

INFORMATION BULLETIN

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Number 4

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GATE INFORMATION BULLETIN No. 5 will be in press in February. It will complete our survey of typical GATE days with the collection of material available for 5 September 1974. That issue, then, will mark the end of the preliminary survey of the GATE field operation. There will, of course, continue to be announcements of GATE data availability - there is no new information to present in this issue.

Looking ahead to future issues, we plan to include information developed here at NCAR on the quality of some of the GATE data as judged from intercomparisons. There may also be useful summary information on the various subprograms, or summary information that scientists who participated in GATE wish to call to the attention of their colleagues. We will be glad to receive such information for future BULLETINS. Extensive material up to about twenty pages will be no publication problem. Readers are reminded that material submitted for the BULLETIN should not be considered as citable material.

Contents No. 4:

Symbols used on surface pressure charts, GATE Microfilm Series
One Day in the Life of Phase II - 10 August 1974

ADDENDUM TO
 EXPLANATION OF SYMBOLS USED
 ON A-SCALE MAPS
 (see GIB No.3 Page 27)

SURFACE PRESSURE CHART (in ISMG microfilm series, not reproduced in GIB)

PPP	Surface pressure in tenths of a mb.
TTt _T	Air temperature in degrees and tenths, Celsius.
ww	Present weather - decoded (See Code 4677, WMO No. 306).
T _d T _d	Dewpoint in degrees Celsius.
dddff	True direction of wind in degrees rounded to nearest 10°, and speed. Direction and speed of wind in mps or kt as reported; nevertheless, barb on shaft always indicates speed in kt.
W	Past weather - decoded. (See Code 4500, WMO No. 306). The period covered by W is 6 hours.
Cloud Group	N _h C _L hC _M C _H - coded. (See code 2700, 0513, 1600, 0515 and 0509, WMO No. 306, for specifications of symbolic letters, respectively).

	cloud	
	group	
TTt _T	⊙	PPP
ww		
T _d T _d		W ship call letters
dddff		

SURFACE SHIP MODEL

NOTE: Surface land model is the same as the ship model except for identification. This information is included here for the convenience of those who will order the ISMG microfilms.

ONE DAY IN THE LIFE OF PHASE II 10 August 1974 Julian Day 222

This day was selected to illustrate the Basic GATE Mission, type 1A, with a butterfly pattern flown by four aircraft in a stack with the support of a fifth short-range aircraft. Particular interest is given this day because the "cloud cluster" investigated and sampled fairly thoroughly (we hope) became a named tropical storm (Alma) within 48 hours as it progressed westward. An indication of the difficulties in interpreting the satellite photographs, forecasting, and observing the cloud systems, *in situ*, is implicit in the varying summations and evaluations given by the aircraft scientists after completion of mission 222-1. The material that we include here for 10 August 1974, Julian Day 222 consists of:

- Minutes of the Mission Selection Team meeting of 9 August.
- Three geostationary satellite photographs to illustrate the cloud cover input to mission planning.
- Report of the Mission Scientist, including his sketch of the flight patterns.
- Reports of the Airborne Mission Scientists, including their sketches of flight patterns.
- A-scale maps for 1200Z map time: surface wind over the sea and 500/600-m winds over land; 700- and 200-mb wind maps. A legend and explanation is included to clarify the reading of the plotted data. In reproducing these maps for the BULLETIN, we had to crop them slightly owing to limitations in our photo-reproduction equipment. They are, of course, reproduced uncropped in the ISMG microfilm of preliminary data.
- B-scale maps for 1200Z map time: temperature, dew-point, winds and heights for surface, 700- and 200-mb maps.
- Radar summary for 1200Z from the QUADRA and OCEANOGRAPHER radars combined with a nephanalysis extracted from satellite photographs.
- Summary of aircraft missions executed 10 August 1974, extracted from the complete catalog of aircraft missions, *Summary of Aircraft Missions in the GATE* described in GIB, No. 3.
- Detailed flight tracks for each aircraft with some data plotted. These were constructed at GOCC, Dakar, based on the navigators' logs and other available data. Here we have combined the individual sheets of the tracklines into composites to show the entire track on one page. Owing to the

comical projection used, and the fact that the map sheets for regions south of the B-array were merely repeats of those drawn for more northerly regions, the sections do not match perfectly for flights extending further south than $6\frac{1}{2}^{\circ}$ N. The trackline charts are contained in the ISMG microfilm series in their full size, one sheet per frame.

A general discussion of how aircraft mission selection, planning and implementation processes were carried out at Dakar, with a typical time schedule of the various events, is given in GATE INFORMATION BULLETIN No. 3.

MISSION SELECTION TEAMSESSION No. 509 August 197416:30Report by AIRCRAFT OPERATIONS:

The following aircraft are not available. CV-990 (INS inoperable), Electra (fire detection system inoperative), IL-18M (radar problems - landed in Conakry, Guinea). In addition, the KC-135 has problems with its dropsondes, but should be ready tomorrow. The 990 might be available soon if a spare INS can be found.

Report by SHIP OPERATIONS:

The situation is almost the same as yesterday. RESEARCHER is returning to Station 5 (ETA 12Z on the 10th). ONVERSAAGD and ENDURER are both providing wind observations.

WEATHER Report:

The trough in the easterlies now appears as an inverted v near 27W. The previous wave in the easterlies has an inverted v about 55W. No trough to the east over Africa at 700 mb can be seen yet. The squall line which appeared yesterday afternoon near 10N, 10W moved rapidly westward and grew rapidly. Considerable rain fell in Dakar during the morning hours. A very large cirrus shield was generated by the squall line covering latitudes from 5 to 20N and about 10° longitude across. The convection died rapidly during the late morning but some deep convection remains along a NW-SE line from 10N, 20W to 5N, 15W. The QUADRA radar has shown little or no convection until 2 this afternoon when a line of fairly intense convection moved to the west along 10N. At 850 mb a small anticyclonic circulation is directly over the B-scale array at 0600. Both the 0600 and 1200Z ship data indicate a cyclonic circulation between 5 to 10N and 15 to 20W. Little or no convection is associated with the anticyclonic circulation and considerable convection, near the cyclonic circulation.

SUBPROGRAMME SCIENTISTS Recommendation (Cox):

(1) Primary mission is a 1A cluster mission with the IL-18C, US C-130, DC-7, UK C-130 and DC-6. In addition, if the convection is in the NW part of the B array, the Sabreliner might also take part; otherwise, it could go on a 7B1 radiation mission. Alternate for the IL-18C and the US C-130 is an 8B, and for the DC-7, UK C-130 and DC-6 a 5B2.

(2) Meanwhile, the KC-135 will fly a 9B dropsonde mission assuming the problem with its sondes is repaired.

COMMENTS

- Sabreliner can fly in the 1A if the mission occurs in the area N of OCEANOGRAPHER and E of the centre of the array. E.g. over QUADRA, Sabreliner could fly box patterns for approximately one hour - time for two 50 nmi. boxes.

- Type 5B2 missions are lagging behind.

MST DECIDED:

Proposal accepted as stated.

AMS: (1) Dr. Pennell on UK C-130;

- if alternates are flown, Dr. Long on US C-130 and Dr. Cox or one of his graduate students on Sabreliner.

(2) Dr. Simpson on KC-135.

MS: Dr. Betts, assisted by Dr. Rasmussen during lunch.

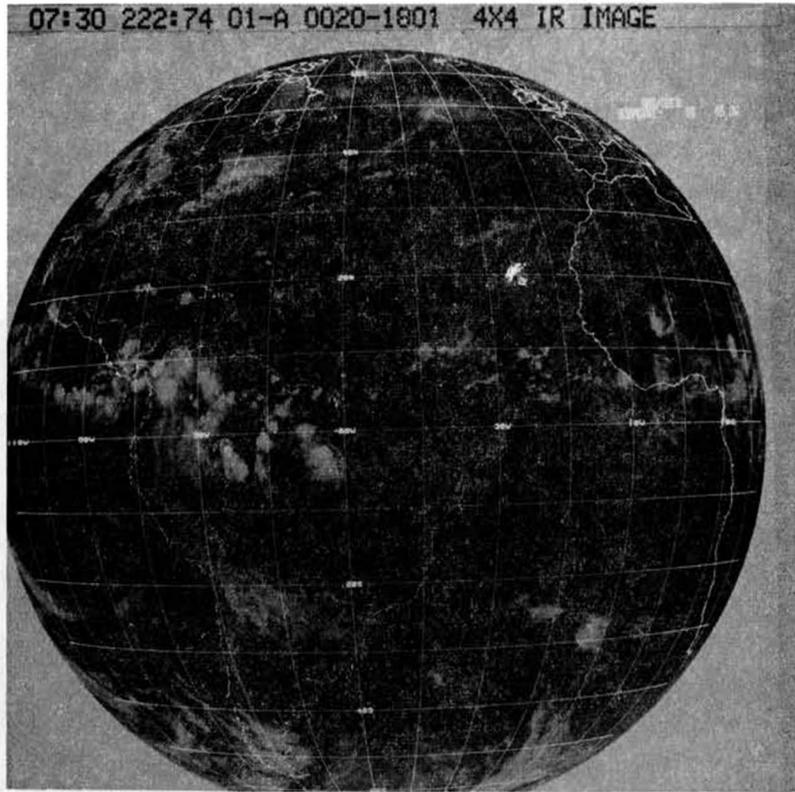
SHIPS: No change in status tomorrow.

