Dataset Title: University of Washington Convair-580 Cloud and Microphysics Data

General Dataset Description: This dataset includes airborne measurements obtained from the Convair-580 aircraft during the Improvement of Microphysical Parameterization through Observational Verification Experiment 1 (IMPROVE-1). This dataset contains a variety of measurements including 2DC probe, liquid water content, state parameter, size spectrum of cloud and precipitation, dew point, and cloud drop effective radius data in both excel and ASCII text formats. Parameters are not consistent across the data files in this dataset.

Parameter specifications are as follows:

a) Navigation and Flight Characteristics

Parameter	Instrument Type	Manufacturer/Model	CARG Data System Parameters	Problems
Latitude, longitude, ground speed, horizontal winds	GPS (Pilot's) and Trimble TANS Vector	Trimble TANS Vector	tans-lat, tans-lon, tans-alt, tans-grspeed, wind_dir, wind_spd	No major problems
True airspeed	Variable capacitance	Rosemount Model F2VL 781A	tas	No major problems
Heading	Standard GPS	Trimble TANS Vector	tans-azimth	No major problems
Pressure	Variable capacitance	Rosemount Model 830BA	pstat	No major problems
Altitude above terrain	Radar Altimeter	Bendix Model ALA 51A	ralt	No major problems
Altitude	Standard GPS	Trimble TANS Vector	tans-alt	No major problems
Pitch and Roll	Standard GPS	Trimble TANS Vector	tans-pitch, tans-roll	No major problems

b) General Meteorological Parameters

Parameter	Instrument Type	Manufacturer/Model	CARG Data System Parameters	Problems
Total Air Temperature	Platinum wire resistance	Rosemount Model 102CY2CG and 414 L Bridge	ttot (derived parameter: tstat)	Did not provide reliable measurements.

Static Air Temperature	Reverse-flow thermometer	In-house	ttotr (derived parameter: tstatr)	Some noise; data usable.
Dew Point	Cooled-mirror dew point	Cambridge System Model TH73-244	dp (derived parameter: rh_chl)	Some noise; data usable.
Absolute Humidity	IR optical hygrometer	Ophir Model IR-2000	rhovo (derived parameters: rh_o, dp_o)	Values sometimes too high.
UV hemispheric radiation, up and down	Diffuser, filter (0.295 to 0.390 um)	Eppley Lab. Inc. Model TUVR	uvup, uvdo (derived parameter: uvalb)	Noisy signals for UW Flights 1847, 1849, 1855, 1856, 1857, 1858.
VIS-NIR hemispheric radiation, up and down	Eppley thermopile (0.3 to 3 um)	Eppley Lab. Inc. Model PSP	pyrup, pyrdo (derived parameter: pyralb)	Noisy signals for UW Flights 1847, 1849, 1854(pyrdo), 1855, 1856, 1857, 1858.
Surface radiative temperature	IR radiometer 1.5 FOV (8 to 14 um)	Omega Engineering OS3701	irtemp	No major problems when aircraft was close to surface.
Video Image	Forward-looking camera and time code	Ocean Systems Splash Cam	SVHS tape.	Noise due to "scrolling bars"; useable.

c) Aerosol

Parameter	**Instrument Type**	**Manufacturer/Model**	**CARG Data System Parameters**	**Problems**
Size spectrum of particles	35 to 120 deg lightscattering	PMS PCASP-100X	pcaspn, pcaspt, pcaspdl, pcaspcc, pcaspcw, pcaspa (derived parameters: pcaspdn, pcaspdnc, pcasprt, pcaspa)	No major problems.

Size spectrum of particles	Forward light-scattering	PMS FSSP-100	fspn, fspt, fspdl, fspcc, fspcw (derived parameters: fspdn, fspdnc, fsprt, fspsa, fspsr)	No major problems.
Light-scattering coefficient	Integrating 3-wavelength nephelometer with backscatter shutter	MS Electron 3W-02	nepgrn, nepred, nepblu, bkspgr, bkspgr, bkspbl	Noisy during ~75% of each flight.

d) Cloud Physics

Parameter	**Instrument Type**	**Manufacturer/Model**	**CARG Data System Parameters**	**Problems**
Cloud and precipitation particle imagery	Digital Holographic camera	SPEC Inc. Model CPI230	Separate data system.	Not installed on UW Flights 1846, 1847, 1848, 1849
Size spectrum of precipitation particles	256 photodiode CCD array	SPEC Inc. HVPS	hvpsn – still in development (derived parameters: hvspdn, hvpsclassf)	No data on UW Flight 1846. Occasional drop-outs and some noise on all flights.
Size spectrum cloud particles	Forward light-scattering	PMS FSSP-100	fspn, fspt, fspdl, fspcc, fspcw, fspsa (derived parameters: fspdn, fspdnc, fsprt, fspsr, lwfsp)	No major problems.
Size spectrum of cloud and precipitation particles	Diode occultation	PMS OAP-200X (1D-C)	cpn, cpdl, cpd, cpt, cpcc, cpsa (derived parameters: cpdn, cpdnl, cpdv, cprt)	Poor spectral data on UW Flight 1846. Not installed on UW Flight 1847. Concentrations may be low.

Images of cloud particles	Diode imaging	PMS OAP 2D-C	tdcn, tdccc, tdcd, tdcsv (derived parameters: tdcclassf, tdcdn, tdcrt)	No data on UW Flights 1846, 1847, 1848, 1849.
Liquid water content	Hot wire resistance	Johnson-Williams	lwjw	Some random noise spikes on all flights, but data usable through ≈0910 UTC on UW Flight 1859.
Liquid water content; particle surface area; effective droplet radius	Optical sensor	Gerber Scientific Ins. PVM-100A	lwpvm, sapvm, erpvm	Some random noise spikes on all flights, but data usable.
Liquid water content	Hot wire	Droplet Measurement Technologies	lwdmt	Excessive drift in low LWC clouds and in clear air. Good for high LWC.

e) Remote Sensing

Parameter	**Instrument Type**	**Manufacturer/Model**	**CARG Data System Parameters**	**Problems**
Radar Reflectivity	Pulsed 35 GHZ radar	In-house	Separate data system	Installed but data not recorded until end of UW Flight 1852. Up-down switch did not work at low temperatures.
Weather Radar	Pilot's radar	Bendix/King	Data not recorded.	---

The above information was obtained from Table 3.1 of "Summary of Flights and Types of Data Collected Aboard the University of Washington's Convair-580 Research Aircraft in IMPROVE-I (Frontal Studies) (4 January–14 February 2001)" at http://carg.atmos.washington.edu/sys/research/archive/IMPROVE-1-Report.pdf.