

CRPL-F 250 PART A

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PART A
IONOSPHERIC DATA

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JUNE 1965

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

IONOSPHERIC DATA

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IONOSPHERIC DATA

The CRPL-F series bulletins are issued as part of the responsibility of the Central Radio Propagation Laboratory for the exchange and distribution of ionospheric and related geophysical data. Part A, "Ionospheric Data," and Part B, "Solar-Geophysical Data," of the CRPL-F series present a variety of data collected by CRPL in the course of its research and service activities. Through the CRPL-F series, as part of the general exchange of scientific information, these data are made available for use by others in research on radio propagation and the ionosphere, and in other geophysical applications.

In the CRPL-F series, Part A, tables of monthly median values of vertical-incidence ionospheric data are presented accompanied by graphs of critical frequencies and $M(3000)F_2$. The tables include the number of values entering into the median determination (count). When available, the upper and lower quartile values (indicated by UQ and LQ) are listed for f_oF_2 , f_oF_1 , f_oE_s , $M(3000)F_2$, $h'F_2$ and $h'F$. Space limitations do not permit inclusion of quartile values for the other characteristics. The tables are prepared by machine methods and the graphs are plotted automatically.

The tables and graphs present the ionospheric data as received from the originating laboratory. Responsibility for the accuracy and reliability of the data rests entirely with the originator. Medians of data for the U.S. stations are computed by CRPL in accordance with the recommendations of the World-Wide Soundings Committee.

Data will appear in the F-series, Part A, only when the complete daily-hourly tabulations have been received by the CRPL or the World Data Center A for Airglow and Ionosphere. In general, priority of publication is given to the most current data. Data received too long after the month of observation may experience an indefinitely prolonged delay before finding space in the F series, Part A.

Information on symbols, terminology and conventions may be found in the "URSI Handbook of Ionogram Interpretation and Reduction of the World-Wide Soundings Committee," edited by W. R. Piggott and K. Rawer (Elsevier, 1961), which supersedes previous documents. A list of symbols is available from CRPL on request.

Units and Abbreviations of Ionospheric Data Tables

foF ₂ , foE _s - - - Tenths of a megacycle	MED - Median
foF ₁ , foE - - - Hundredths of a megacycle	CNT - Count
h'F ₂ , h'F, h'E - Kilometers	UQ - Upper Quartile
M(3000)F ₂ - - - Hundredths	LQ - Lower Quartile

Key to Points of Ionospheric Data Graphs

foF2: x foE : ◯ M(3000)F2 : ◇
 foF1: Δ foEs: +

< Less-than value indicated. > Greater-than value indicated.
 - - - Interpolated value indicated.

The following table contains the latest available information on twelve-month smoothed average of observed Zurich relative sunspot numbers, beginning with the minimum of April 1954. Final numbers are listed through June 1964, the succeeding values being based on provisional data.

Smoothed Observed Zurich Relative Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	10	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	185	184	182	181	180
1959	179	177	174	169	165	161	156	151	146	141	137	132
1960	129	125	122	120	117	114	109	102	98	93	88	84
1961	80	75	69	64	60	56	53	52	52	51	50	49
1962	45	42	40	39	39	38	37	35	33	31	30	30
1963	29	30	30	29	29	28	28	27	27	26	24	21
1964	20	18	15	13	11	10	10	10	10	10	10	

WORLD-WIDE SOURCES OF IONOSPHERIC DATA

THE IONOSPHERIC DATA PRESENTED IN THE 100 TABLES AND GRAPHS OF THIS ISSUE WERE ASSEMBLED BY THE CENTRAL RADIO PROPAGATION LABORATORY FOR ANALYSIS, CORRELATION, AND DISTRIBUTION. THE FOLLOWING ARE THE SOURCES OF DATA.