On 11 August at 06Z, the upper-air systems will all go on Plan A - 4 observations per day. All tethered balloons continue fixed level operation.

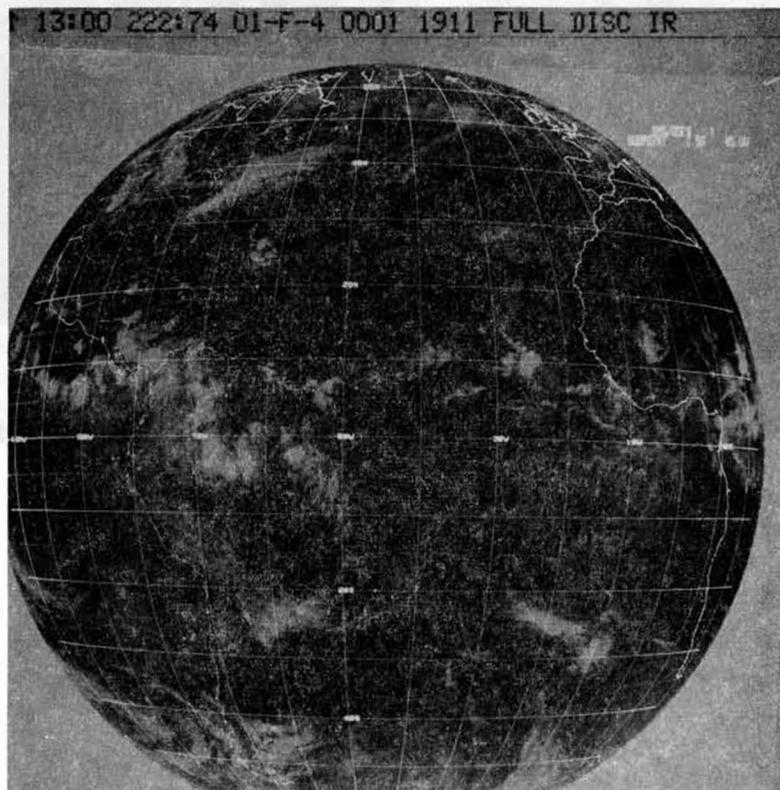
OTHER Reports:

- Dr. LaSeur, today's MS, gave a brief report on the missions. Dr. Cox, who flew on Sabreliner, stated that little convection remained from last night. The clouds encountered were mainly stratiform remnants.

- Special analysis reported on the diurnal character of convection in the B scale. Dr. Rodenhuis, Frank Marks, Dave Martin and Dr. Weickman presented different aspects from radar and satellite data. The main conclusion to be drawn from this on-going study is that the MST must consider night missions, as convection over the sea appears to start mainly at night.

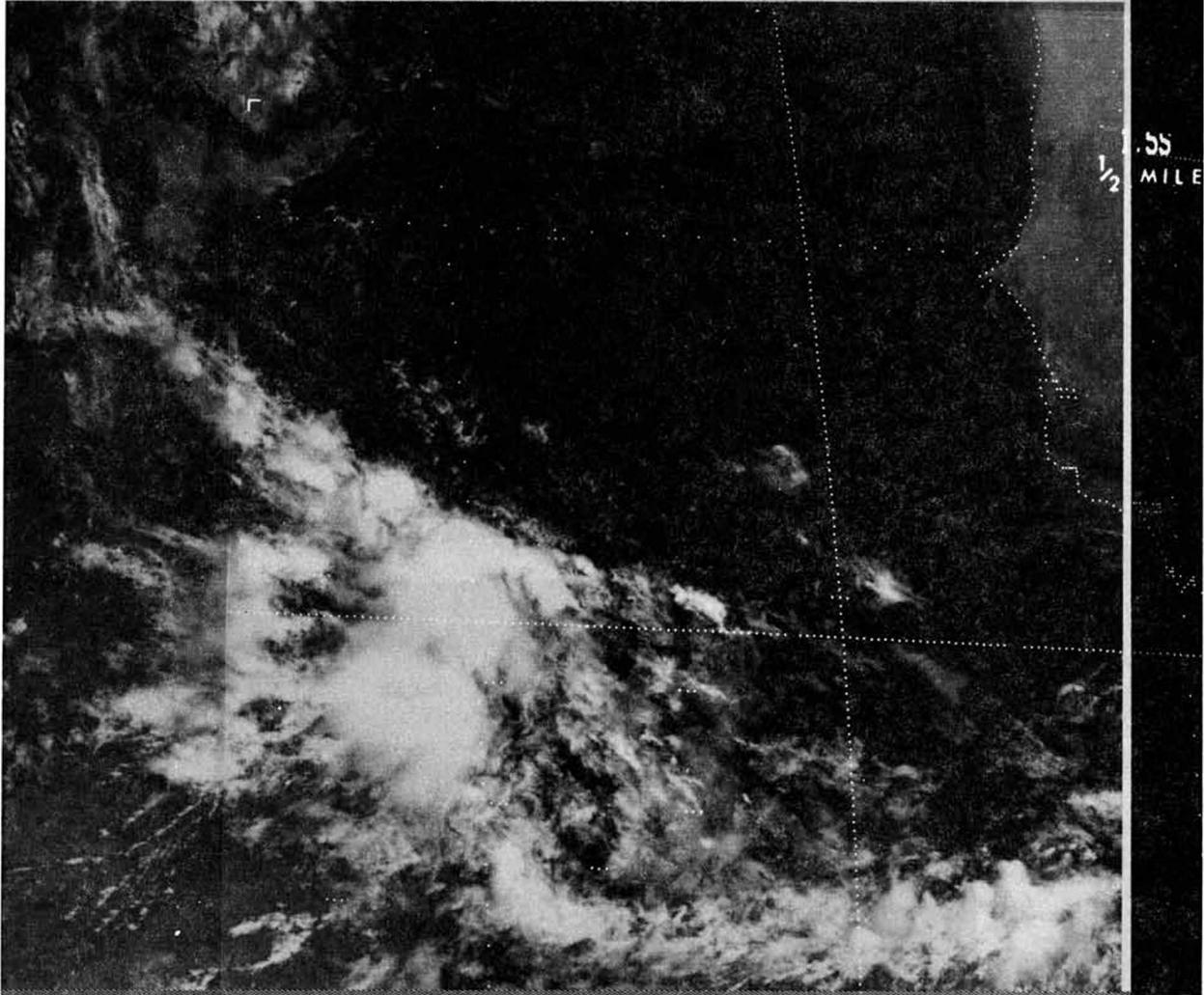


SMS-A Infrared Image 0730Z



SMS-A Infrared Image 1300Z

↑ 13:00 222:74 01-A-H 0545 2650 A1 DAK 6A5 CH1



SMS-A 1-Mile Resolution 1300Z

MISSION SCIENTIST REPORTMISSION 222/1
222/2

10 August 1974

MS: Betts
AMS: Pennell 222/1
Simpson 222/2

222/1	TYPE	1A	DC-6, UK C-130, DC-7, US C-130, CV-990, Sabreliner
222/2	TYPE	9B	KC-135

Mission Plan:

The primary missions planned were a Basic GATE Mission Type 1A and a KC-135 9B dropsonde mission flying west of Dakar and north of the B array. The alternate multi-aircraft missions were 5B2 (boundary layer) for the DC-6, UK C-130, DC-7 and cloud physics 8B for the UK C-130 and CV-990. The Sabreliner alternate was a radiation mission.

The primary mission 1A was flown since very active convection developed in the B array from about 04Z, with tops to 44,000 ft, and very high intensities.

