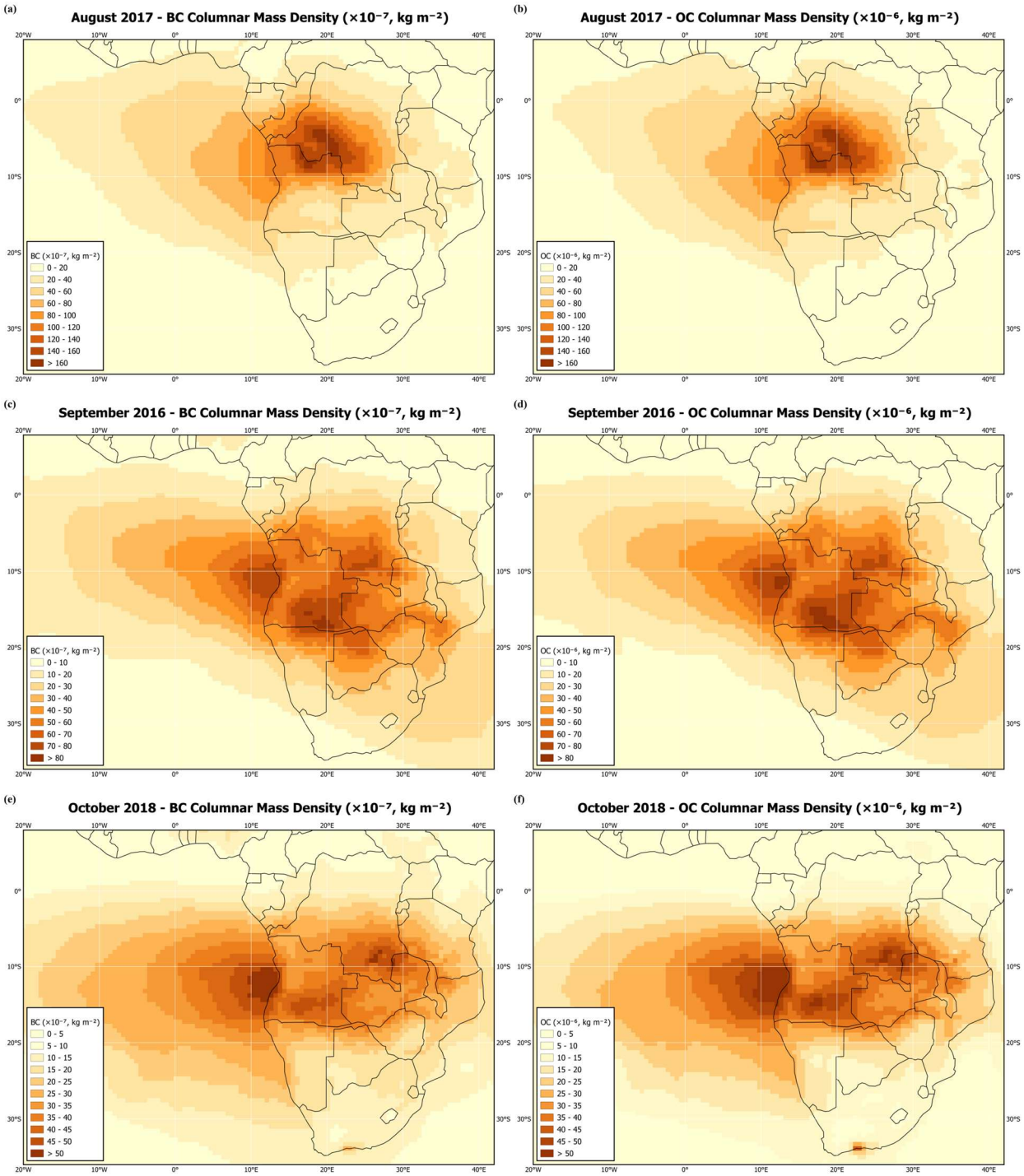

Figure S1: Black Carbon (BC) and Organic Carbon (OC) columnar mass densities from MERRA-2 (Modern-Era Retrospective analysis for Research and Applications, version 2) for the ORACLES campaign months of August 2017 (a-b), September 2016 (c-d), and October 2018 (e-f), respectively. Data courtesy of NASA Giovanni.

