Heterogeneous chemistry: a mechanism missing in GEOS-Chem to explain sulfate formation in Beijing

Jingyuan Shao¹,², Becky Alexander², Lin Zhang¹, Qianjie Chen², Yuxuan Wang³, Pengzhen He⁴, Zhouqing Xie⁴, Xiao Lu¹, Yele Sun⁵

*Calculations with aerosol pH = 3-5 result in up to ~25% of sulfate abundance originating from heterogeneous chemistry, with metal-catalyzed oxidation dominating under polluted conditions.*

*Observed sulfate concentrations and Δ¹⁷O(SO₄²⁻) suggest aerosol pH between 4.5-5.5 on average, slightly higher than model calculations (pH = 3-5).*