Mission Execution:

The AMS Pennell arrived at the I.P. ($10^{\circ}\text{N } 22^{\circ}\text{W}$) at about 10Z to survey the line of Cb systems stretching across the West half of the array from North of VANGUARD to the RESEARCHER. Discussions with the MS in Dakar and OCEANOGRAPHER led to the selection as target of the large system west of the OCEANOGRAPHER. The initial butterfly pattern was set up about 1045Z. It was unfortunately necessary to lower the tethered balloon on the DALLAS for about 3 hours as the pattern was within 30 nm. of the ship in disturbed conditions. The initial butterfly pattern was flown between GILLISS and DALLAS. The system was moving westwards at about 20 kts., and the pattern was later rotated (see sketch map). The system seemed active the first pattern but started to decay by 1300. There were further developments to the north in a band to the NW. The dropsonde mission was flown north of this band (see AMS report). Two days later this disturbance area had intensified to a tropical storm, so the mission should prove of great interest. It was also studied the next day by a dropsonde mission so we have some time continuity on its development. The cluster studied showed most rapid development 04-10Z, with tops to 44,000 ft. One interesting observation was that of dry patches at 10,000' (by Bill Gray on the DC-7) in the disturbance.

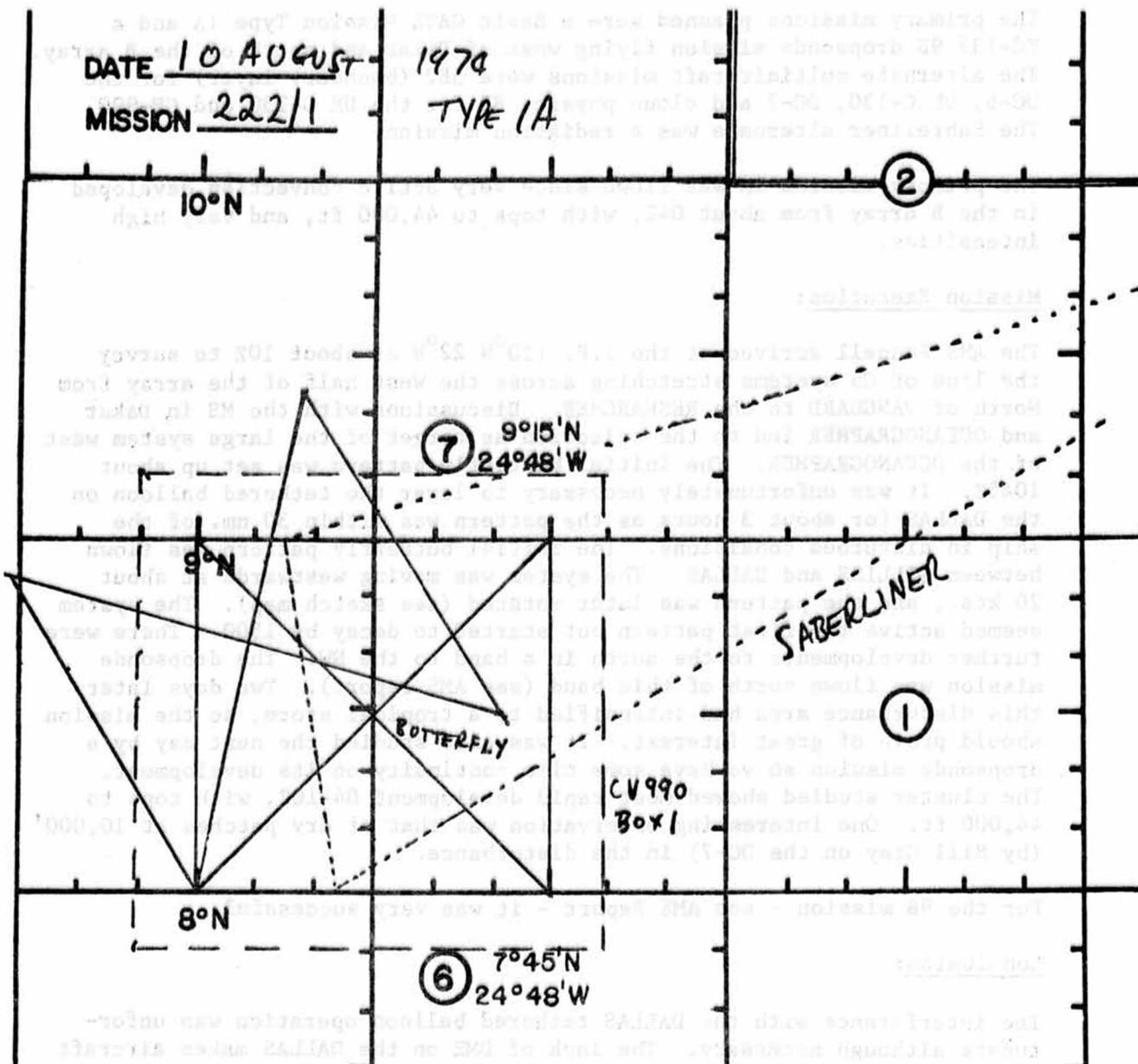
For the 9B mission - see AMS Report - it was very successful.

Conclusion:

The interference with the DALLAS tethered balloon operation was unfortunate although necessary. The lack of DME on the DALLAS makes aircraft

pilots reluctant to fly close at low levels. The search radar has not yet been proven to be useful.

The mission was a success. The Sabreliner flew the 39,000-ft level in a 1A mission for the first time. The CV-990 was delayed 1 3/4 hrs in starting the pattern. Further, because of the rapid growth and decay of these mesoscale systems, we are still tending to sample (it appears) more of the decay stage than the growing stage.



MISSION No. 222/1 222/2
 DATE Aug 10 1974

Type: 1A
9B

RELATION SCIENTIST: BETTS

AIRBORNE M.S. PENNELL
SIMPSON

on UKC130
KC-135

a/c	A.S. Name	T.O. Time GMT	Launching Time GMT	Pattern flown	Number of patterns	Levels flown	Initial point	Time of start pattern	Time of leaving pattern	Self-calibr. intercomp. performed	a/c system failures
DC-6	Bean	0835	1840	Backlog	2+	500' 2000, 4000 2000	9°N 24°W	1122	1522	3	Sides by van der Grint 1400Z
UKC130	(Pennell)	0831	1806		3			1116	1547	3	-
DC-7	Blot (Gray)	0840	1937		3	10000		1113	1653	3	5 Drops in return 23°22', 21', 20', 19°W
USC-130	Harland Davis (Long)	0907	1740		3	20000 16000 13000		1107	1524	3	Downed PRT-5 1400Z
CU-990	Hughway	1153	1800	Box	3/4	3000, 11000 2400, 3500		1305	1640	3	115 good
Submarine	Lufbery	1125	1456	Out to back		39000 at 41-43000 high	(10°N 22°W)	(1210)	(1345)	2	-
222/2 KC-135	Simpson	1210	(1650)	West of Pelham	(See ATIS Report)						14 Drops in return Successful

Airborne Mission Scientist Report 222-1

Type 1A

W. T. Pennell on UK C-130

Alan Betts - MS

Aircraft:

DC-6	500'
UK C130	2,000', 4,000', 2,000'
DC-7	10,000'
US C130	20,000', 16,000', 23,000'
CV990	30,000', 35,000', 29,000', 35,000'
Sabreliner	39,000'

General Description of the Mission

Given the information available at takeoff, the exact target to be flown was unclear. After takeoff, the AMS received a radar update from the MS. This report identified 3 major systems as being the most likely targets:

1. A system to the north of the OCEANOGRAPHER.
2. One to the west of the VANGUARD but out of the B-scale array.
3. One to the west of the OCEANOGRAPHER.

At 0958 the AMS arrived in the B-scale area and began to scout the northern and western parts of the array for the most promising targets.

The system to the west of OCEANOGRAPHER appeared to contain the most active convection; hence, it was chosen as the target. At this time the OCEANOGRAPHER was called for a radar report. Hudlow (the radar meteorologist on the OCEANOGRAPHER) gave the coordinates of a box which he said contained the most active echoes. The approximate coordinates were $09^{\circ}30'N$ and $24^{\circ}W$, $08^{\circ}50'N$ and $24^{\circ}W$, $08^{\circ}50'N$ and $25^{\circ}W$, and $09^{\circ}30'N$ and $25^{\circ}W$. Based both on this information and the observation that the most active convection was in the southern portion of the system, the coordinates of the first butterfly were chosen. These were:

A ₁	$09^{\circ}N$	$24^{\circ}W$
A ₂	$08^{\circ}N$	$25^{\circ}W$
A ₃	$09^{\circ}N$	$25^{\circ}W$
A ₄	$08^{\circ}N$	$24^{\circ}W$

As the coordinates of the pattern were within 30 nm of the DALLAS, it was necessary to request the DALLAS to lower its tethered balloon. After the coordinates of the butterfly were set the MS was informed. The MS agreed in general with the location of the pattern but suggested that the next circuit be moved to the west since he had information indicating that the system was moving rapidly westward.

