Atmospheric
Chemistry
and Physics

Supplement of

Long-term multi-source data analysis about the characteristics of aerosol optical properties and types over Australia

Xingchuan Yang et al.

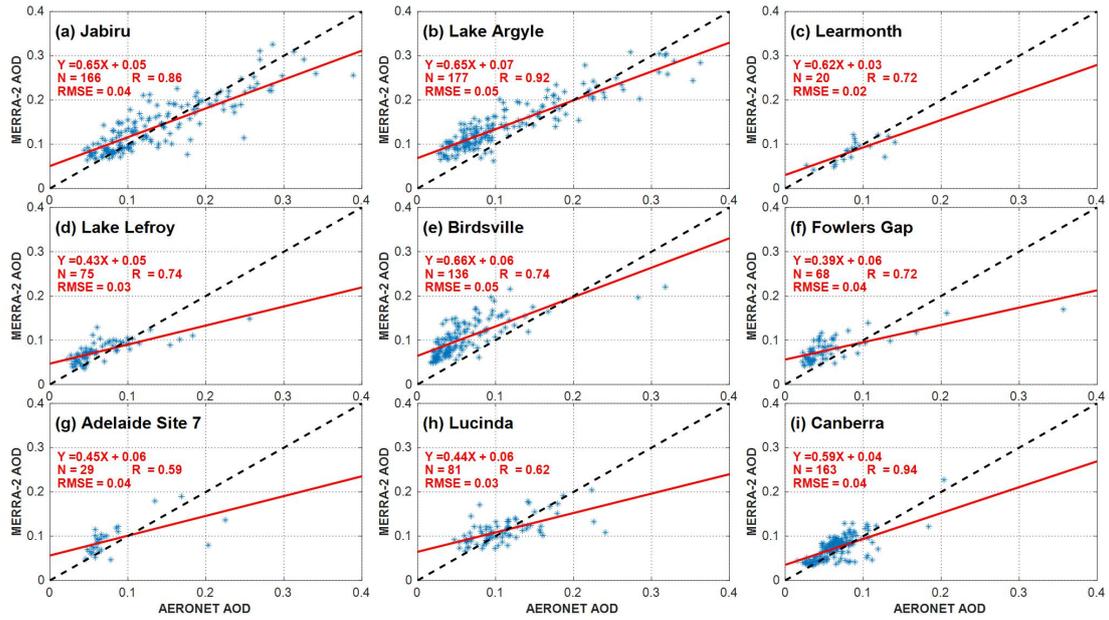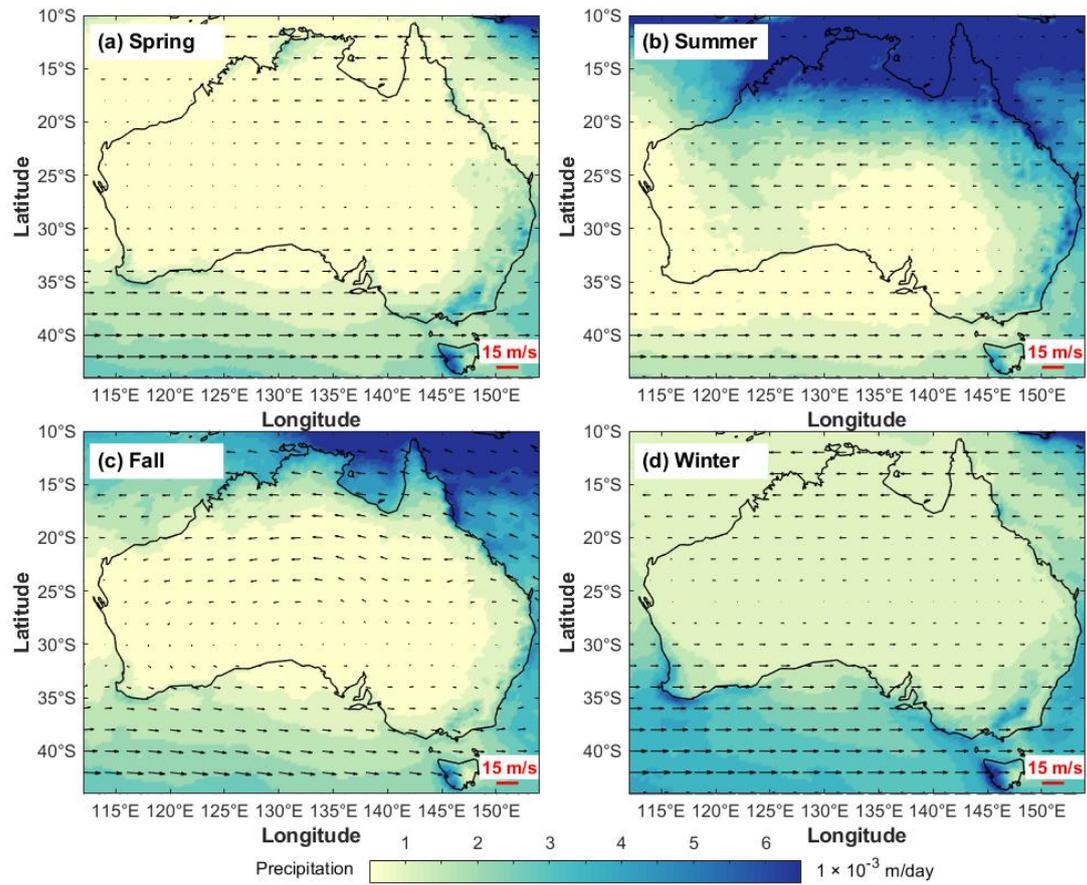*Correspondence to:* Chuanfeng Zhao (czhao@bnu.edu.cn)

Figure S1. The comparisons of monthly MERRA-2 and AERONET AOD at nine AERONET sites over Australia during 2002-2020. Linear regression is shown as a solid red line and all the linear relationships