Overview of Citation Missions in CRYSTAL-FACE, with Preliminary Analysis of July 11, 2nd Flight

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Data Quality

Flight Instrument	3	7	9	11a	11b	16	18	19	21	23	25	26	28	29
NAV	G	G	G	G	G	G	G	G	G	G	G	G	G	G
True Air Speed	6	2	G	G	8	3	G	G	G	G	G	3	G	5
Pressure	3	3	G	G	2	G	G	G	G	G	G	G	G	G
Temperature	G	G	G	G	8	3	G	G	G	G	G	G	G	G
Dew Point	8	G	G	G	G	G	G	G	G	G	G	G	G	G
Horizontal Wind	8	5	8	G	2	2	2	2	1	2	3	4	1	5
Vertical Wind	B	B	B	B	B	B	B	B	B	B	B	B	B	B
TDL	8	B	B	B	B	3	G	G	1	1	G	G	G	7
FSSP	G	G	G	G	G	1	G	G	G	G	G	G	G	9
2-DC	5	3	5	G	3	1	G	1	G	G	G	1	1	3
King Liquid Water	G	G	G	G	G	G	G	G	G	G	B	G	G	9

(Wind data will be reprocessed)

G - Good (No problems or erroneous data)
B - Bad (Not any data that is valuable)
P - Problems (Minor areas of bad data, some problems may be fixed)
A scale of 1-10 (low to high) based on the percentage of data that have problems
July 9, 2002 – throughout the entire data set there is voltage noise. This error has not been included in the table above.

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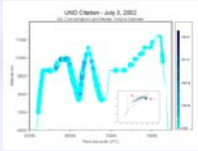
Instruments

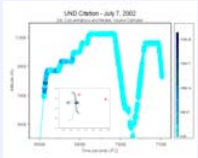
Instrument	Parameter	Investigator
CFDC	Ice nuclei concentrations, filter samples	DeMott (Colorado State) Rogers (NCAR)
CVI	Ice mass, residual particles	Twohy (Oregon State)
CIN	Mass extinction	Gerber (Gerber Scientific)
CPI	Cloud particle images	Heymsfield (NCAR)
HVPS	Precipitation particle images	Heymsfield (NCAR)
FSSP	Cloud droplet sizes	Poellot
PMS 2D-C	Cloud particle images	Poellot
CNC	Condensation nuclei concentrations	Poellot
TDL H2O	Water vapor concentration	Poellot
King, Rosemount	Supercooled liquid water	Poellot
State Parameters	Temperature, Pressure, Dew/Frost Point	Poellot
Winds	u, v, w, turbulence	Poellot
Aircraft Parameters	Position, Orientation, Motion	Poellot

Date	Takeoff (UTC)	Land (UTC)	Hours	Comments
July 3	171444	211650	4.0	Steps and spirals
July 7	175842	214245	3.7	Steps and spirals; dense cirrus
July 9	175517	214935	3.9	Steps over east and west sites. Mixed phase over west site
July 11	142548	165155	2.5	Altostratus, Terra overpass
July 11	180651	221418	4.1	Anvil steps
July 16	183744	225329	4.2	Spirals, steps in anvils
July 18	165043	203043	3.7	Ice nucleation, anvil spiral
July 19	183648	224621	4.2	Anvil steps, spiral
July 21	183500	224852	4.2	Anvil steps, spiral
July 23	185225	232229	4.5	Anvil steps, spirals
July 25	150449	193147	4.5	Steps and spirals; samples over sites
July 26	202909	235643	3.5	Melting layer spiral descents
July 28	193833	220733	2.5	Growing tower samples; dust on descent
July 29	171101	212418	4.2	Anvil steps, spiral; dust on descent

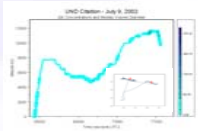
Flight Mission Summary



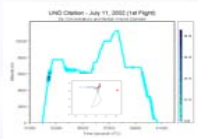
Shakedown mission. Spirals, steps



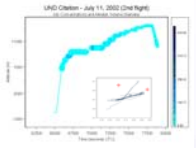
High CWC (exhaust plugged). Possible melting layer measurements.



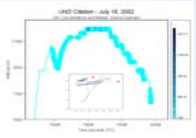
Mixed phase altostratus. Some data over East ground site.



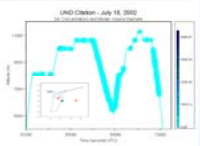
Very thin cloud over West ground site.