By the time the UK C-130 started the first leg of the butterfly (11:17) it was obvious that the pattern was too far east. At 11:25 the pattern was translated 30 nm to the west. The aircraft scientist on the US C-130 observed that, based on their radar, a 30-mile westward translation would probably get through the western edge of the system. The change in the pattern was communicated to all aircraft before any of them had reached A₂. However, by the time the B pattern was flown the system had moved far enough to the west that the western edge again was not penetrated. Later (13:28) it became necessary to change the pattern again (C₁, C₂, C₃, C₄) in order to compensate for the westward movement of the cluster. A simple rotation of the pattern seemed to be the most effective method of getting the pattern back into the convection with the least waste of aircraft research time.

Due to the rapid movement of the cluster, at no time did any of the patterns successfully box the system or even penetrate its western edge. Most of the convective activity was encountered on the western and southwestern portions of the butterfly. Most of the eastern portion and particularly the southeastern corner of the pattern was in immediate post cluster weather.

CONCLUSIONS:

Due to the failure to either box or completely penetrate the cluster, this mission cannot be rated as a complete success. Nevertheless I do think that flight will merit analysis. The rapid movement of the system coupled with the rather large "time constant" of the butterfly pattern made the centering of the flight pattern on the disturbance a difficult operation.

AIRBORNE MISSION SCIENTIST LOG

Mission was briefed as a 1A cloud cluster mission in the B-scale array. The IP was $10^{\circ}\text{N } 22^{\circ}\text{W}$. Take-offs were planned in order to have the UK C130 at the IP at 0950. The tentative location of A_1 was $10^{\circ}\text{N}, 23^{\circ}\text{W}$.

0700 - 0800 - Monitored conversation with Hudlow: Echo pattern north of OCEANOGRAPHER moving west at 10 kts. As of 720 the target near RESEARCHER looked the most promising.

0915 - Received 08Z satellite information from Betts. Targets 1-6, 9, 10, 11, 12 were still in existence.
- Was informed that DALLAS had 4 sondes up to 1000 meters and that VIZE balloon was down. METEOR balloon at 650 meters. At 930 Betts would transmit a radar up-date.

0950 - Received radar up-date from Betts. Three major systems: one to the west of the VANGUARD, and one to the west of OCEANOGRAPHER.(sic)

0958 - Started to scout the north and western parts of the array.

1025 - System west of OCEANOGRAPHER shows the most new growth. Decided to make this system the target. Called OCEANOGRAPHER for a radar report.

1030 - 1040 - Hudlow gave the coordinates of a box containing the most active echoes. The approximate coordinates were $09^{\circ}30'\text{N } 24^{\circ}\text{W}$, $08^{\circ}50'\text{N } 24^{\circ}\text{W}$, $08^{\circ}50'\text{N } 25^{\circ}\text{W}$, $09^{\circ}30'\text{N } 25^{\circ}\text{W}$.

1045 - Picked coordinates of the first butterfly:

A_1	09N	24W
A_2	08N	25W
A_3	09N	25W
A_4	08N	24W

Since it appeared the southern end of the system contained the most new growth, Garstang protested. Talked to Betts about initial pattern and he suggested that the second pattern be moved to the west since echoes were moving rapidly westward at about 15 kts.

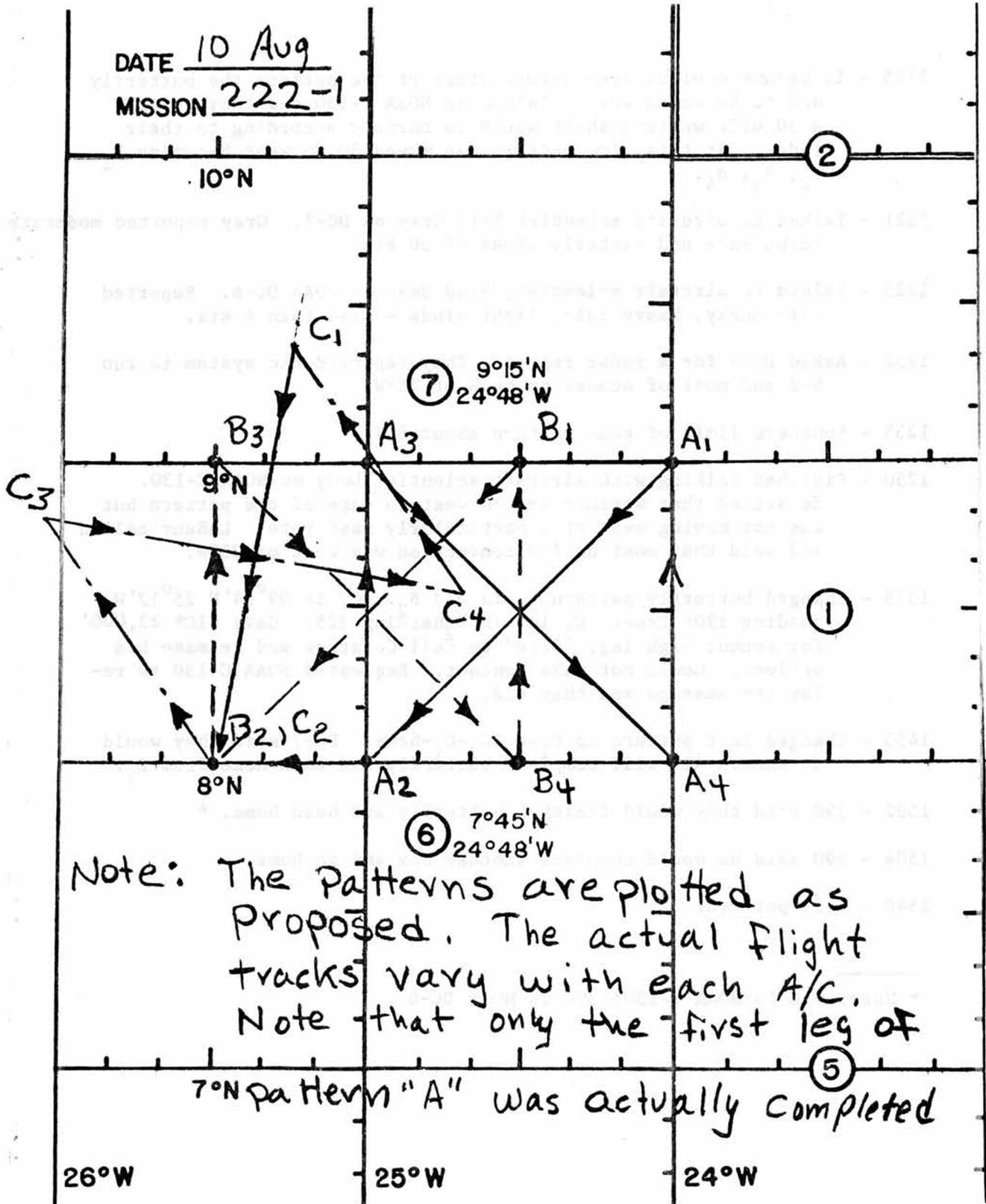
1102 - Told NOAA C-130 their second leg could be made at 16,000'.

1117 - Started $A_1 - A_2$ leg.

- 1125 - It became obvious even before start of the pattern the butterfly had to be moved west. Talked to NOAA C-130 and they thought a 30 mile western shift would be correct according to their radar. At this time pattern was moved 30 nm west becoming B₁, B₂, B₃, B₄.
- 1221 - Talked to aircraft scientist Bill Gray on DC-7. Gray reported moderate turbulence and easterly winds of 30 kts.
- 1225 - Talked to aircraft scientist, Brad Bean on NOAA DC-6. Reported very murky, heavy rain, light winds - less than 4 kts.
- 1232 - Asked DC-7 for a radar report. They reported the system to run N-S and most of echoes to be W of 25°W.
- 1235 - Southern limit of echo pattern about 8°N.
- 1250 - Finished talking with aircraft scientist Long on NOAA C-130. He stated that weather was on western edge of the pattern but was not moving west at a particularly fast rate. LaSeur called and said that most active convection was west of 25°W.
- 1328 - Changed butterfly pattern C₂ is old B₂. C₁ is 09°24'N 25°12'W heading 190° true. C₂ is old B₂ heading 325. Gave 41C*. 23,000' for second high leg. Tried to call Garstang and release his balloon. Could not make contact. Requested NOAA C-130 to relay the message and they did.
- 1455 - Changed last pattern to C₁-C₂-C₃-C₁-home. DC-7 said they would do same. 41C will complete butterfly and then home from C₁.
- 1502 - 39C said they would finish C butterfly and head home. *
- 1504 - 990 said he would complete another box and go home.
- 1548 - Left pattern.