are statistically significant at $\alpha = 0.01$. The black dashed line is the 1:1 line.

Figure S2. Spatial distributions of seasonally averaged total precipitation (colors) and winds (arrows) from the ERA-5 monthly dataset in Australia, a) spring, b) summer, c) fall, and d) winter.
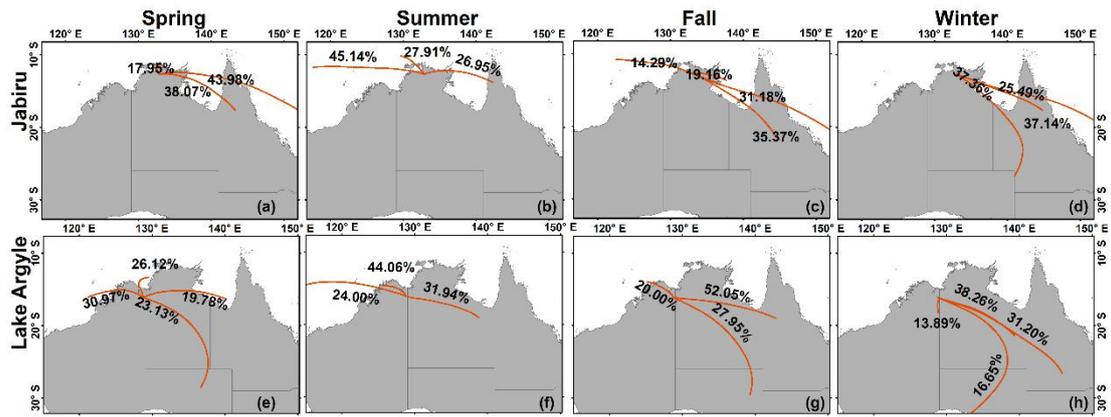
Figure S3. Cluster analysis of simulated back trajectories from HYSPLIT during the period January 2005-May 2020 for air masses ending at Jabiru and Lake Argyle at 500 m above ground level in Australia.
