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ACCLIP

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ABSTRACT: This is final data from the NOAA Single Particle Soot
Photometer (SP2), flown on the NSF/NCAR GV in ACCLIP. The data
consists of 1-s refractory black carbon (rBC) concentrations (in
ng-rBC/STP-cubic-meter-air and ng-rBC/ambient-cubic-meter-air). The SP2
measures rBC in the size range of approximately 90- 500 nm
volume-equivalent diameter assuming a void-free density of 2 g/cc for rBC
and quantifies ~80% of rBC mass in accumulation mode. The observed
rBC mass in this size range has been scaled upwards to represent total
accumulation-mode rBC concentrations based on gaussian fits to size
distributions in two altitude ranges: below 5km and above 5km. This is a
well-established approach (Schwarz et al., JGR, 2006). In-cloud data have
been removed and final calibrations have been applied.

INSTRUMENT_INFO: NOAA Single-Particle Soot Photometer (GV);
The Single Particle Soot Photometer uses an intense intra cavity near IR
laser to heat refractory black carbon (rBC) to vaporization. The visible
thermal emissions is used to measure the mass of just the rBC for
individual particles. These are integrated to determine rBC concentration.
See: J. P. Schwarz, J. R. Spackman, D. W. Fahey, R. S. Gao, U. Lohmann,
P. Stier, L. A. Watts, D. S. Thomson, D. A. Lack, L. Pfister, M. J. Mahoney,

D. Baumgardner, J. C. Wilson, J. M. Reeves, Coatings and their enhancement of black-carbon light absorption in the tropical atmosphere, J. Geophys. Res., doi:10.1029/2007JD009042, 2008 for more information.

DATA COLLECTION AND PROCESSING:

Provided is 1-s integrated refractory black carbon concentration (ng-rBC/m³ air at STP conditions and ng-rBC/m³ air at ambient conditions). The specific size-range of integration is stated in the header to the .ict file. Zero-concentration values are meaningful and should be included in averages, as they represent periods without detection of rBC in our size range. Invalid data is flagged with -9999.99.

PARAMETERS:

Time_start, seconds since midnight; BC_mass_90_550_nm_std, ng std m⁻³, BC_concentration; BC_mass_90_550_nm_amb, ng ambient m⁻³, BC_concentration_amb

UNCERTAINTY: 25 pct systematic uncertainty from flow and mass calibration, and inlet aspiration efficiency.

PLATFORM: NSF/NCAR GV

TEMPORAL COVERAGE: 2022-08-04–2022-09-01; Note: Data from the transit flight on 2022-07-31 (Guam, PGUM to Osan AFB, RKSO) is not included because of near-total loss of data to cloud interference.

SPATIAL COVERAGE: 2022-08-04–2022-08-30: Western Pacific; flight operations from Osan AFB (RKSO, latitude: 37.090, longitude: 127.030, elevation: 12m/39ft AMSL), Korea; 2022-09-01: Transit flight from Anchorage International Airport (PANC; latitude: 61.170, longitude: 150.000, elevation: 40m/131ft AMSL) to Rocky Mountain Metropolitan Airport (KBJC; latitude: 39.912, longitude: 105.117, elevation: 1,729m/5,673ft AMSL), USA

ASSOCIATED_DATA: N/A

ULOD_FLAG: -7777

ULOD_VALUE: N/A

LLOD_FLAG: -8888

LLOD_VALUE: N/A

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PROJECT_INFO: NASA ACCLIP Mission, 2022

STIPULATIONS_ON_USE: Please address questions to the PI.

OTHER_COMMENTS: *****FINAL DATA*****

REVISION: R0

R0: Final data and calibrations, using available cloud and meteorological data.

RA: Field 1-s data.

GCMD science keywords: black carbon: UUID:
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