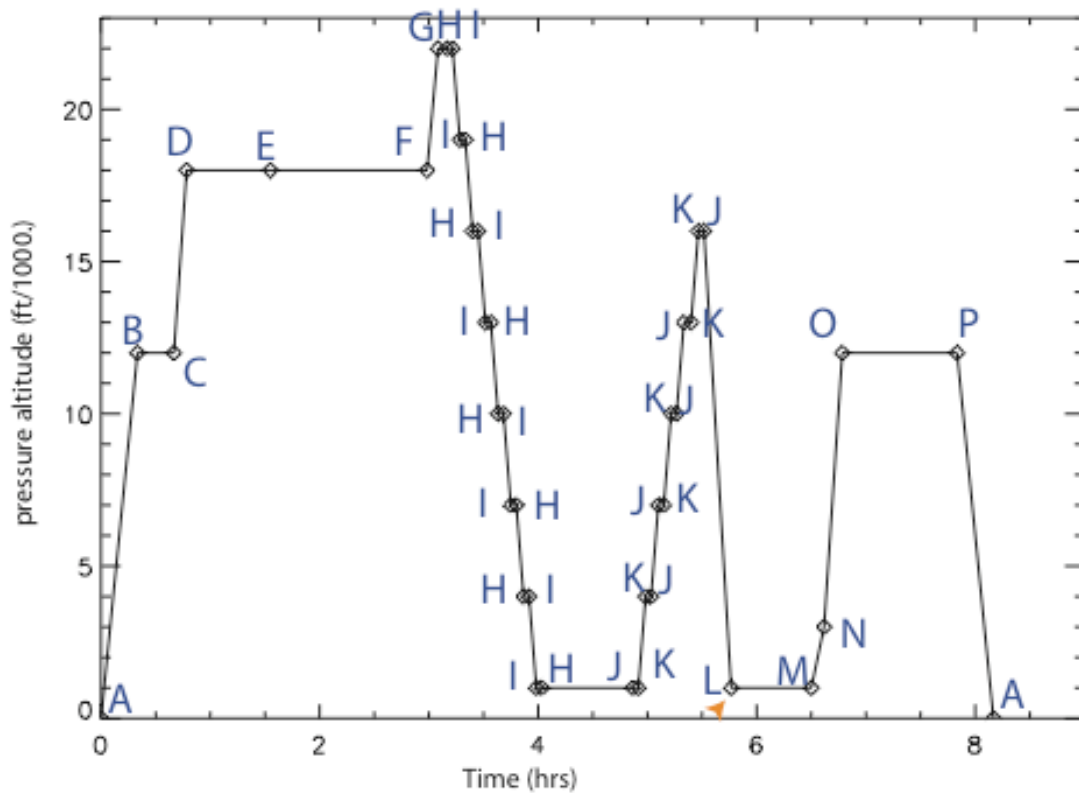
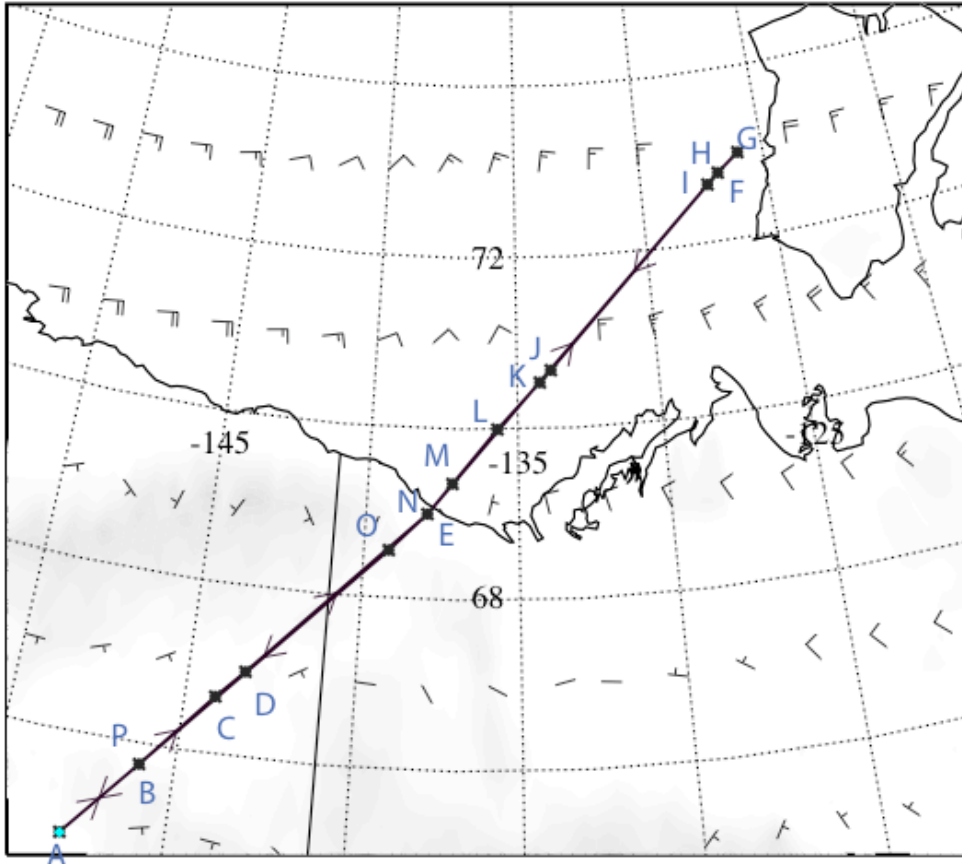