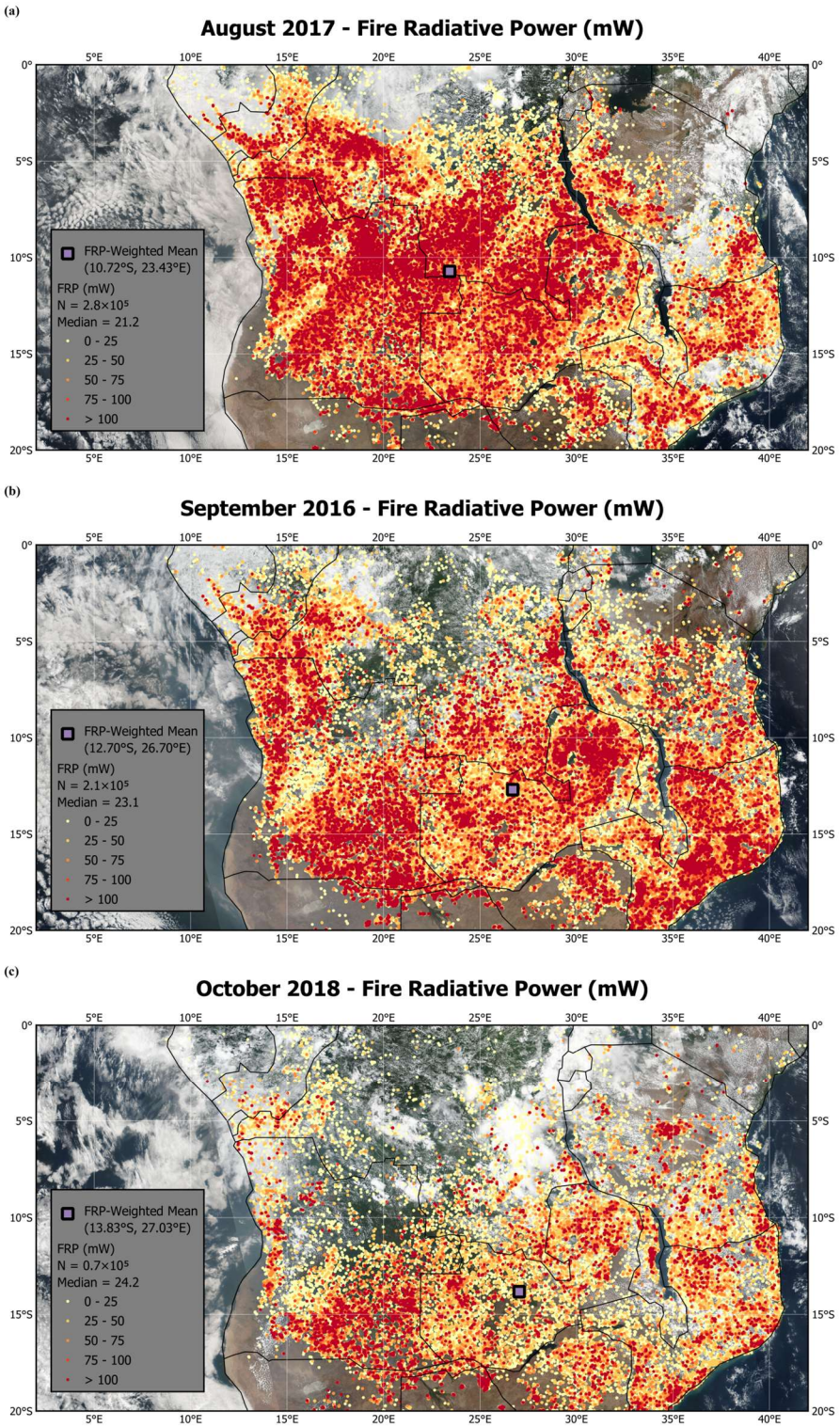

Figure S2: Fire Radiative Power (FRP) for presumed vegetation fires detected by MODIS (MODerate resolution Imaging Spectroradiometer) aboard the NASA Aqua and Terra satellites for the ORACLES campaign months of August 2017 (a), September 2016 (b), and October 2018 (c). Data courtesy of NASA FIRMS (Fire Information for Resource Management System). Satellite imagery is true color corrected reflectance from the VIIRS (Visible Infrared Imaging Radiometer Suite) aboard the NASA/NOAA Suomi satellite for 21 August 2017 (a), 12 September 2016 (b), and 10 October 2018 (c), courtesy of NASA Worldview.