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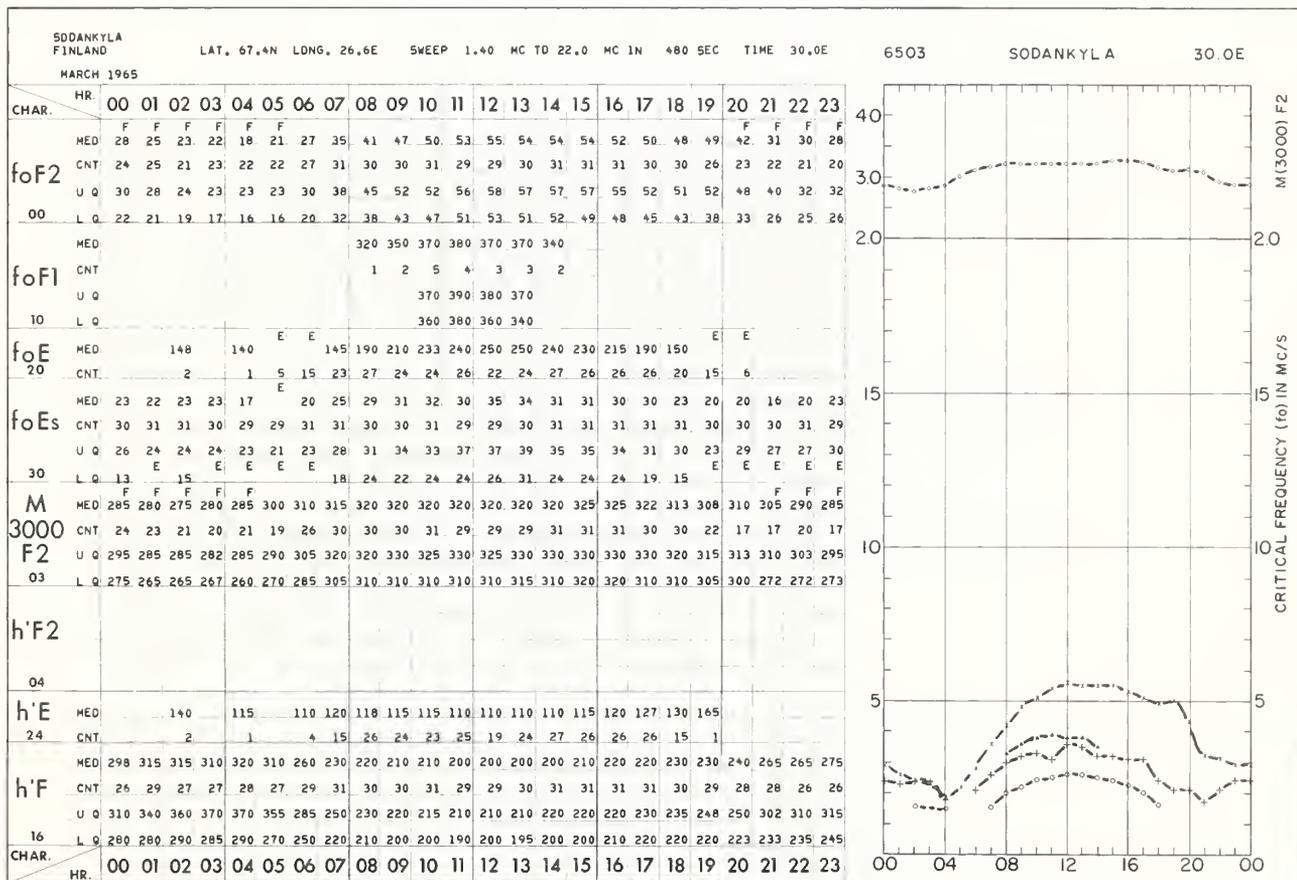
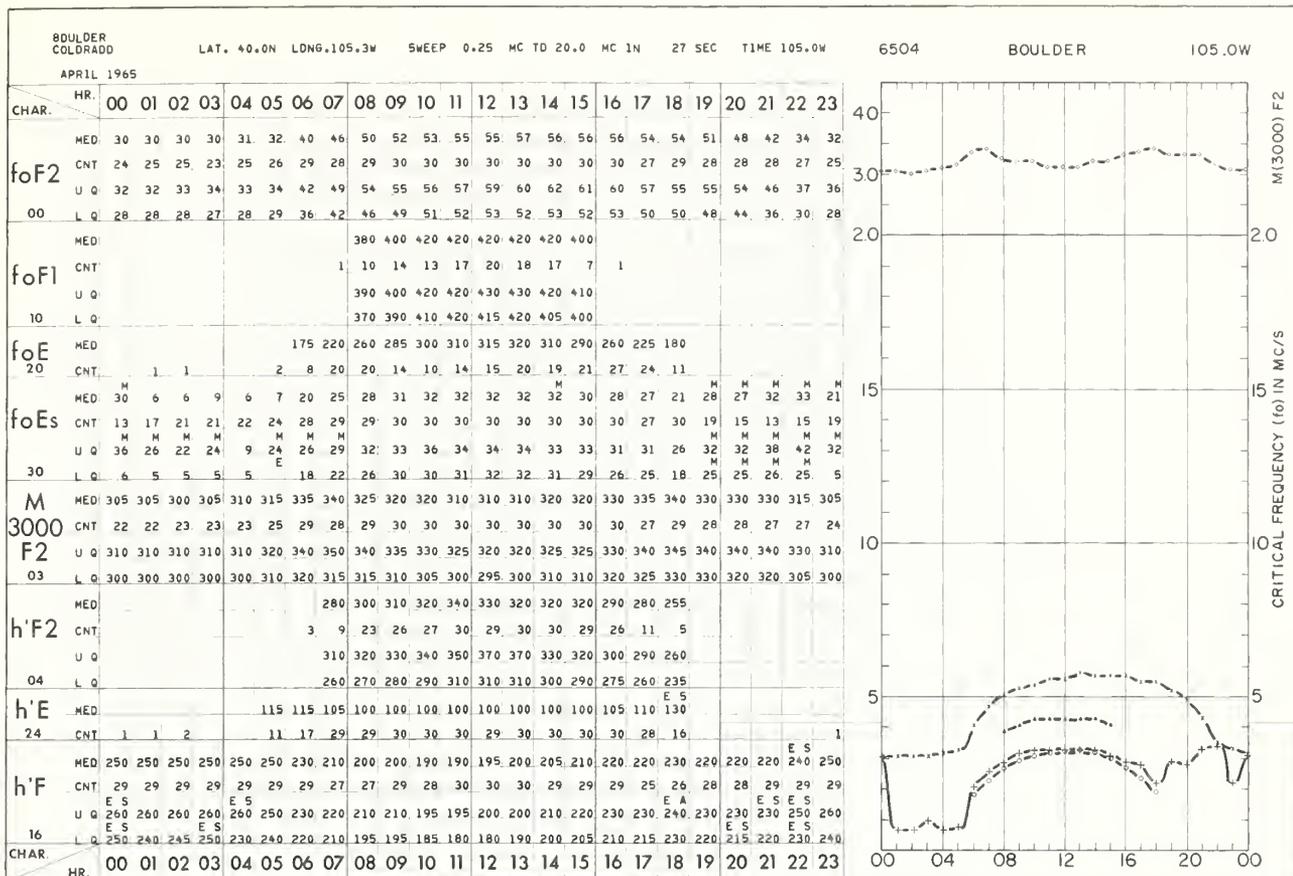