* Note: 41C is NOAA C-130; 39C is NOAA DC-6

(AMS Pennell)



A.M.S. REPORT

GATE MISSION 222-2 TYPE 9B

August 10, 1974

PURPOSE:

To supply a synoptic ("A") scale description of the circulation north of the "B" array in support of the 1A type mission in that area.

WEATHER SETTING AND SUMMARY OF MISSION RESULTS:

Very active strong convection was occurring near and south of the 10th parallel with a line of Cbs extending continuously for more than 350 miles ESE-WNW. Our flight track about 80-100 miles north of this line paralleled the line as far west as 18°W. The entire airspace north of the active convection to at least 19°N was highly suppressed with visibility greatly reduced by haze and dust. Other than a few patches of altocumulus, very little cloudiness was encountered on the entire flight.

A total of 14 dropsondes were dispensed successfully. Two instruments experienced chute failures but second drops were made within several minutes in both cases.

In general all systems functioned well. During the flight it became apparent that the flight track could be advantageously adjusted to extend further westward into the inverted "V" area but this decision was made too late to gain clearance to change the plan before the turn back to the northeast was upon us.

R. H. Simpson
A.M.S.

EXPLANATION OF SYMBOLS USED
ON A-SCALE MAPS

SURFACE WIND CHART

D s	Ship's course (true) made good during the three hours preceding the time of observation. See Code 0700 WMO No. 306.
v s	Ship's average speed made good during the three hours preceding the time of observation. See Code 4451 WMO No. 306.
T T T w w w	Sea-surface temperature in tenths of a degree Celsius.
3P P H H w w w w	Wind wave group. 3 is group indicator; period of waves in seconds; height of the waves in units of 0.5 m.
d d P H H w w w w	Swell group. True direction, in tens of degrees, from which waves are coming; period of waves (Code 3155 WMO No. 306); and height of the waves in units of 0.5 m.
dddff	Direction and speed of wind in mps or kt as reported; nevertheless, barbs on shaft always indicate speed in kt.

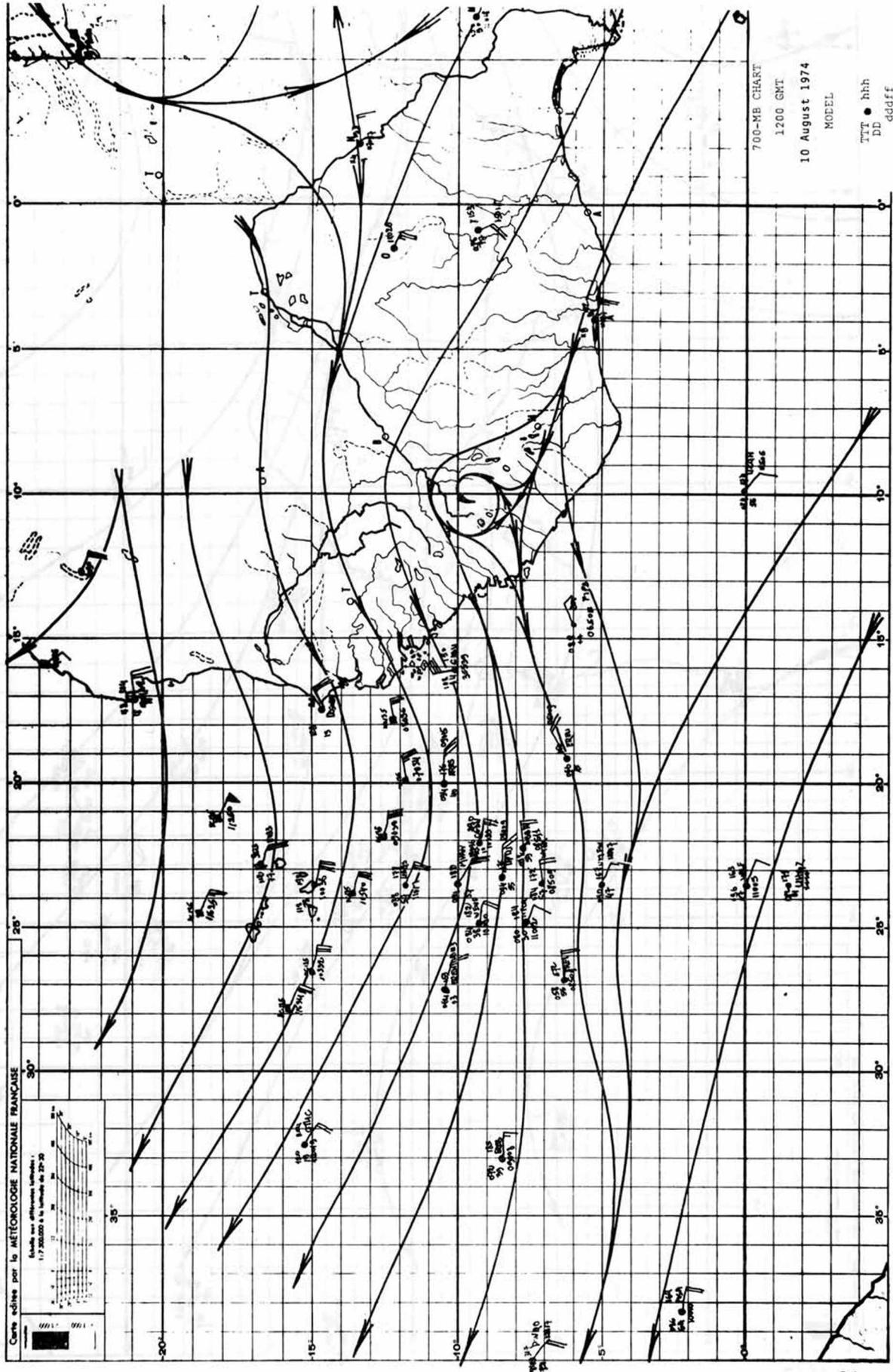
700-MB CHART

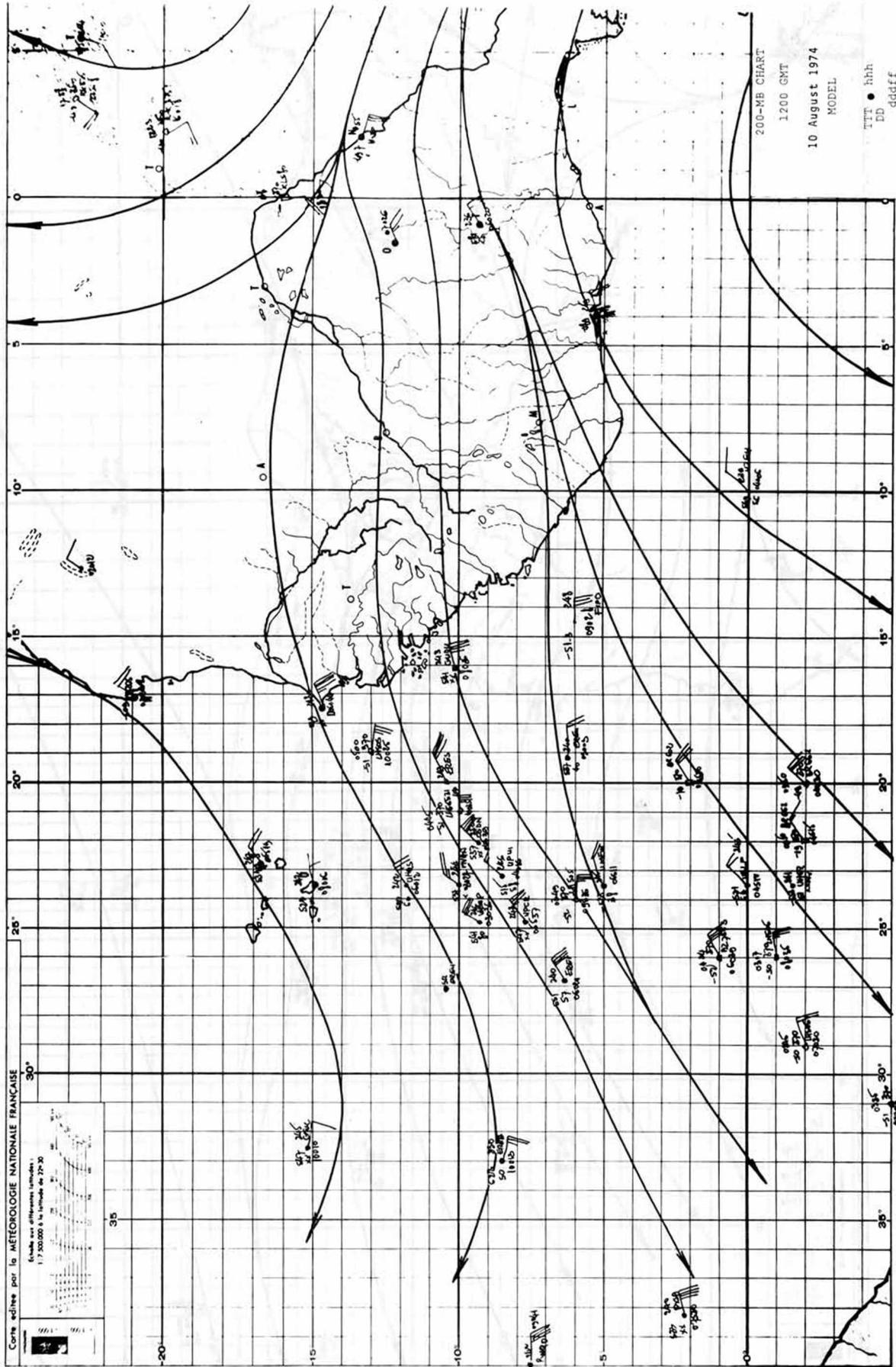
hhh	Geopotential of the 700-mb surface in geopotential meters. Ex., 163 = 3163 m.
TTT	Air temperature in tenths of a degree Celsius.
DD	Coded dew-point depression. See Code 0777 WMO No. 306.
dddff	Direction and speed of wind in mps or kt as reported; nevertheless, barbs on shaft always indicate speed in kt.