NCEP GFS Wind Flags (knots) on Press = 1000 hPa

Init:2008042018 Valid:2008042200



Possible location for cloud module

pt	elapsed	leg	notes
A	00:00	0	
B	00:20	20	cal leg
C	00:40	20	
D	0:47	7	FltSci calls climbs/descents for layers, note low cloud
E	01:33	46	FltSci note layer lat/lon J for profile on return
F	02:59	86	arctic air
G	03:05	6	reverse course
H	03:10	11	stacked legs, 3 minutes each
I	03:13	3	22 kft
I	03:17	4	19 kft
H	03:20	3	
H	03:24	4	16 kft
I	03:27	3	
I	03:31	4	13 kft
H	03:34	3	
H	03:38	4	10 kft
I	03:41	3	
I	03:45	4	7 kft
H	03:48	3	
H	03:52	4	4 kft
I	03:55	3	
I	03:59	4	1 kft
H	04:02	3	low over ice, find clouds/leads to work here or L-M, approx. 45 minutes total
J	04:56	54	stacked legs J-K, 3 minutes each
K	04:59	3	1 kft
K	05:03	4	4 kft
J	05:06	3	
J	05:10	4	7 kft
K	05:13	3	
K	05:17	4	10 kft
J	05:20	3	
J	05:24	4	13 kft
K	05:27	3	
K	05:31	4	16 kft
J	05:34	3	
L	05:50	15	possible location for cloud module, if time allows
M	06:34	44	(includes 30 min. for cloud module)
N	06:41	7	FltSci calls level in haze
O	06:51	10	FltSci calls level in haze
P	07:54	63	
A	08:14	20	Landing

Assumed ground speed of 220 knots. 4 minutes added for each level increment & turn in haze sampling parking garages (28 minutes for northernmost point, 20 minutes for one on return leg, 30 minutes added for cloud module at point L.