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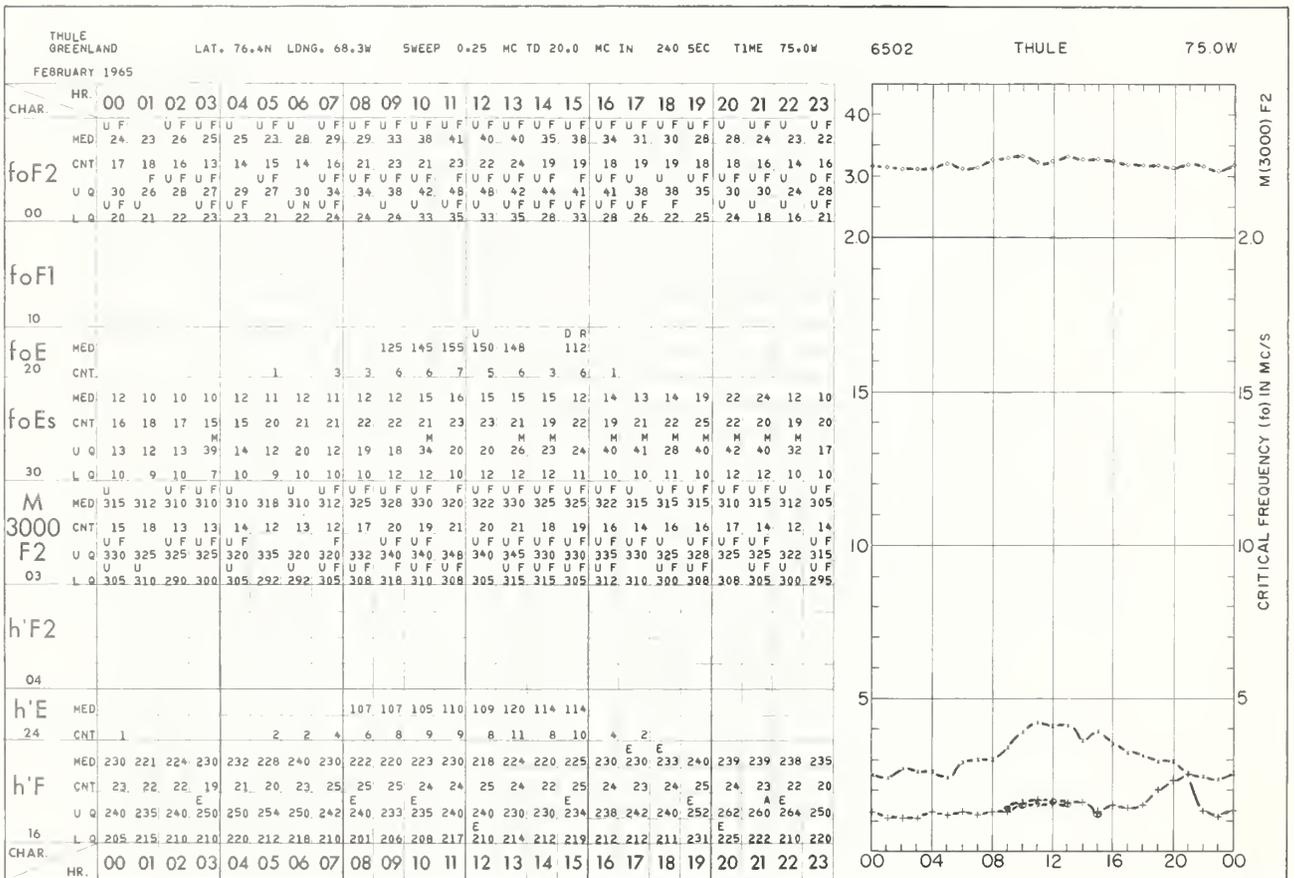
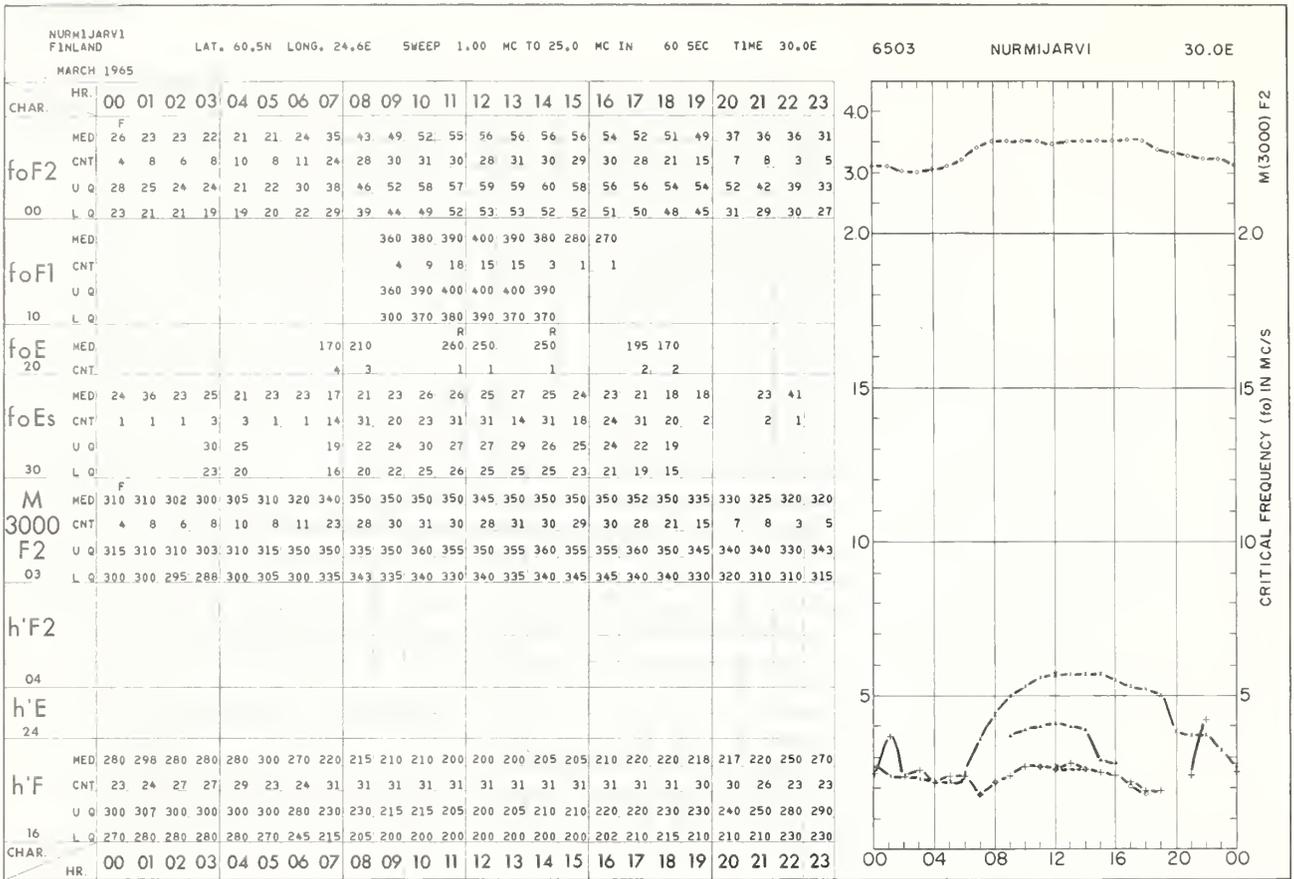
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