200-MB CHART

hhh	Geopotential of the 200-mb surface in geopotential decameters. Ex., 235 = 12350 m.
TTT	Air temperature in tenths of a degree Celsius. For sign, see Code 3931 WMO No. 306.
DD	Same as 700-mb chart.
dddff	Same as 700-mb chart.

NOTE: Winds at surface over ocean and at 500-600 m over land are both included on surface wind chart.





EXPLANATION OF SYMBOLS USED
ON B-SCALE MAPS

SURFACE SHIP

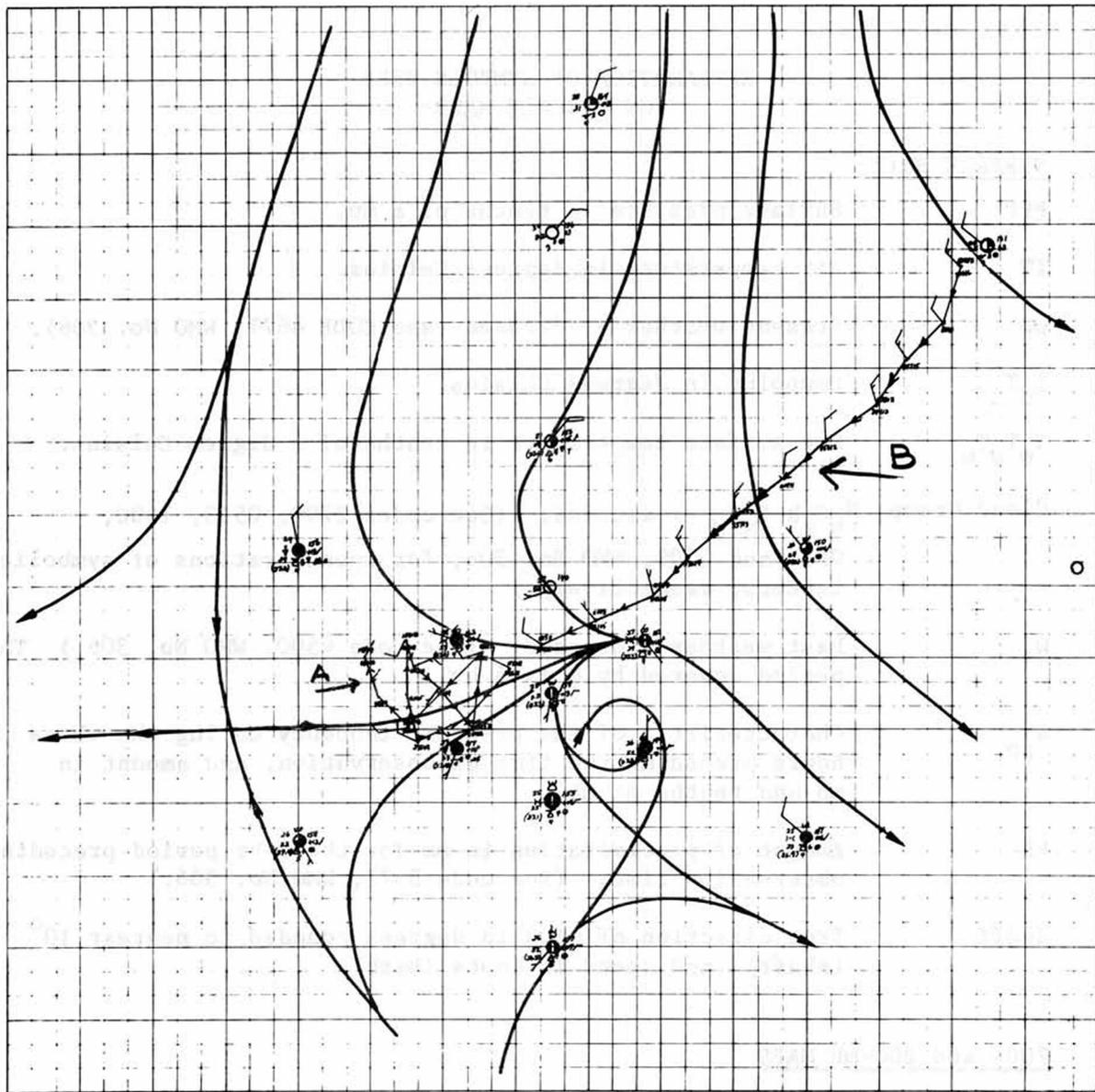
PPP	Surface pressure in tenths of a mb.
TT	Air temperature in degrees Celsius.
ww	Present weather - decoded (see CODE 4677, WMO No. 306).
T _d T _d	Dewpoint in degrees Celsius.
T _w T _w T _w	Sea-surface temperature in tenths of a degree Celsius.
Cloud Group	N _h C _L h C _M C _H - decoded. (See codes 2700, 0513, 1600, 0515 and 0509, WMO No. 306, for specifications of symbolic letters, respectively.)
W	Past weather - decoded. (See code 4500, WMO No. 306.) The period covered by W is 6 hr.
a _{pp}	Characteristic of the pressure tendency during the three hours preceding the time of observation, and amount in mb and tenths of mb.
RR	Amount of precipitation in mm for the 6-hr period preceding observation time. (See code 3577, WMO No. 306.)
dddff	True direction of wind in degrees rounded to nearest 10 ^o (shaft), and speed in knots (barb).

700- and 200-mb MAPS

see legend for A-scale maps, page 19.

GATE AND COMMERCIAL AIRCRAFT OBSERVATIONS

hhh	Flight level in hundreds of feet.
TT	Air temperature in degrees Celsius.
dddff	True direction of wind in degrees and speed in knots.
GGGG	Time of observation in hours and minutes GMT.
NOTE:	On charts, GATE and commercial aircraft are differentiated by solid and open observation rectangles, respectively.



Analysis 0-5

DC-6
FL. 5Kft FL. 1Kft.

SURFACE 10 Aug. 1974
12Z 05. 17.