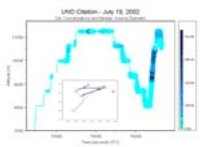
Anvil bases, step profile to 13.3 km. Crystal aggregates.



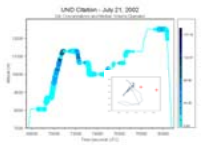
Anvil bases, step profile to 13.3 km. Aggregates



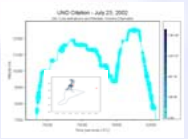
Cell penetrations. Spiral down in uniform anvil.



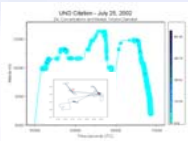
Decaying anvil, also some fresh. Sampled to anvil top thru 3 km depth.



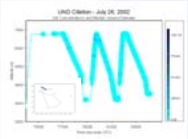
Spiral up through full depth, low CWC, chain aggregates. Optically thin cirrus.



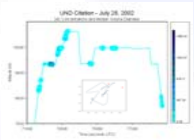
Plates and small aggregates. Spiral up through anvil over West site.



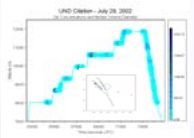
Bullet rosettes. Some samples over East site, limited spiral over West. Some cloud over East.



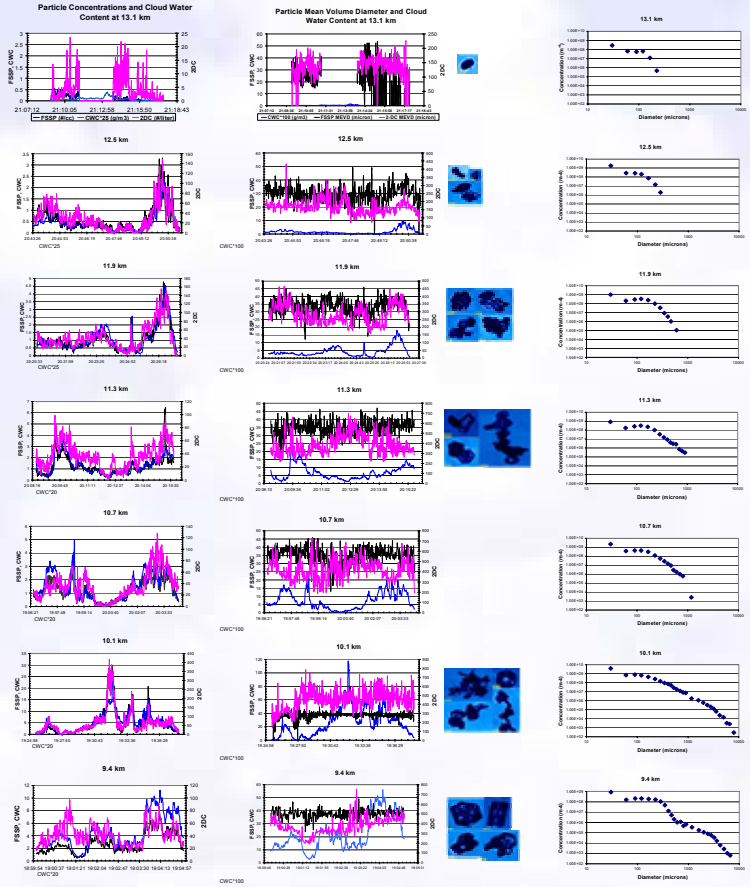
Melting layer study.



Convective tower penetrations. Dust on descent.



High CWC. Lightning. Dust on descent.

July 11, 2nd Flight

Flight Leg (km)	Flight Leg (ft)	FSSP (#/cc)	2DC (#/liter)	CWC (g/m^3)	Calc Wind Dir	Calc Wind Speed (m/s)	Temp (°C)	Extinction Coeff (1/km)	FSSP MEVD (micron)	2-DC MEVD (micron)
9.4	31000	2.8	42.7	0.22	WNW	3	-38.4	14.1	38	373
10.1	33000	4.6	61.9	0.26	Variable	3	-34.4	21.9	36	453
10.7	35000	1.2	35.2	0.07	Variable	2	-39.4	7.3	35	417
11.3	37000	1.2	36.9	0.07	Variable	3	-44.9	7.2	35	380
11.9	39000	1.1	42.4	0.04	Variable	4	-50.3	5.9	33	280
12.5	41000	0.6	29.5	0.02	NE	5	-55.5	3.9	29	168
13.1	43000	0.1	4.2	0.00	ENE	NA	-60.7	2.5	19	135