pt	UT	lat	lon	palt(ft)	dist total	dist inc	time total	time inc
A	1600Z	64.82N	147.86W	000.00	0	0	00:00	0
B	1620Z	65.76N	146.00W	12000.00	73	73	00:20	20
C	1640Z	66.67N	144.10W	12000.00	144	71	00:40	20
D	1647Z	67.00N	143.30W	18000.00	172	28	00:47	7
E	1733Z	69.00N	138.00W	18000.00	341	169	01:33	46
F	1859Z	72.80N	126.90W	18000.00	656	315	02:59	86
G	1905Z	73.00N	126.00W	22000.00	676	20	03:05	6
H	1910Z	72.80N	126.90W	22000.00	696	20	03:10	5
I	1913Z	72.68N	127.37W	22000.00	707	11	03:13	3
I	1917Z	72.68N	127.37W	19000.00	707	0	03:17	4
H	1920Z	72.80N	126.90W	19000.00	718	11	03:20	3
H	1924Z	72.80N	126.90W	16000.00	718	0	03:24	4
I	1927Z	72.68N	127.37W	16000.00	729	11	03:27	3
I	1931Z	72.68N	127.37W	13000.00	729	0	03:31	4
H	1934Z	72.80N	126.90W	13000.00	740	11	03:34	3
H	1938Z	72.80N	126.90W	10000.00	740	0	03:38	4
I	1941Z	72.68N	127.37W	10000.00	751	11	03:41	3
I	1945Z	72.68N	127.37W	7000.00	751	0	03:45	4
H	1948Z	72.80N	126.90W	7000.00	762	11	03:48	3
H	1952Z	72.80N	126.90W	4000.00	762	0	03:52	4
I	1955Z	72.68N	127.37W	4000.00	773	11	03:55	3
I	1959Z	72.68N	127.37W	1000.00	773	0	03:59	4
H	2002Z	72.80N	126.90W	1000.00	784	11	04:02	3
J	2056Z	70.68N	133.80W	1000.00	966	182	04:56	54
K	2059Z	70.54N	134.20W	1000.00	978	12	04:59	3
K	2103Z	70.54N	134.20W	4000.00	978	0	05:03	4
J	2106Z	70.68N	133.80W	4000.00	989	11	05:06	3
J	2110Z	70.68N	133.80W	7000.00	989	0	05:10	4
K	2113Z	70.54N	134.20W	7000.00	1001	12	05:13	3
K	2117Z	70.54N	134.20W	10000.00	1001	0	05:17	4
J	2120Z	70.68N	133.80W	10000.00	1013	12	05:20	3
J	2124Z	70.68N	133.80W	13000.00	1013	0	05:24	4
K	2128Z	70.54N	134.20W	13000.00	1024	11	05:27	3
K	2128Z	70.54N	134.20W	16000.00	1024	0	05:31	4
J	2124Z	70.68N	133.80W	16000.00	1013	11	05:34	3
L	2150Z	70.00N	135.70W	1000.00	1092	56	05:50	15
M	2234Z	69.36N	137.20W	1000.00	1141	49	06:34	44
N	2241Z	69.00N	138.00W	3000.00	1169	28	06:41	7
O	2251Z	68.56N	139.20W	11996.40	1206	37	06:51	10
P	2354Z	65.76N	146.00W	12016.10	1437	231	07:54	63
A	2414Z	64.82N	147.86W	363.79	1511	74	08:14	20

In degrees and decimal minutes

Pt	UT	lat	lon	palt (ft)
A	1600Z	64°49.200N	147°51.600W	000.00
B	1620Z	65°45.600N	146° 0.000W	12000.00
C	1640Z	66°40.200N	144° 6.000W	12000.00
D	1647Z	67° 0.000N	143°18.000W	18000.00
E	1733Z	69° 0.000N	138° 0.000W	18000.00
F	1859Z	72°48.000N	126°54.000W	18000.00
G	1905Z	73° 0.000N	126° 0.000W	22000.00
H	1910Z	72°48.000N	126°54.000W	22000.00
I	1913Z	72°40.800N	127°22.200W	22000.00
I	1917Z	72°40.800N	127°22.200W	19000.00
H	1920Z	72°48.000N	126°54.000W	19000.00
H	1924Z	72°48.000N	126°54.000W	16000.00
I	1927Z	72°40.800N	127°22.200W	16000.00
I	1931Z	72°40.800N	127°22.200W	13000.00
H	1934Z	72°48.000N	126°54.000W	13000.00
H	1938Z	72°48.000N	126°54.000W	10000.00
I	1941Z	72°40.800N	127°22.200W	10000.00
I	1945Z	72°40.800N	127°22.200W	7000.00
H	1948Z	72°48.000N	126°54.000W	7000.00
H	1952Z	72°48.000N	126°54.000W	4000.00
I	1955Z	72°40.800N	127°22.200W	4000.00
I	1959Z	72°40.800N	127°22.200W	1000.00
H	2002Z	72°48.000N	126°54.000W	1000.00
J	2056Z	70°40.800N	133°48.000W	1000.00
K	2059Z	70°32.400N	134°12.000W	1000.00
K	2103Z	70°32.400N	134°12.000W	4000.00
J	2106Z	70°40.800N	133°48.000W	4000.00
J	2110Z	70°40.800N	133°48.000W	7000.00
K	2113Z	70°32.400N	134°12.000W	7000.00
K	2117Z	70°32.400N	134°12.000W	10000.00
J	2120Z	70°40.800N	133°48.000W	10000.00
J	2124Z	70°40.800N	133°48.000W	13000.00
K	2128Z	70°32.400N	134°12.000W	13000.00
K	2132Z	70°32.400N	134°12.000W	16000.00
J	2135Z	70°40.800N	133°48.000W	16000.00
L	2150Z	70° 0.000N	135°42.000W	1000.00
M	2234Z	69°21.600N	137°12.000W	1000.00
N	2241Z	69° 0.000N	138° 0.000W	3000.00
O	2251Z	68°33.600N	139°12.000W	12000.00
P	2354Z	65°45.600N	146° 0.000W	12000.00
A	2414Z	64°49.200N	147°51.600W	000.00