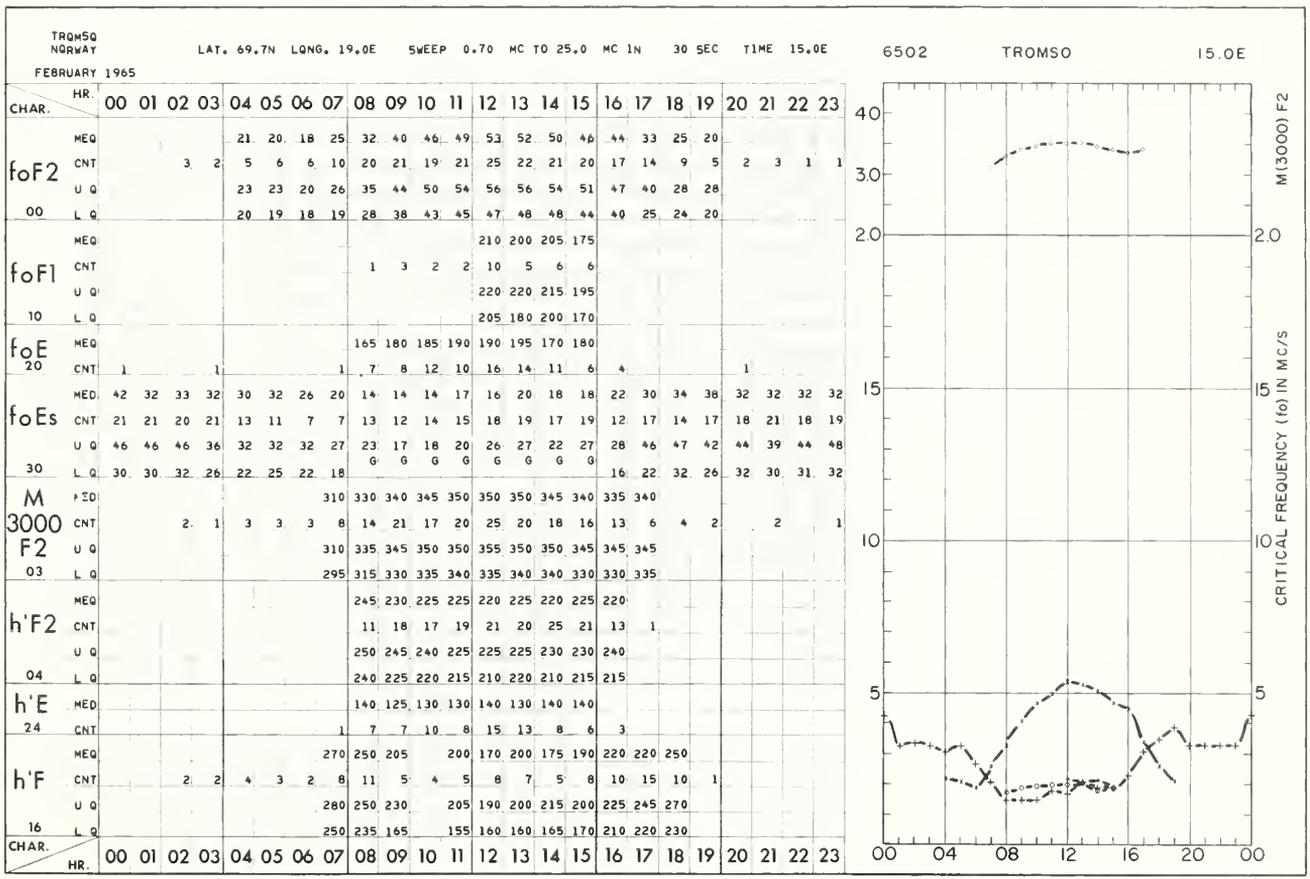
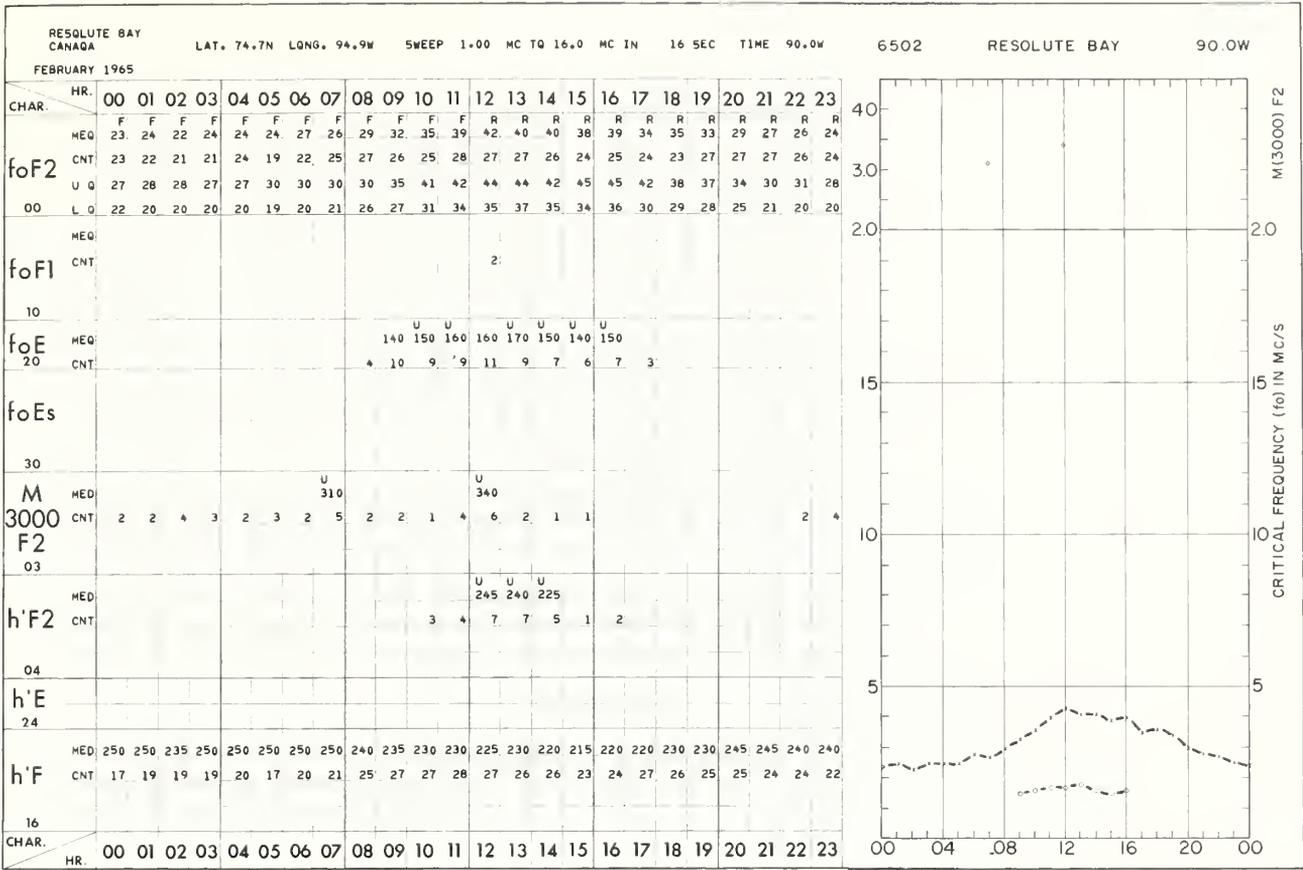
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