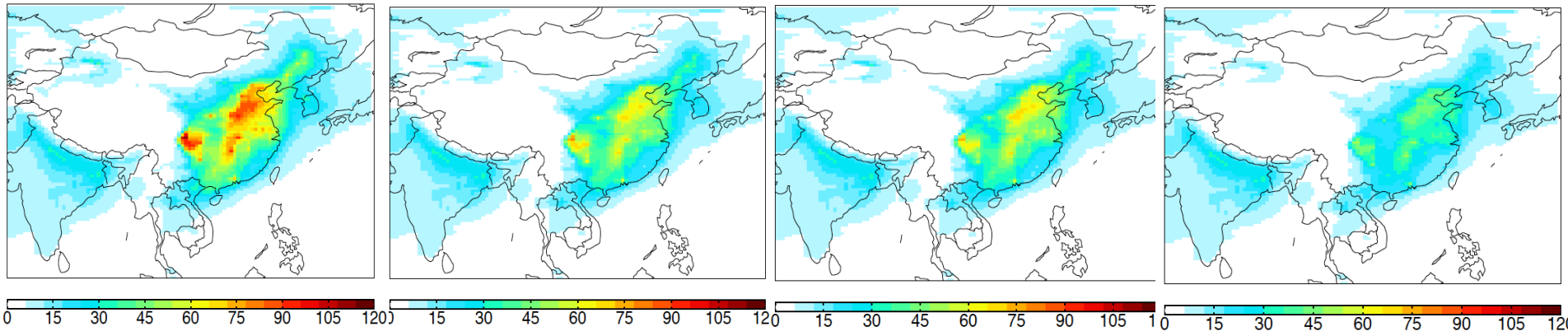
NH_3



Impacts of future emissions on $PM_{2.5}$ pollution

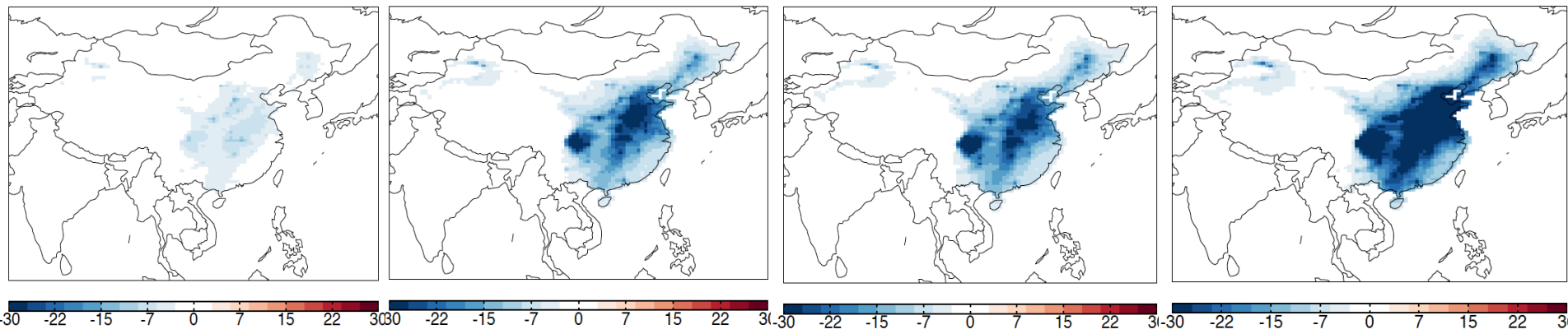
$PM_{2.5}$ in 2030, ug/m^3

2030 BAU1 **2030 BAU2** **2030 PC1** **2030 PC2**



2030 minus 2013, ug/m^3

2030 BAU1 **2030 BAU2** **2030 PC1** **2030 PC2**



Wang et al., 2015, in preparation

Conclusions

- **In 2013, the anthropogenic emissions of SO_2, NOx, PM_{10}, $PM_{2.5}$, BC, OC, NMVOC and NH_3 in China were estimated to be 23.2 Mt, 25.6 Mt, 16.5 Mt, 12.2 Mt, 1.95 Mt, 3.42 Mt, 23.8 Mt, and 9.62 Mt, respectively.**
- **Under BAU[1] with current air pollution control legislations, NO_X emissions in 2030 are comparable with that in 2013. $PM_{2.5}$ emissions decrease slightly, while the emissions of SO_2, NMVOC and NH_3 increase.**
- **In 2030, the implementation of energy saving measures may reduce NO_X, SO_2, $PM_{2.5}$, NMVOC and NH_3 emissions by 26.2%, 35.7%, 31.0%, 16.9% and 16.7% from the BAU[1] scenario.**
- **In 2030, the implementation of maximum feasible end-of-pipe control measures may reduce NO_X, SO_2, $PM_{2.5}$, NMVOC and NH_3 emissions by 55.1%, 46.4%, 43.8%, 43.5% and 20.8% from the BAU[1].**
- **With the implementation of both energy and end-of-pipe control measures, NO_X, SO_2, $PM_{2.5}$, NMVOC and NH_3 emissions in 2030 are reduced to 41.8%, 36.5%, 36.1%, 48.1% and 66.7% of that under BAU[1], which significantly reduces the $PM_{2.5}$ concentrations.**

References:

1. Zhao, B., Wang, S. X., Xu, J. Y., Fu, K., Klimont, Z., Hao, J. M., He, K. B., Cofala, J., and Amann, M. NOx emissions in China: historical trends and future perspectives, Atmos. Chem. Phys., 13, 1-29, 2013.

2. Wang, S. X., Zhao, B., Cai, S. Y., Klimont, Z., Nielsen, C. P., Morikawa, T., Woo, J. H., Kim, Y., Fu, X., Xu, J. Y., Hao, J.M., and He, K. B. Emission trends and mitigation options for air pollutants in East Asia, Atmos. Chem. Phys., 14, 6571–6603, 2014.

3. Burden of Disease Attributable to Coal-Burning and other Major Sources in China (DRAFT Report), 2015

Acknowledgement: Support from Health Effects Institute, GBD MAPS (Global Burden of Disease-Major Air Pollution Sources)

Thank you for your attention!