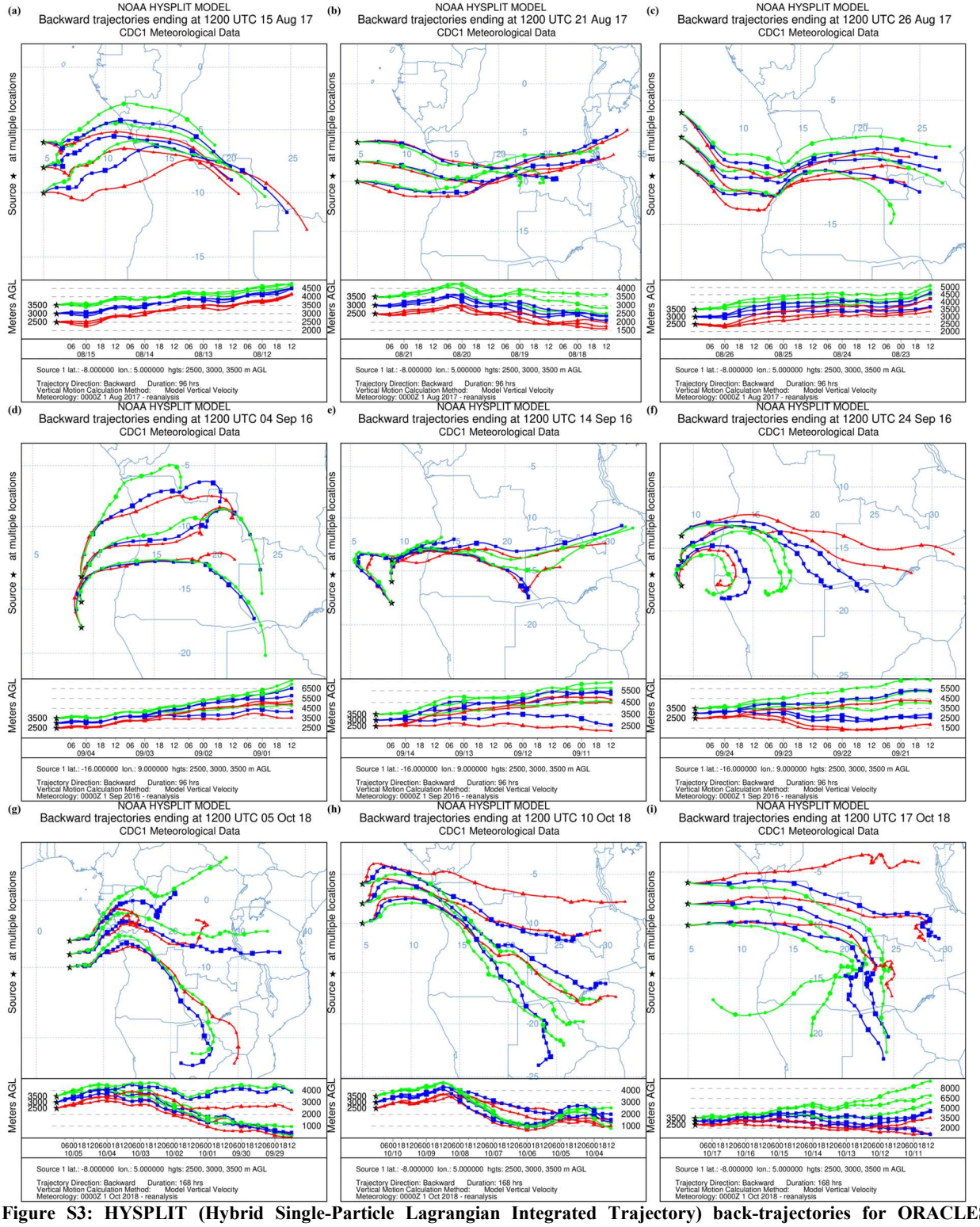

Figure S3: HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) back-trajectories for ORACLES campaign dates in August 2017 (a-c), September 2016 (d-f), and October 2018 (g-i). The source locations are the median campaign coordinates ±2 ° latitude. This results in source locations of 14-18 °S, 9 °E for ORACLES 2016 and 6-10 °S, 5 °E for ORACLES 2017 and 2018. The source altitudes are 2.5-3.5 km, where in situ extinction coefficients were generally greatest. Back-trajectory