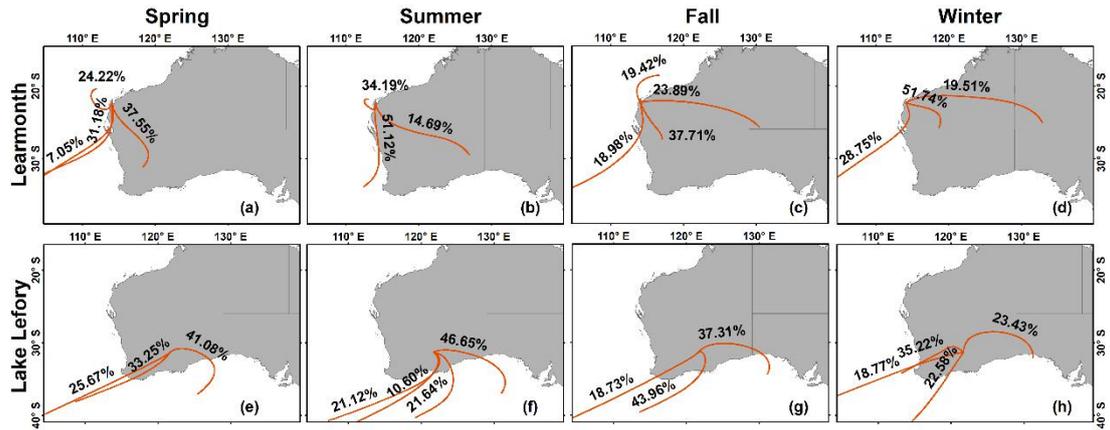
Figure S4. Cluster analysis of simulated back trajectories from HYSPLIT during the period January 2005-May 2020 for air masses ending at Learmonth and Lake Lefory at 500 m above ground level in Australia.
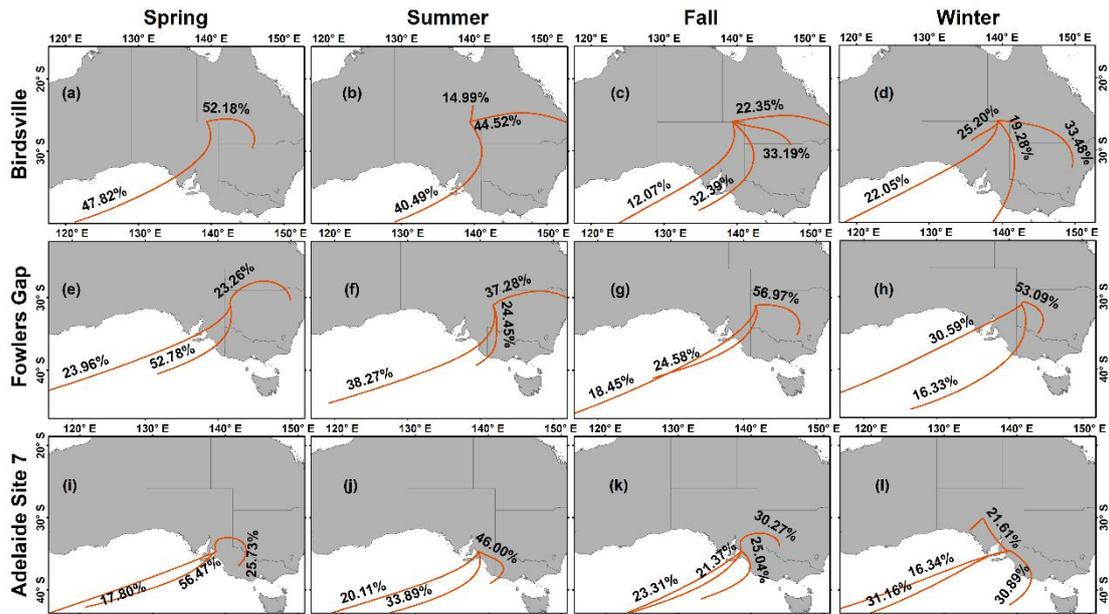
Figure S5. Cluster analysis of simulated back trajectories from HYSPLIT during the period January 2005-May 2020 for air masses ending at Birdsville, Fowlers Gap, and Adelaide Site 7 at 500 m above ground level in Australia.