Flight Module 1: Haze mapping, sampling, profiling

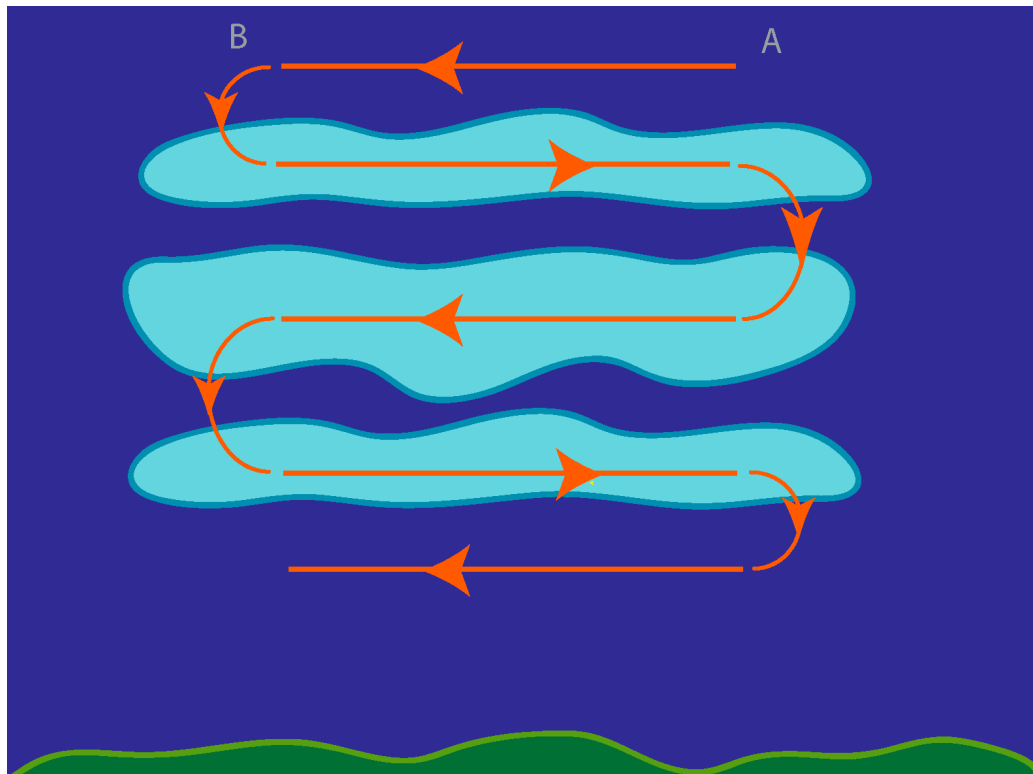
Science goals: Map spatial extent, vertical distribution, particle and gas-phase properties, and radiative heating rate of arctic haze layers.

Forecasting: Estimate best location for finding pollution layer and also need clear conditions.

Reasonable location: North of Brooks Range, over tundra or over sea ice.

Flight instructions:

- 1) Perform a 3-min level leg above (below) the vast majority of the haze, noting starting location as a Waypoint A and ending point as Waypoint B.
- 2) Descend or climb to altitude in haze as called by FltSci. Reverse course (90-270) and perform 10-min level leg between Waypoints B and A
- 3) Repeat (IV) to perform stacked, level legs at altitudes called by FltSci, remaining between Waypoints A and B
- 4) Last leg should be below (above) vast majority of haze.