SHIP MODEL

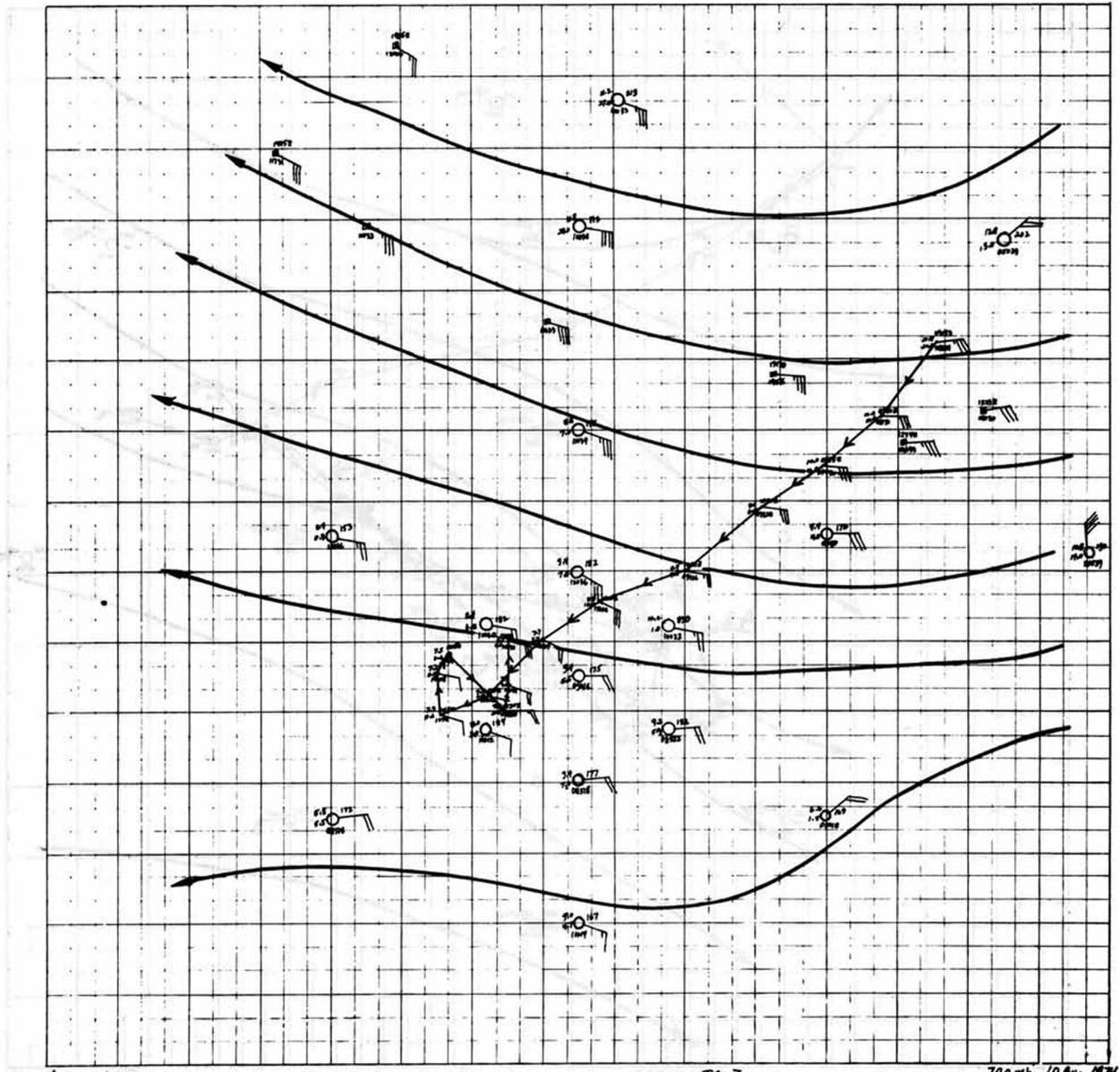
CH
 CM
 (N)
 TT
 ww
 T_dT_d
 (T_wT_wT_w)
 C_Lh
 W_{RR}
 PPP
 a
 pp
 W_{RR}

AIRPLANE MODEL

A B
 GGGG
 TT □ hhh
 dddff

SURFACE CHART 10 August 1974 1200 GMT

NOTE: information on aircraft flight levels added to original chart



Analysis 8.3

Dropsondes KC-135

DC-7 FL. 10kft.

700 mb 10 Aug. 1974 12Z 85 YJA

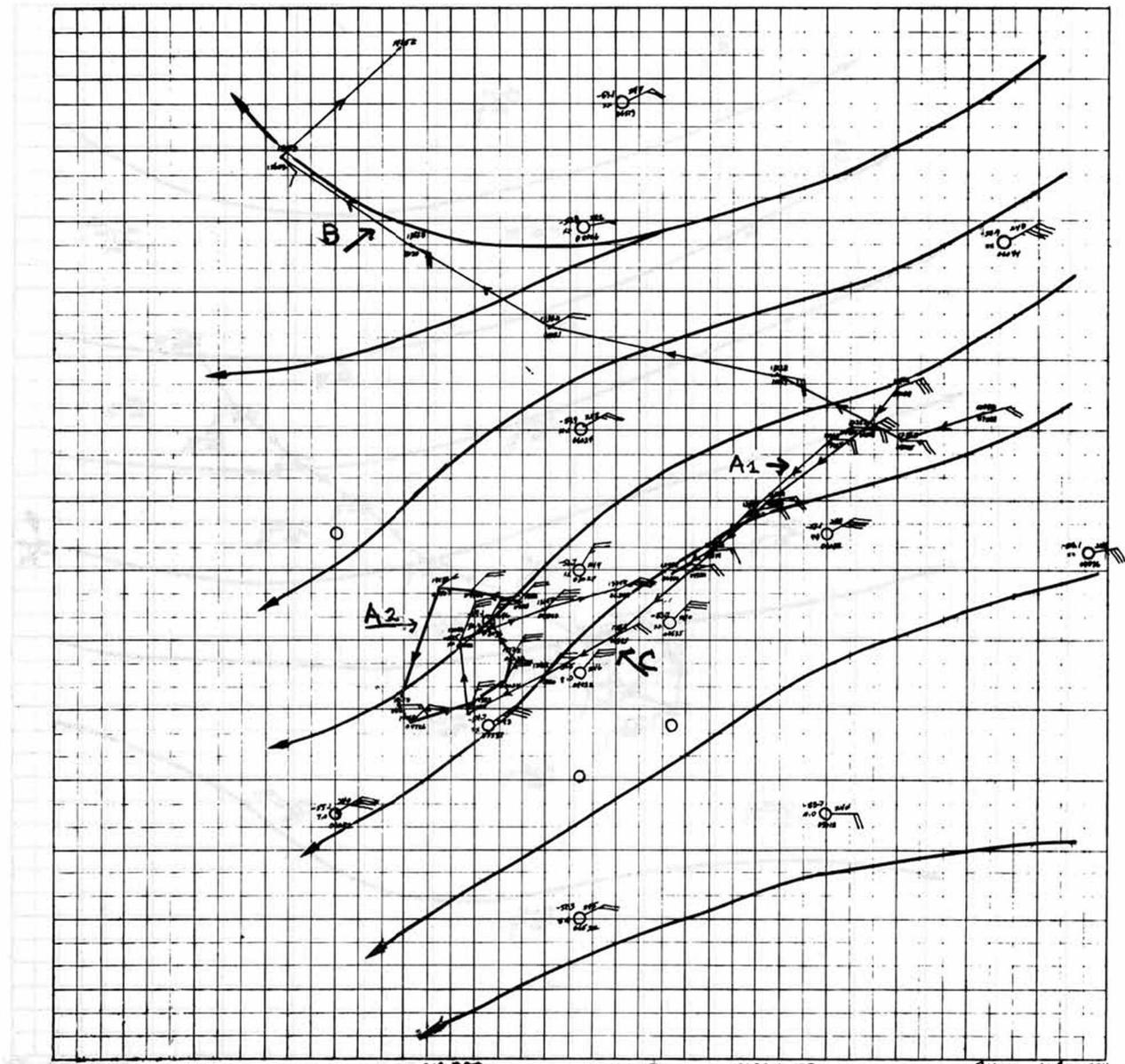
TTT ○ hhh
DD dddff

GGGG
TT □ hhh
dddff

SHIP MODEL

AIRCRAFT MODEL

700-mb 10 August 1974 1200 GMT



122 BS. 9 24. 200 mb 10 Aug. 1974

CV-990 FL. 91 kft. FL. 35 kft. KC-135 FL. 91 kft. SABRELINER FL. ~38 kft.