duration was limited to the maximum duration where the flow was not dominated by recirculations, resulting in durations of four days for August 2017 (a-c) and September 2016 (d-f), and six days for October 2018 (g-i). Courtesy of the NOAA Air Resources Laboratory.

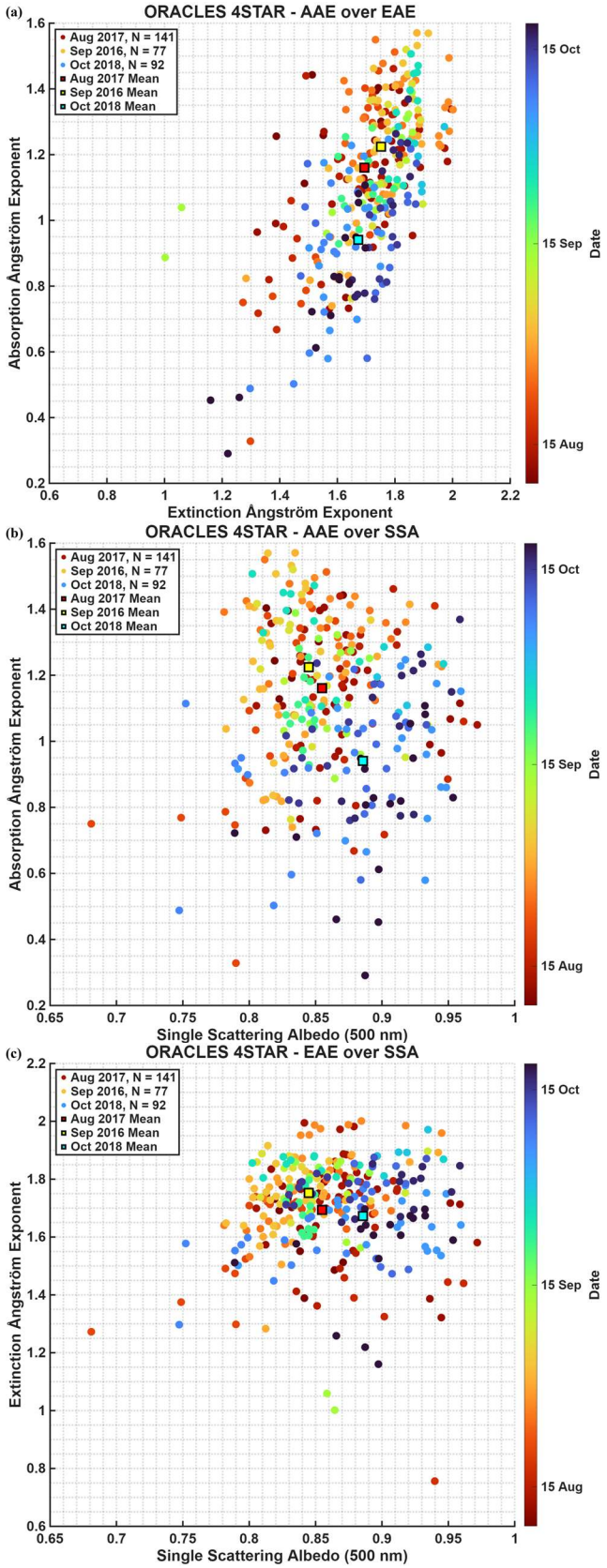

Figure S4: AAE as a function of EAE (a), AAE as a function of SSA (b), and EAE as a function of SSA (c) for ORACLES 2016-2018 4STAR sky-scans. Dots are colored by date, with square campaign means.