

Interactive
Comment

Interactive comment on “Source-receptor relationships between East Asian sulfur dioxide emissions and Northern Hemisphere sulfate concentrations” by J. Liu et al.

J. Liu et al.

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One motivation for this study was to quantitatively describe the spatial extent of the linearity (and non-linearity) of the conversion of emitted SO₂ to sulfate. Our conclusion that "sulfate concentrations over downwind regions respond nearly linearly to changes in SO₂ emissions, but sulfate concentrations over the source region increase more slowly than SO₂ emissions" allows Liu and Mauzerall (2007) to derive an inter-continental Influence Potential (IP) metric. The IP quantifies the human exposure that occurs in a receptor region as a result of a unit of SO₂ emissions from a source region. With the S-R curves for SO₂/SO₄ from this work, Liu and Mauzerall (2007) calculate IP ratios (IPR) between foreign and domestic SO₂ emissions over ten continental regions. Due to the non-linearity of SO₂ to sulfate conversion over source regions, the IPR pro-

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vides a conservative estimate of the importance of controlling foreign SO₂ sources relative to mitigating domestic emissions. The estimate is based on geographical, meteorological and demographic patterns only; economic and political factors that could influence a decision to mitigate foreign versus domestic emissions are ignored. The ERL paper along with our follow up papers which evaluate the inter-continental transport of fine aerosols and their associated impacts on premature mortality (e.g., Liu et al., 2008a; Liu et al., 2008b) demonstrate that a regional agreement among EA countries, and an inter-regional agreement among EU, ME, FSU and (north) AF regions to control sulfur emissions could benefit public health in these regions.

References

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