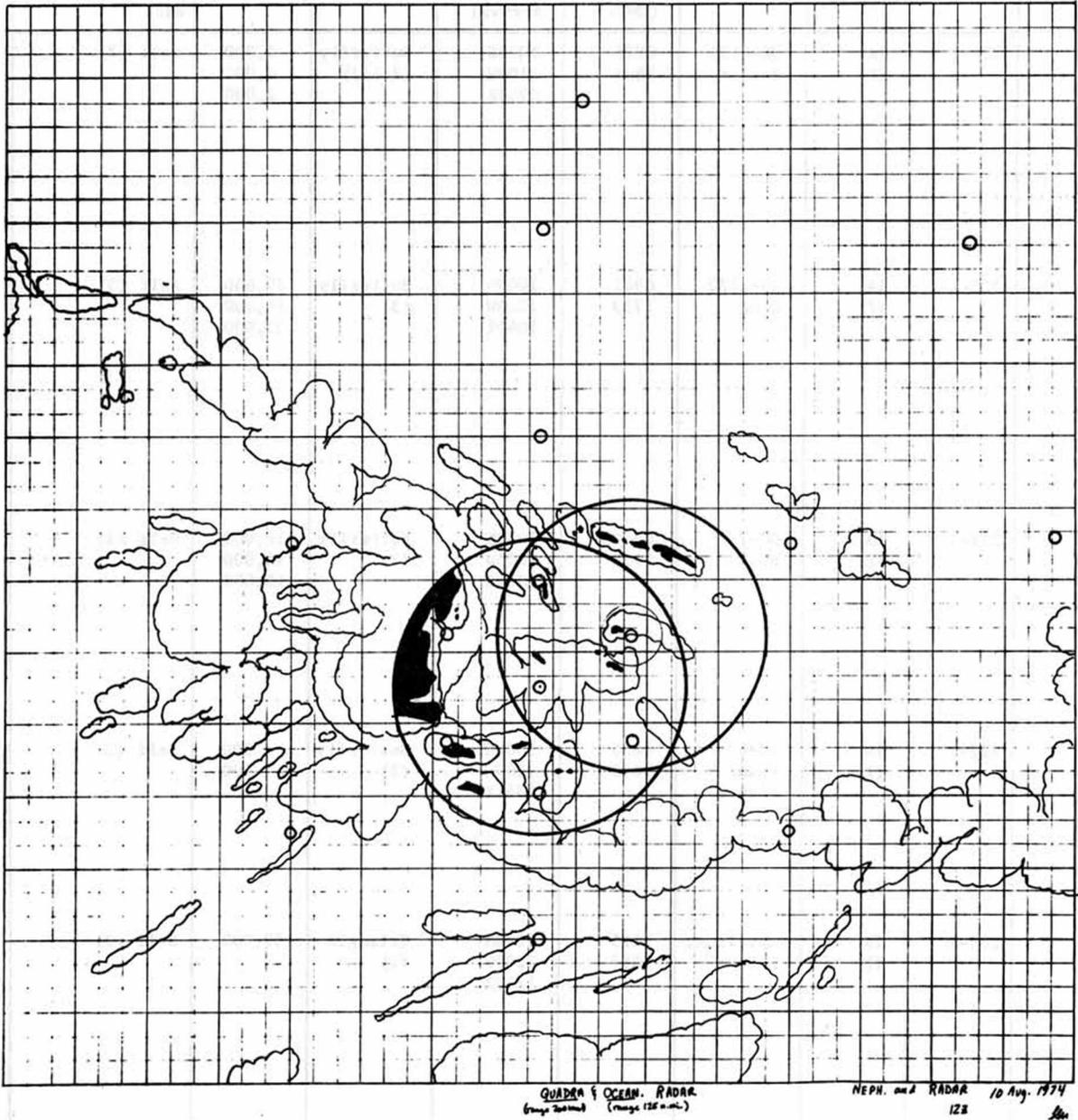
A1 A2 B C

TTT hhh TT hhh
 DD dddd

SHIP MODEL AIRCRAFT MODEL

200-mb 10 August 1974 1200 GMT

NOTE: information on aircraft flight levels added to original chart



NEPHANALYSIS based on Satellite Images and Ship Radar

GATE INFORMATION BULLETIN No.4 31 January 1975

DATE: 10 August 1974

MISSION SCIENTIST(S): Betts

JULIAN DAY: 222

Mission Number	Mission Type P=Prim. A=Alter.	Aircraft and Aircraft Scientist	Time of Take Off and Landing (GMT)	Lat. and Long. (°) of IP and Time of Arrival	Pattern Flown and Number of Circuits	Pattern Altitude (feet)	Intercomparison with, or Calibrations, and number of each
222-1*	1A (P)	UK-C130 Butler	0821 1805	1000N 2100W 0958Z	Butterfly (2 1/2)	2,000 4,000 2,000	Self (3)
222-1	1A (P)	US-C130 Long	0907 1733	1000N 2200W 1040Z	Butterfly (3)	20,000 16,000 23,000	Self (3)
222-1	1A (P)	DC-7 Blot	0840 1938	1000N 2200W 1028Z	Butterfly (3)	10,000 10,000 10,000	Self (3)
222-1	1A (P)	DC-6 Bean/ Michie	0835 1835	1000N 2200W 1041Z	Butterfly (2)	500 500	Self (3)
222-1	1A (P)	Sabreliner LaSeur	1125 1457	1000N 2200W 1210Z	Triangle (1)	39,000	Self (2)

AIRBORNE MISSION 222-1 Pennell (UK-C130)
 SCIENTIST(S): 222-2 Simpson, R. (KC-135)

Down Systems	Weather Encountered in Route and in Pattern	Summary and Evaluation
<p>Doppler inop. for about ten minutes. Hygrometer questionable from 1449 to 1453Z and from 1712 to 1725Z.</p>	<p>In route: Very hazy, scattered Sc and Ci. Broken Ac. In pattern: NW part of pattern was most active weather. Suppressed weather in SE part of pattern.</p>	<p>*Cloud cluster investigated became a tropical storm by 12 August 1974. Pattern had difficulty keeping up with active weather. Mission is most useful as a post-cluster mission in the eastern portion of the pattern especially. Mission was a marginal success.</p>
<p>Sea surface temp. in error after 1557Z. Doppler radar inop. throughout.</p>	<p>In route: Haze, scattered Sc, Ac, Ci becoming overcast with Ac. In pattern: A mass of mature to decaying Cbs. Eastern part of pattern was covered with Ac, western part was mostly Cbs. Little turbulence and precipitation encountered in Cbs. System appeared to move to the W and N. Lightning struck craft at 1557Z.</p>	<p>The first pattern encountered mature to slightly decaying Cbs with large Ci shields. The subsequent patterns found decaying Cbs in W part of pattern with precipitation from stratiform clouds. The flight was a success in documenting the decay of a dissipating system.</p>
<p>--</p>	<p>In route: Heavy dust, scattered Sc, broken Ac. In pattern: Layered clouds, lightning struck craft at 1715Z. Flew in heavy rain at times. Rain areas had few low level clouds under them. Dry patches were observed in the disturbance.</p>	<p>This mission is rated as an excellent ITCZ mission. A dropsonde mission was flown enroute to Dakar.</p>
<p>--</p>	<p>In route: Haze, scattered Cu, broken Ac. In pattern: Flew under Ac layer, encountered lower and lower clouds and rain in center of disturbance. Broke out into clear area on other side of pattern.</p>	<p>Successful mission. Pattern appeared to be well placed.</p>
<p>Computer inop. from 1259 to 1320Z.</p>	<p>In route: Patchy Ac, As, Sc with tops about 20,000 ft. In pattern: Increasing TCu and Cbs with tops 40,000 to 45,000 ft. East edge of cloud cluster was solid anvil, with embedded Cbs. Independent thin Ci overcast.</p>	<p>Despite 20 kt westward movement of cloud cluster, range of aircraft was sufficient to sample eastern edge. Successful mission provided high tropospheric data in the B-scale array.</p>

GATE INFORMATION BULLETIN No. 4 31 January 1975

DATE: 10 August 1974

MISSION SCIENTIST(S): Betts

JULIAN DAY: 222

Mission Number	Mission Type P=Prim. A=Alter.	Aircraft and Aircraft Scientist	Time of Take Off and Landing (GMT)	Lat. and Long. (°) of IP and Time of Arrival	Pattern Flown and Number of Circuits	Pattern Altitude (feet)	Intercomparison with, or Calibrations, and number of each
222-1	1A (P)	CV-990 Haughney	1153 1801	1000N 2200W 1248Z	Box (3 1/4)	30,000 35,000 29,000 35,000	Self (3)
222-2	9B (P)	KC-135 Holle	1211 1729	1217N 1750W 1233Z	Distorted Box (1)	31,000	--

GATE INFORMATION BULLETIN No. 4 31 January 1975

AIRBORNE MISSION 222-1 Pennell (UK-C130)
 SCIENTIST(S): 222-2 Simpson, R. (KC-135)

Down Systems	Weather Encountered in Route and in Pattern	Summary and Evaluation
<p>Erratic outputs on data recording printout, however, good values were recorded.</p>	<p>In route: Passed through a developing line of Cbs, which on return to Dakar was oriented E-W as two distinct lines at about 1030N, 2310W. In pattern: Cloud system was decaying. During first two patterns the system was well developed with precipitation. During remainder of patterns, system had dissipated especially in SE sector.</p>	<p>Cloud cluster was a dissipating system. Shift of patterns was successful in centering over the system.</p>
<p>Doppler radar was unusable for short period of time because of smooth sea surface. Two of 14 dropsondes experienced parachute failures.</p>	<p>In route: Few clouds, Sc, thin Ci, elsewhere clear. Very suppressed. Haze, dust. In pattern: Very suppressed, dusty and hazy, few Sc. Line of Cbs to S extended from coast to 2600 W. NW was an area of Ac reaching to 20,000 ft.</p>	<p>Flight track was N of line of very active Cbs, in very suppressed conditions. Good mission. Should have good data on winds. Signal was strong enough on all drops so that data can be examined for homogeneity in this meteorologically uniform area. Comparison to Cape Verde Island soundings should be made.</p>

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