Response of aerosols toward drought: a view from climate–chemistry model

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Drought is a period of time when precipitation is below average in a given region, which affects not only agricultural activities but also air quality. Considering aerosols, drought can reduce wet scavenging and affect their chemical production. Previous study shows that surface PM2.5 concentrations increase 26% in the southern US during severe drought in 2011 and suggests that cloud process could be a key factor controlling PM2.5 concentration during drought period [1]. Furthermore, it was found that most climate-chemistry models underestimate sulfate during drought, which may be attributed to reduction of sulfate production in clouds during drought period [2]. In this presentation, a climate chemistry model, CESM CAM-Chem is used to capture the response of sulfate and SOA to drought, with a focus on in-cloud formation of aerosol species.

References

[1] Wang, Y., Xie, Y., Cai, L., Dong, W., Zhang, Q. and Zhang, L., 2015: Impact of the 2011 Southern U.S. drought on ground-level fine aerosol concentration in summertime. *J. Atmos. Sci*. **72**, 1075–1093.

[2] Wang, Y., Xie, Y., Dong, W., Ming, Y., Wang, J., and Shen, L., 2017: Adverse effects of increasing drought on air quality via natural processes. *Atmos. Chem. Phys*. **17**, 12827 – 12843.

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