

EGU21-12466

<https://doi.org/10.5194/egusphere-egu21-12466>

EGU General Assembly 2021

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## **Optical properties of smoke particules from Australian 2019-20 wildfires derived from lidar measurements at the French Antarctic station Dumont d'Urville**

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Australia experienced an unprecedented fire season from August 2019 to March 2020, now colloquially named as Black Summer. As a warming climate could tend to enhance wildfire seasons, it is critical to study their impact on a large scale : pyrocumulonimbus (pyroCb) events directly inject large quantities of material into the stratosphere, from which aerosols can then be transported due to the general circulation patterns. Stratospheric aerosols have an important impact on the radiative budget of the Earth : directly, through the change in albedo they imply, and indirectly, enhancing nucleation processes.

The pyrocumulonimbus events triggered by these wildfires between 2019/12/29 and 2020/01/04 raised the stratospheric aerosol load of the Southern Hemisphere to a rarely observed level and we hereby present the optical signatures and characterization of the smoke-related aerosols detected at the French Antarctic station Dumont d'Urville (66.6°S – 140°E) since their first detection in november 2019 and their presence throughout the 2020 year after long range transport. Combined with satellite measurements from OMI and OMPS, lidar measurements allow us to follow the time evolution of these aerosol layers, their vertical distribution in altitude as well as their optical properties and assessment of the lidar ratio. As the groundbased instrumental coverage remains sparse in the Southern Hemisphere and especially in Antarctica, such events highlight the importance of running monitoring programs at high latitudes.