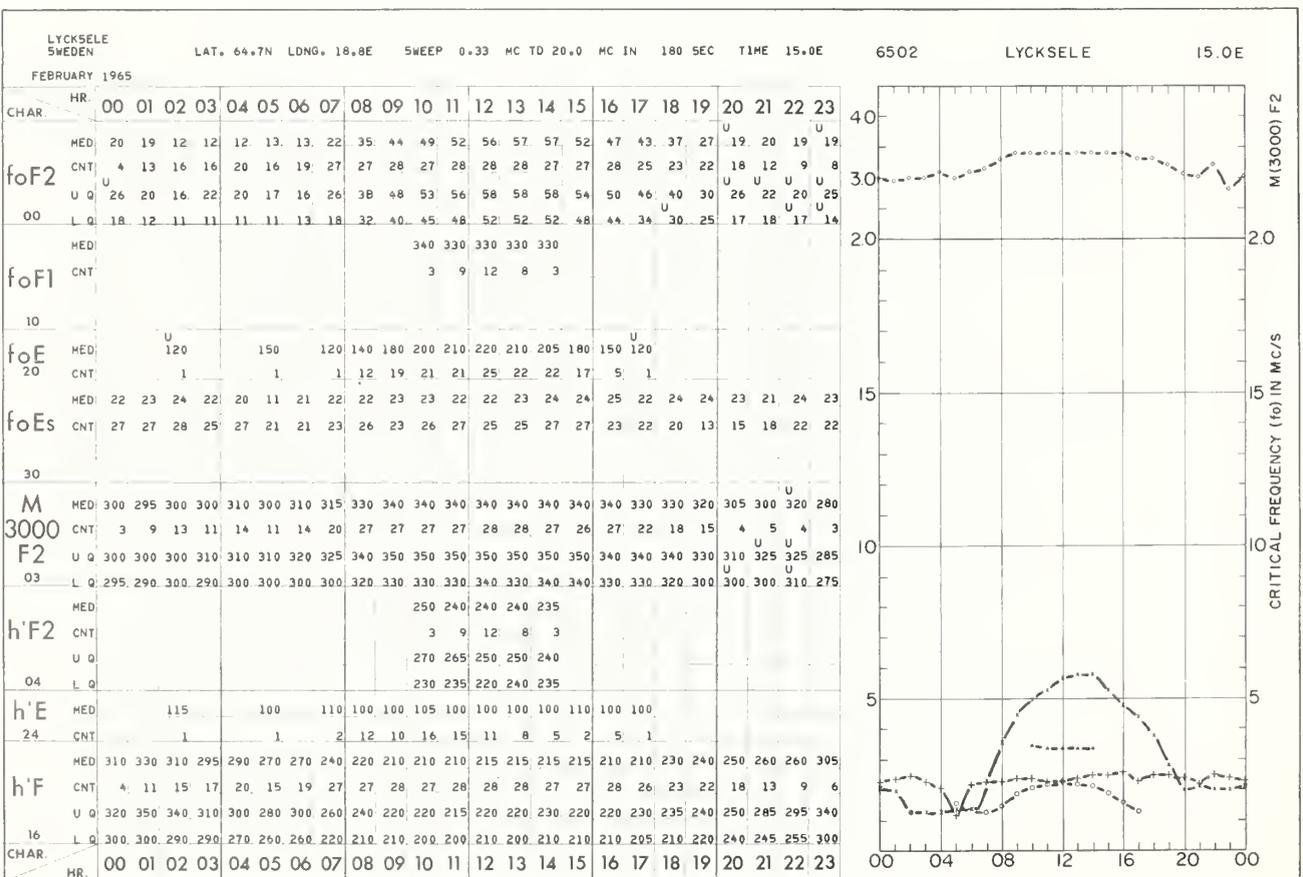
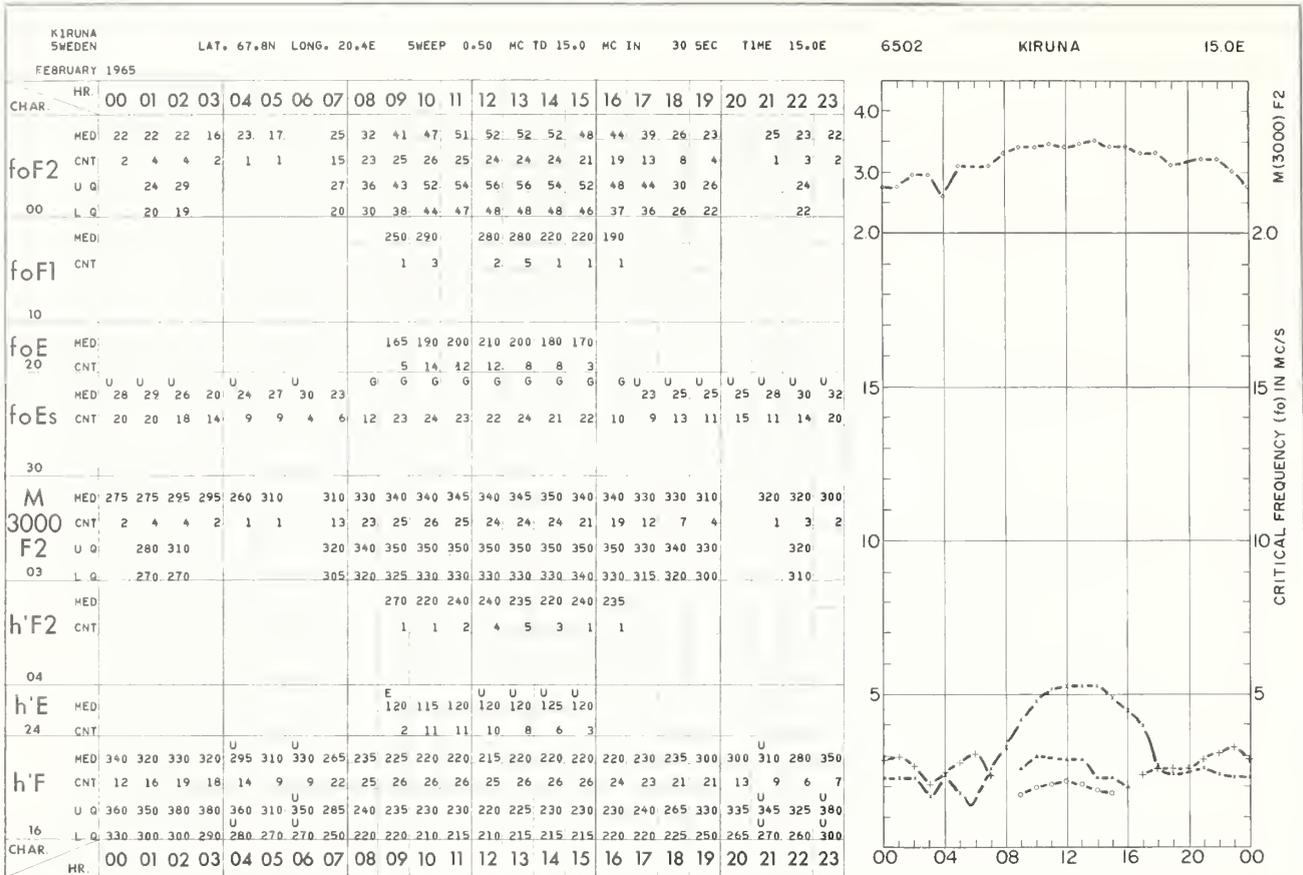
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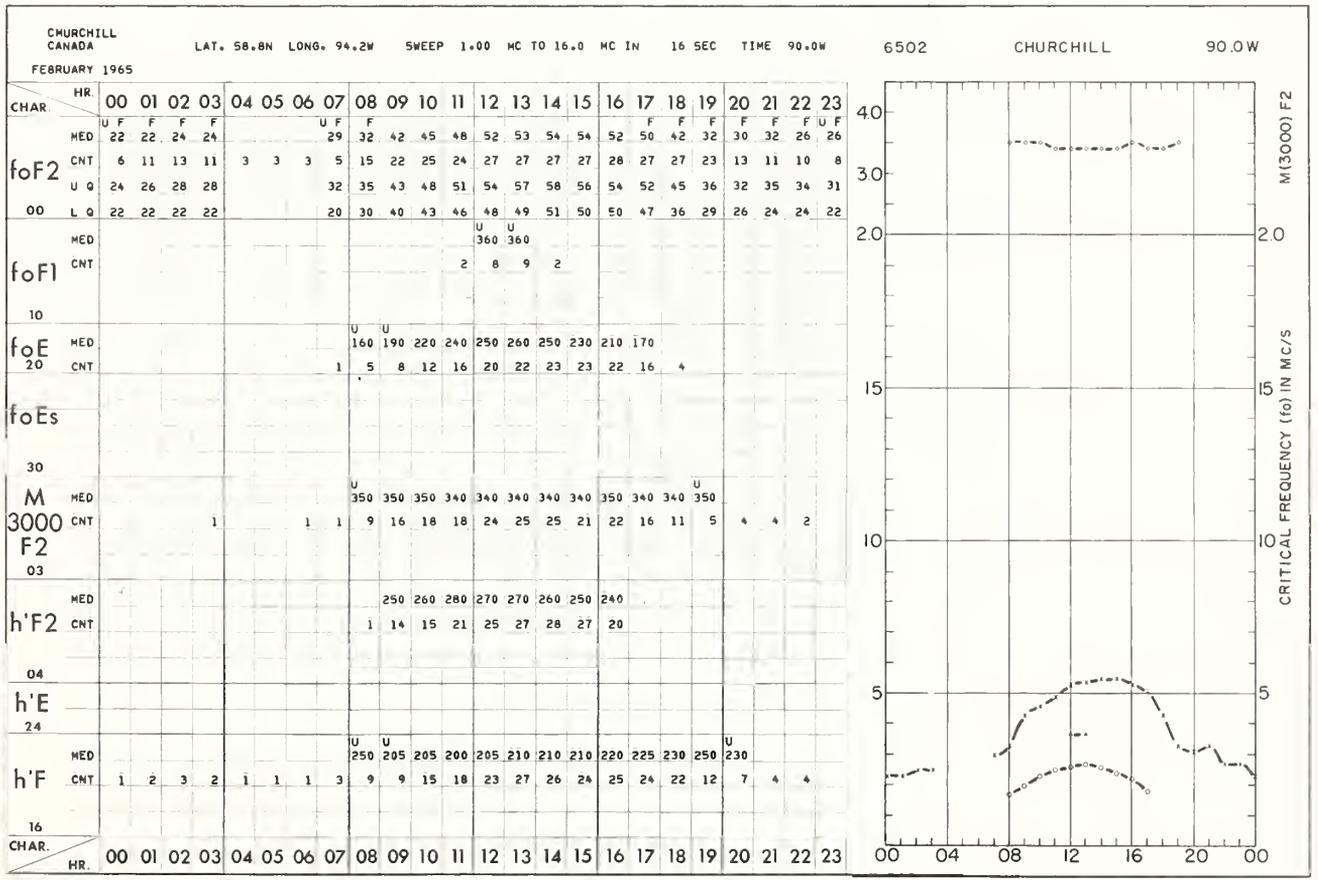
