Table 1. Time schedule for the 3 stratus cruises.

	EPIC 2001	Stratus 2003	Stratus 2004
Cruise period (dates)	Oct. 9-25	Nov. 11-24	Dec. 5-23
Buoy period (dates)	Oct. 16-22	Nov. 15-21	Dec. 11-16
Exact time of arrival (at the buoy)	(Oct.) 15.955	(Nov.) 15.781	(Dec.) 11.181
Exact time of departure (from the buoy)	(Oct.) 22.330	(Nov.) 21.375	(Dec.) 16.250

Table 2 A list of the remote sensing instruments onboard the *Brown* and the *Revelle* and the respective products.

Sensor	Research Cruise	Technical specifications	Direct products	Derived quantities
FMCW* radar	Stratus 2004	94-GHz (3.2 mm) – Vertically pointing	Reflectivity, Doppler Velocity, Doppler Spectrum Width	Drizzle occurrence (Stratus 2004)
MMCR** pulse radar	All three	35-GHz (8.6 mm) – vertically pointing	Reflectivity, Doppler velocity, Doppler spectrum width	Cloud-top height, Drizzle occurrence (EPIC – Stratus 2003)
Brown C-Band radar	EPIC 2001, Stratus 2004	5.6-GHz (5.4 cm) – Scanning	Reflectivity and radial velocity	N/A
Wind Profiler	EPIC 2001, Stratus 2004	915-MHz (32.8 cm)	Reflectivity, wind speed and direction	Cloud top height (Stratus 2004)
Ceilometer	All three	Lidar (Vaisala CT-25K)	Backscatter, cloud base height	Cloud Fraction
Microwave Radiometer	All three	3-channels: 20.6, 31.6, 90 GHz	Column integrated liquid and vapor	N/A

* Frequency Modulated Continuous Wave

** Millimeter Cloud Radar

Table B. 1. Composite soundings used in this study at intervals of 0.1 z/z_i

EPIC Composite			
z/z_i	P (mbar)	θ (K)	r (g kg^{-1})
0.1	1004.6	289.03	8.51
0.2	990.3	289.13	8.40
0.3	976.2	289.17	8.29
0.4	962.2	289.23	8.21
0.5	948.3	289.30	8.15
0.6	934.6	289.42	8.05
0.7	921.1	289.63	7.98
0.8	907.7	290.04	7.82
0.9	894.5	290.62	7.61
1.0	881.4	291.28	7.27
1.1	868.7	298.94	1.69
1.2	856.3	302.93	1.20
1.3	844.1	304.48	1.14
1.4	832.1	305.73	0.99
1.5	820.2	306.84	1.01
1.6	808.6	307.81	1.07
1.7	797.1	308.62	1.15
1.8	785.7	309.24	1.21
1.9	774.5	309.78	1.38
2.0	763.4	310.29	1.49

Stratus 2003 Composite			
z/z_i	P (mbar)	θ (K)	r (g kg^{-1})
0.1	998.6	290.44	9.51
0.2	984.5	290.55	9.31
0.3	970.5	290.66	9.10
0.4	956.7	290.90	8.82
0.5	943.0	291.09	8.60
0.6	929.6	291.33	8.45
0.7	916.2	291.66	8.24
0.8	903,0	291.97	8.11
0.9	890.0	292.49	7.94
1.0	877.1	293.37	7.50
1.1	864.6	300.69	2.85
1.2	852.3	302.71	2.04
1.3	840.3	303.90	2.44
1.4	828.4	305.02	2.51
1.5	816.7	305.94	2.38
1.6	805.2	306.77	2.27
1.7	793.8	307.67	1.87
1.8	782.5	308.33	1.60
1.9	771.4	308.98	1.58
2.0	760.4	309.82	1.30

Stratus 2004 Composite			
z/z_i	P (mbar)	θ (K)	r (g kg^{-1})
0.1	1000.6	291.57	10.19
0.2	984.3	291.65	9.85
0.3	968.3	291.71	9.61
0.4	952.4	291.87	9.20
0.5	936.7	292.08	8.80
0.6	921.3	292.26	8.66
0.7	906.0	292.53	8.48
0.8	890.9	292.82	8.38
0.9	876.0	293.36	8.28
1.0	861.4	293.88	8.02
1.1	847.1	303.71	2.33
1.2	833.3	305.55	1.72
1.3	819.7	306.86	1.76
1.4	806.3	308.08	1.66
1.5	793.1	309.23	1.73
1.6	780.1	310.36	1.81
1.7	767.3	311.33	1.63
1.8	754.7	312.36	1.67
1.9	742.3	313.25	1.81
2.0	730.1	314.24	1.90

Table B. 2. Buoy period statistics.