Flight Module 2: Stratiform cloud sampling

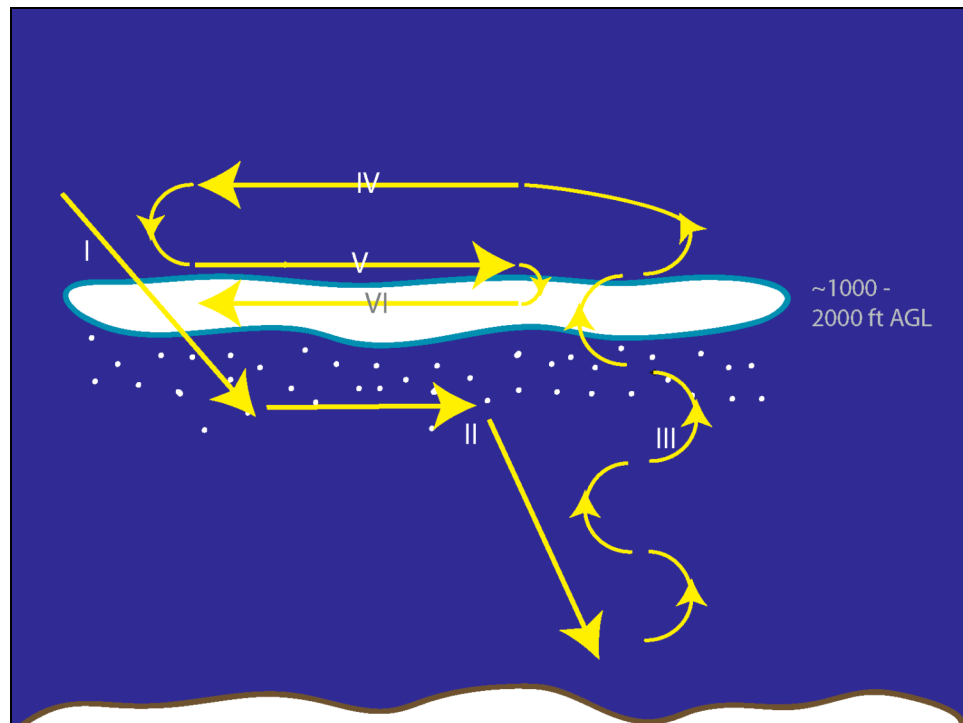
- Science Goals:
- Determine microphysical and radiative properties of low altitude stratiform clouds, especially optically thin clouds
 - Measure aerosol particles just above and below cloud to determine aerosol-cloud interactions
 - Look for evidence of aerosol scavenging in snow precipitation below cloud

Duration: 30-45 minutes

Flight instructions:

- Descend from cruise altitude to determine cloud base
- Level leg for 5 minutes just below cloud base. Note start of level leg as Waypoint A; end of leg as Waypoint B. Then descend to minimum safe altitude.
- Spiral climb to cloud top
- Reverse course and fly level leg between B and A approx. 1000 ft above cloud top for 5 minutes
- Reverse course and fly a level leg just above cloud top, remaining clear of all cloudy air, from A to B for 5 minutes
- Reverse course, descend into cloud, and fly a 5 minute level leg from B to A in the middle of the cloud.

If cloud area is widespread, repeat steps 1-6 approximately perpendicular to the previous A-B course. (30-45 minutes)



Flight Module 4: Cloud formation and mixing from leads and polynyas

Science goals: Cloud-aerosol interactions over open water polynyas
Halogen chemistry in well-mixed air with surface contact

Duration: Will depend on open water location. Once the plane reaches the leads/polynyas, 1.5 - 2 hours.

Flight Instructions:

- 1) Transit to lead/polynya area as identified by satellite.
- 2) Perform stacked crosswind legs upwind of open water perpendicular to wind from lowest safe altitude to height just above the mixed layer (2-5-minute legs, altitude increment 500 ft. assume from 500 - 2000 ft, ~30 minutes)
- 3) Perform crosswind leg over polynya at an altitude within the mixed layer, if possible
- 4) Perform crosswind legs (3-4) within polynya mixed layer every few km downwind until out of the cloud or mixed layer
- 5) On last downwind transect, perform stacked crosswind legs at same altitudes as in (2)