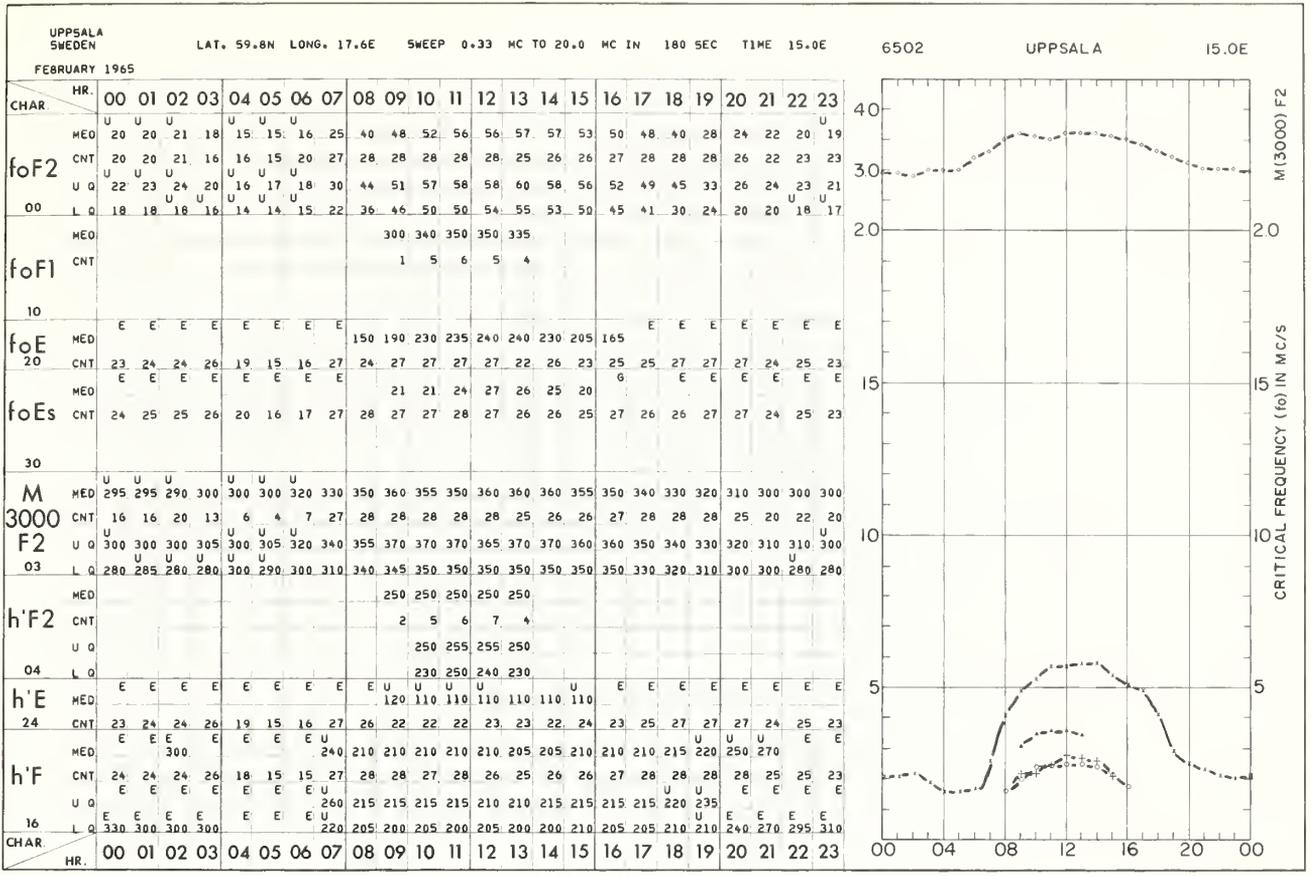
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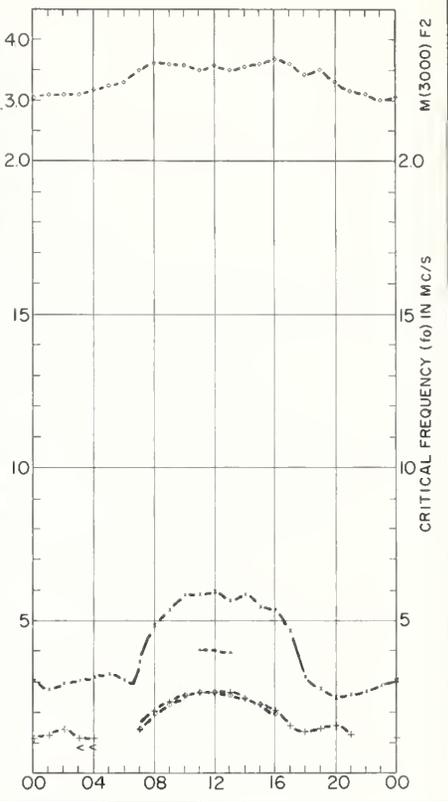