			EPIC		Stratus 2003		Stratus 2004	
			Mean	*Std*	*Mean*	*Std*	*Mean*	*Std*
Soundings	Surface (1000 mb)	Temperature T (K)	289.1	0.6	290.4	0.6	291.6	0.3
		Pot. Temp. θ (K)	289.1	0.6	290.4	0.6	291.6	0.3
		Vir. Pot. Temp. θ_v (K)	290.6	0.6	292.1	0.6	293.4	0.3
		Eq. Pot. Temp. θ_e (K)	313.3	1.6	317.7	2.7	320.8	2
		Sat. Eq. Pot. Temp. θ_{es} (K)	321.5	1.8	325.9	2	329.9	1.1
		Mix. Ratio r (g kg^{-1})	8.5	0.6	9.6	1	10.2	0.8
		Rel. Humidity (%)	74.4	6.5	76.9	8	76.1	6
		Wind Speed (m s^{-1})	7.7	2.2	6.8	1.7	9.7	1.3
		Wind Direction (°)	119	14	121	17	129	9
	700 mb	Temperature T (K)	283.7	0.6	283.1	1.1	285.2	1.2
		Pot. Temp. θ (K)	314.1	0.6	313.4	1.2	315.7	1.3
		Vir. Pot. Temp. θ_v (K)	314.3	0.7	313.6	1.1	316.1	1.3
		Eq. Pot. Temp. θ_e (K)	317.9	2.8	316.2	1.8	322.5	4.2
		Sat. Eq. Pot. Temp. θ_{es} (K)	350.1	2	348.1	3.9	355.9	4.7
		Mix. Ratio r (g kg^{-1})	1.1	0.8	0.8	0.6	2	1.3
		Rel. Humidity (%)	9.6	6.5	7.4	6.3	15.9	10.2
		Wind Speed (m s^{-1})	4.5	2	4.8	2.2	6.4	2.5
		Wind Direction (°)	140	60	155	85	120	16
		Inversion Base Height (m)	1218	105	1208	152	1403	163

	Inversion	Inversion Top Height (m)	1403	123	1311	166	1521	168
		Inversion $\Delta\theta$ (K)	10.5	2.5	7.1	2.4	9.6	1.1
		Inversion Δr (g kg^{-1})	-5.9	1.2	-4.5	1.9	-5.2	2.3
		Inversion shear (m s^{-1})	-0.78	1	-0.5	1.3	0	1.5
Ceilometer		Cloud Base Height (m)	922	88	953	230	1104	185
		Zenith Cloud Fraction (%)	94.1	-	66.1	-	86.5	14.9
Radar		Cloud top Height (m)	1255	113	1233	184	1474	170
		Drizzle Occurrence	42.9	34	22.3	33.2	10.6	18.2
Radar-Ceilometer		Cloud Thickness (m)	341	118	276	142	323	134
Air-Sea Flux System		*SST* (°C)	18.6	0.1	19.3	0.2	19.5	0.1
		SST-T_{air} (°C)	1.6	0.6	0.6	0.5	0.1	0.3
		Surf. Sea Spec. Hum. q_{sea} (g kg^{-1})	13.1	0.1	13.6	0.2	13.9	0.1
		q_{sea}-q_{air} (g kg^{-1})	4.1	0.6	3.3	0.9	3.5	0.6
		Surf. Incom. Solar flux (W m^{-2})	223	323	288	377	202	281
		Surf. Incom. IR flux (W m^{-2})	383	17	364	30	393	10
		Sensible Heat Flux (W m^{-2})	14	7	2	5	-2	3
		Latent Heat Flux (W m^{-2})	99	19	68	27	83	19
		Virtual Heat Flux (W m^{-2})	21	7	7	5	4	3