

Multiscale Model Development and Physical Analysis of Stratospheric Particle Dispersion and Transport Based on Stratospheric Aerosol Injection



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Mong Man Wai Building**

[Zoom Link](#) (Mixed-mode)

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In this presentation, I will talk about particle dispersion and transport in the stratosphere in two aspects based on simulations of stratospheric aerosol injection, a geoengineering method that aims to reflect sunlight by injecting aerosols into the stratosphere.

1. From the dynamic aspect, we use a Lagrangian trajectory model to quantify the stratospheric transport and tropospheric sink of injected particles in the stratosphere. We explore how background circulations influence particle transport in the stratosphere. Interesting results include the zonal asymmetry of particle transport in the stratosphere, QBO's modulation on stratosphere-troposphere exchange (STE), etc.
2. From the model developing aspect, I will introduce a new Lagrangian plume model that we created to simulate small-scale plumes in the stratosphere (e.g., aircraft plumes), and how we coupled this new Lagrangian plume model into a global model to build a multiscale plume-in-grid model. I will also show this plume-in-grid model's advantages in resolving subgrid plumes that cannot be resolved by conventional global models.



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