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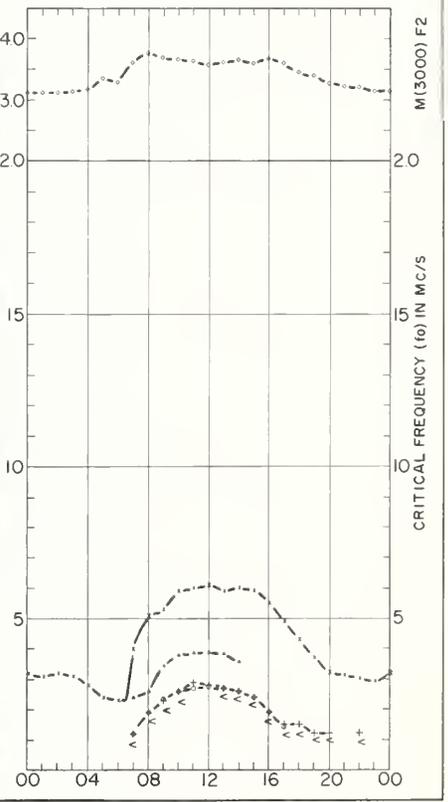
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	CNT	23	24	24	21	22	23	21	27	28	28	28	28	27	27	27	28	28	28	28	27	26	28	25	24	
	U Q	33	34	34	36	36	37	37	41	50	57	60	64	66	61	60	60	58	50	38	29	29	30	32	34	
	L Q	25	24	27	26	25	27	24	33	45	50	54	53	52	53	54	53	48	42	29	22	20	20	21	24	
foF1	MED												400		390											
	CNT									1	1	2	5		4	5	1	1								
	U Q												405		400											
	L Q												370		360											
foE	MED								140	H	H			190	220	250	260	260	250	240	220	190				
	CNT								9	19	23	25	24	26	23	23	23	23	11	1			1			
	U Q																									
	L Q																									
foEs	MED	11	12	14	11	E	E	E	E	14	20	23	25	26	26	26	24	22	20	15	13	14	15	12	E	E
	CNT	21	22	22	24	24	25	25	28	28	28	28	28	27	26	26	27	28	27	20	23	21	20	21	24	
	U Q	18	19	17	16	E	E	E	12	20	23	25	28	29	28	27	25	25	21	17	16	18	20	20	18	15
	L Q	10	11	11	10	E	E	E	12	18	22	24	22	22	22	20	20	16	13							
M 3000 F2	MED	305	310	310	310	318	325	330	350	362	360	358	350	358	350	355	360	368	360	342	350	330	315	310	300	
	CNT	23	23	24	21	20	20	21	27	28	28	28	28	26	27	26	27	28	28	28	27	26	27	25	23	
	U D	315	315	315	318	328	338	350	360	370	370	365	358	365	360	365	370	375	370	358	360	340	325	320	315	
	L Q	300	300	300	302	305	312	312	335	360	350	340	328	345	340	340	345	358	350	335	335	310	300	300	300	
h'F2	MED													232	240	250	244	255	240	229	226					
	CNT									3	12	15	18	23	23	22	14	5								
	U Q													245	250	268	262	267	253	248	234					
	L Q													228	230	243	233	247	235	224	224					
h'E	MED								120	H	H	112	112	110	112	113	115	115	120	H	E					
	CNT								19	25	26	27	27	26	25	25	26	22	16	1			1			
	U Q																									
	L Q																									
h'F	MED	255	254	260	262	254	227	216	212	216	206	204	203	215	205	220	216	218	211	211	218	227	247	250	256	
	CNT	27	27	27	27	27	27	28	28	28	28	28	27	26	27	26	28	28	28	28	28	27	28	27	26	
	U Q	265	270	272	270	262	245	240	226	220	216	218	217	222	215	225	226	225	218	219	226	253	256	260	268	
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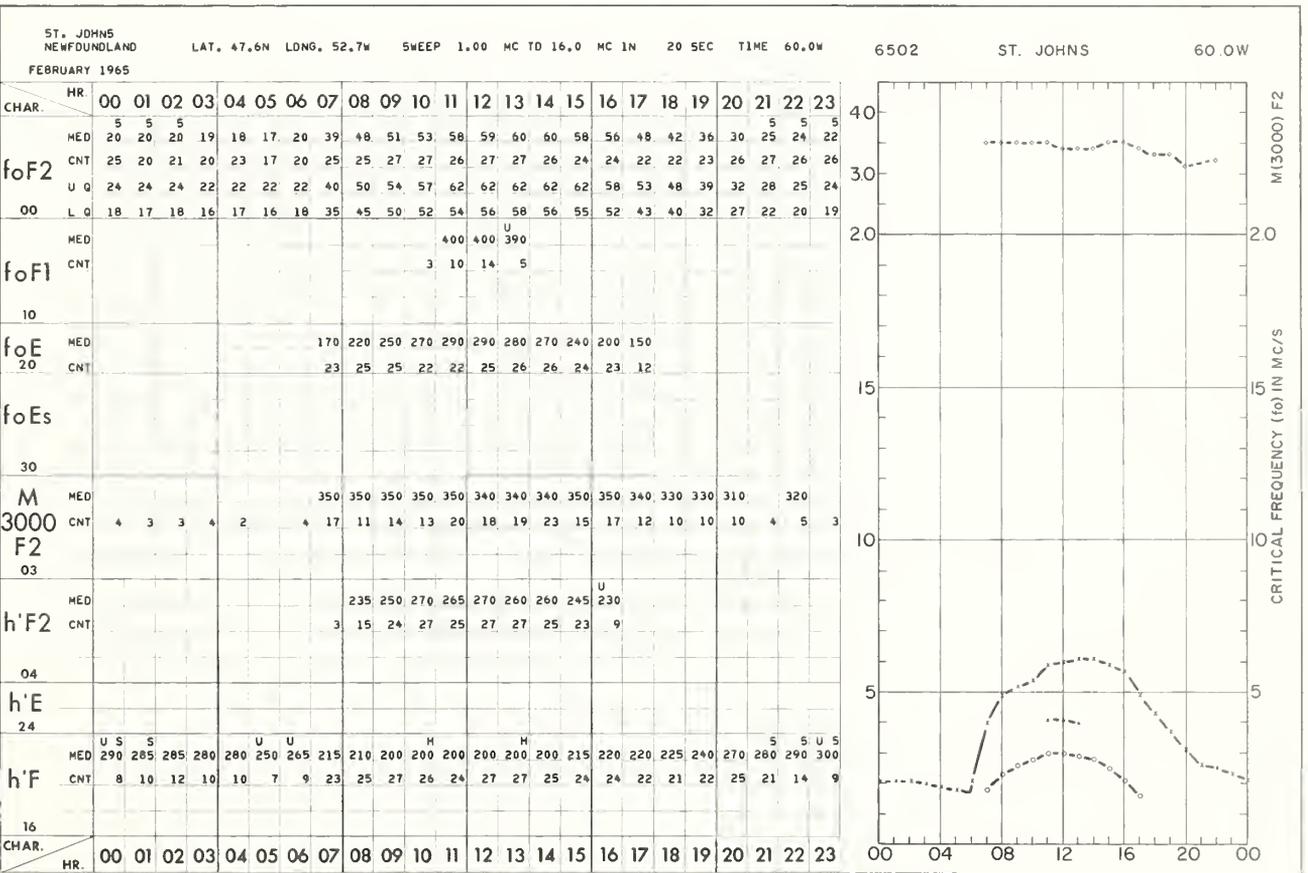
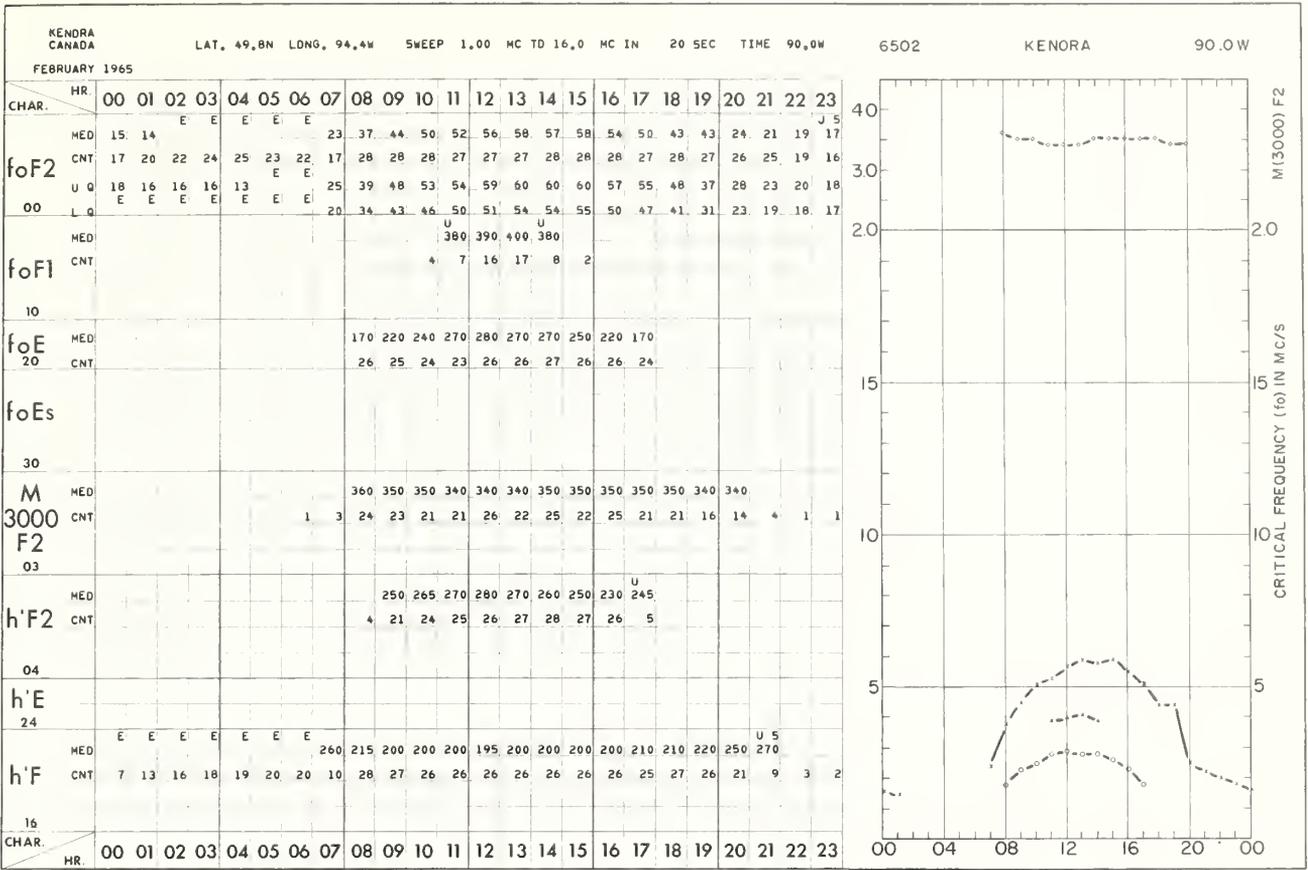


