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The study of aerosol and ozone measurements in lower boundary layer with UAV helicopter platform

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This study describes the aerosol and ozone measurement in the lower atmospheric boundary layer of highly polluted region at Kao-hsiung, Taiwan with a small unmanned aerial vehicle (UAV) helicopter platform. This UAV helicopter, modified from Gaui-X7 electronic-power model helicopter with autopilot AHRS (Altitude-Head-Reference System) kit, has fast climb speed up to 700 m height and keeps stable status for atmospheric measurements in five-minute fly leg. Several quick-replaced battery packages are ready on ground for field intensive observation. The payload rack under this UAV helicopter carries a micro-Aethalometer (black carbon concentration), ozone meter, temperature-humidity sensor, barometer and a time-lapse digital camera. The field measurement site closes to Linyuan Petrochemical Industrial Park, where is one of the heavy polluted regions in Taiwan. Balloon-borne Vaisala RS-92 radiosonde and CL31 Lidar Ceilometer are used to provide the background of the atmosphere at the same time. More data analysis measured by UAV helicopter and its potential application will be discussed.