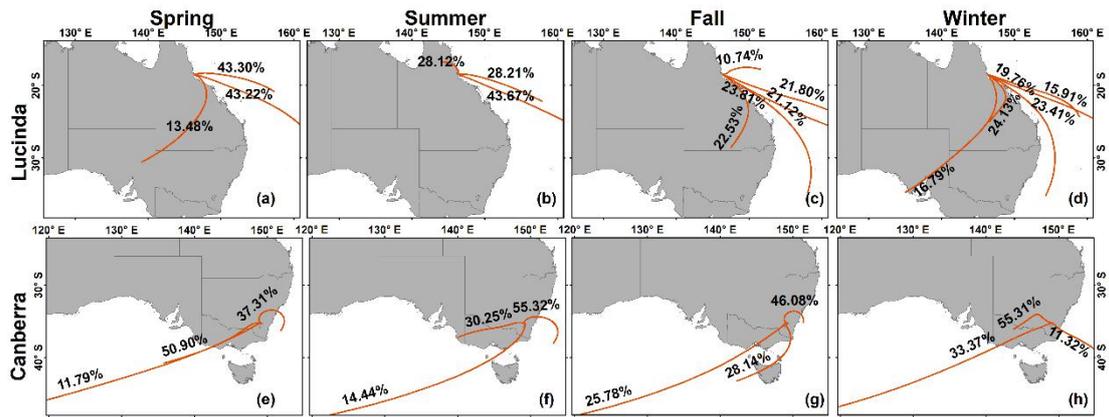
Figure S6. Cluster analysis of simulated back trajectories from HYSPLIT during the period January 2005-May 2020 for air masses ending at Lucinda and Canberra at 500 m above ground level in Australia.
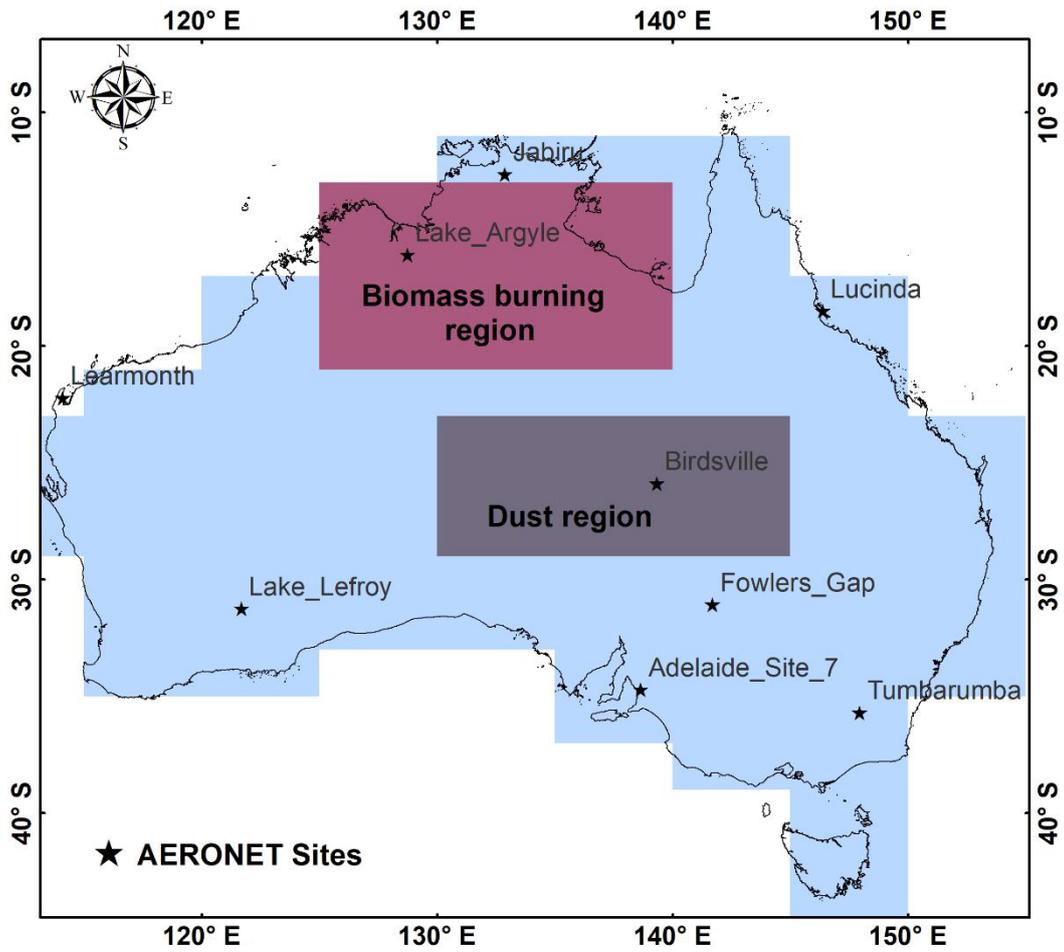
Figure S7. Three domains selected for vertical profile analysis in this study. Blue shade region indicates the Australia; Deep purple shade region represents biomass burning regime areas; and Gray shade region indicates desert regime areas.