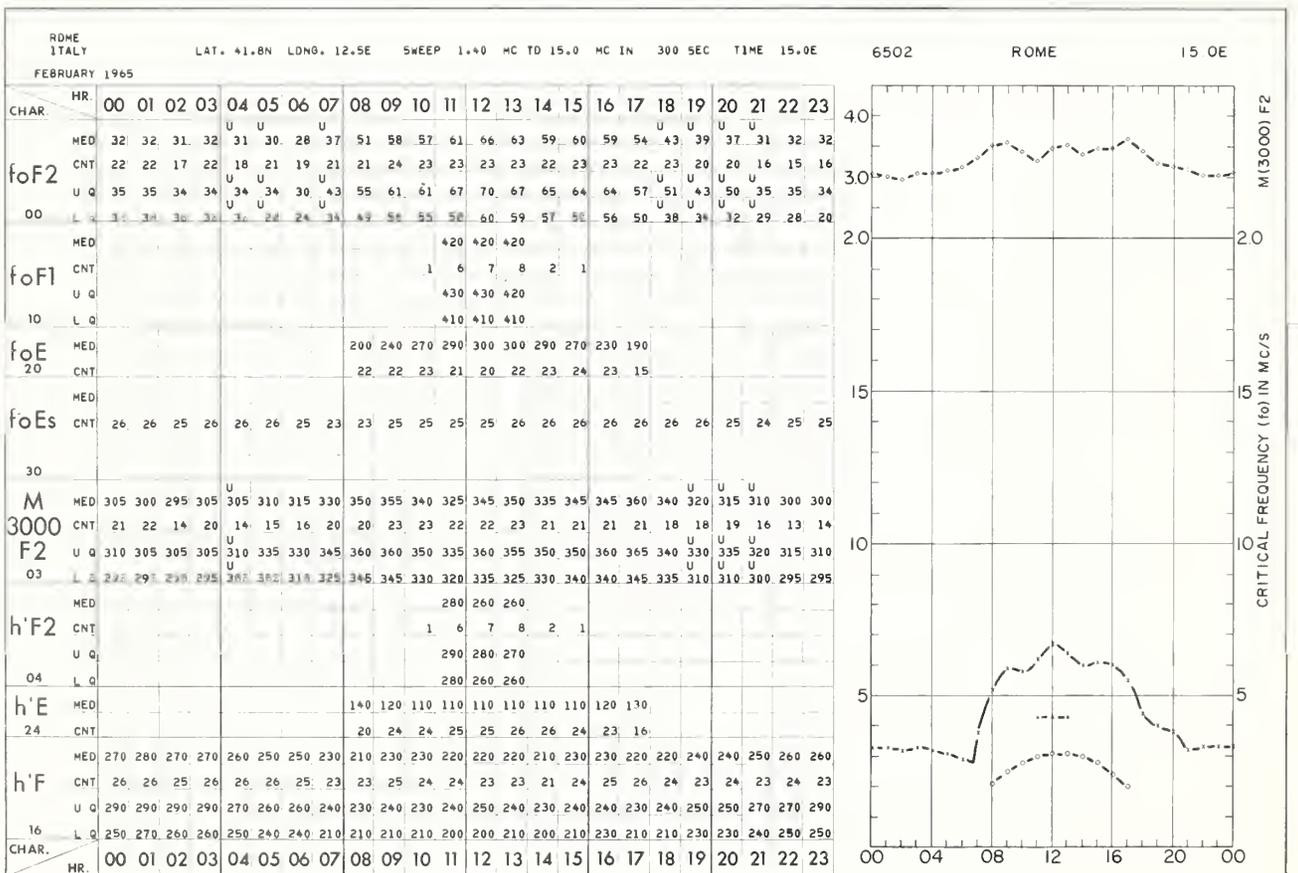
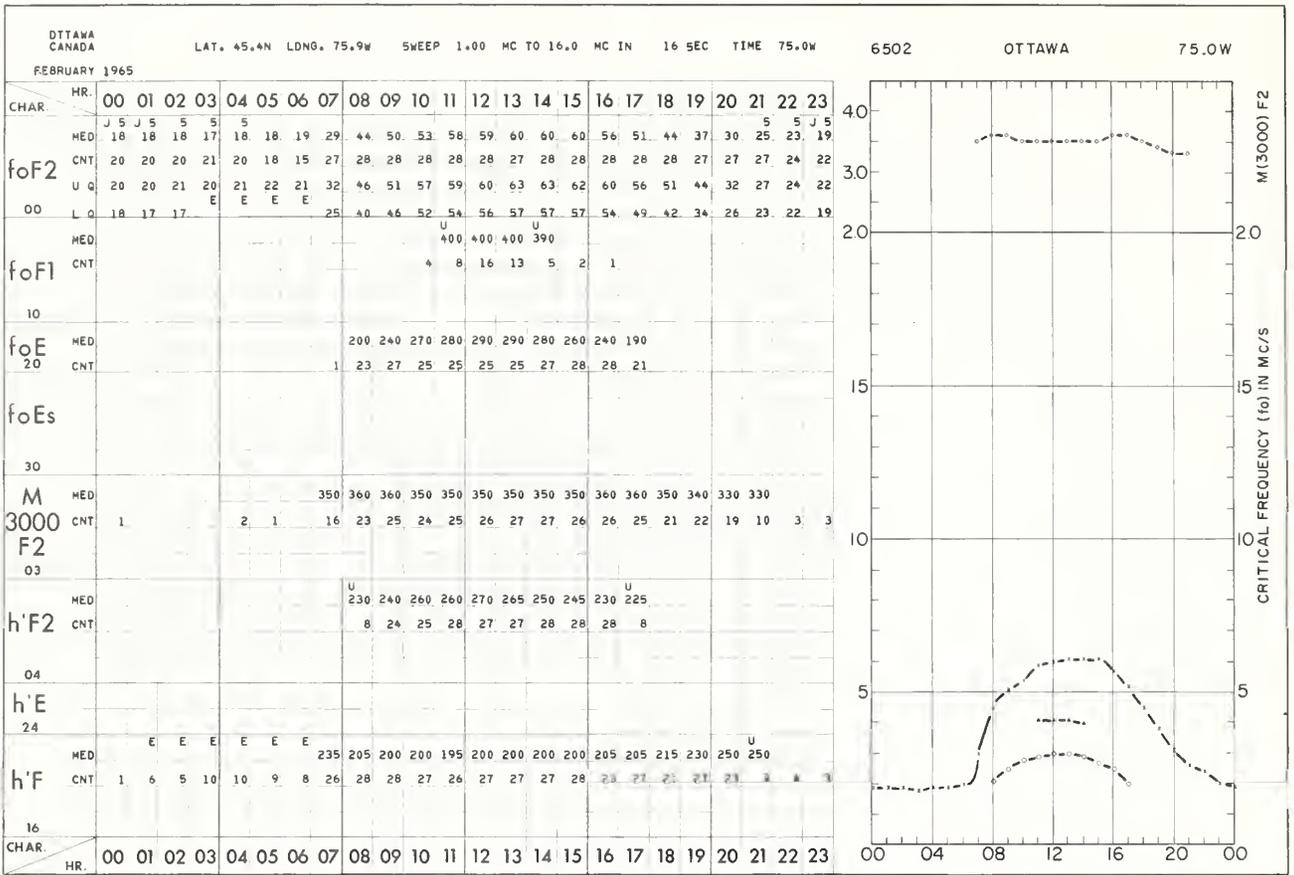
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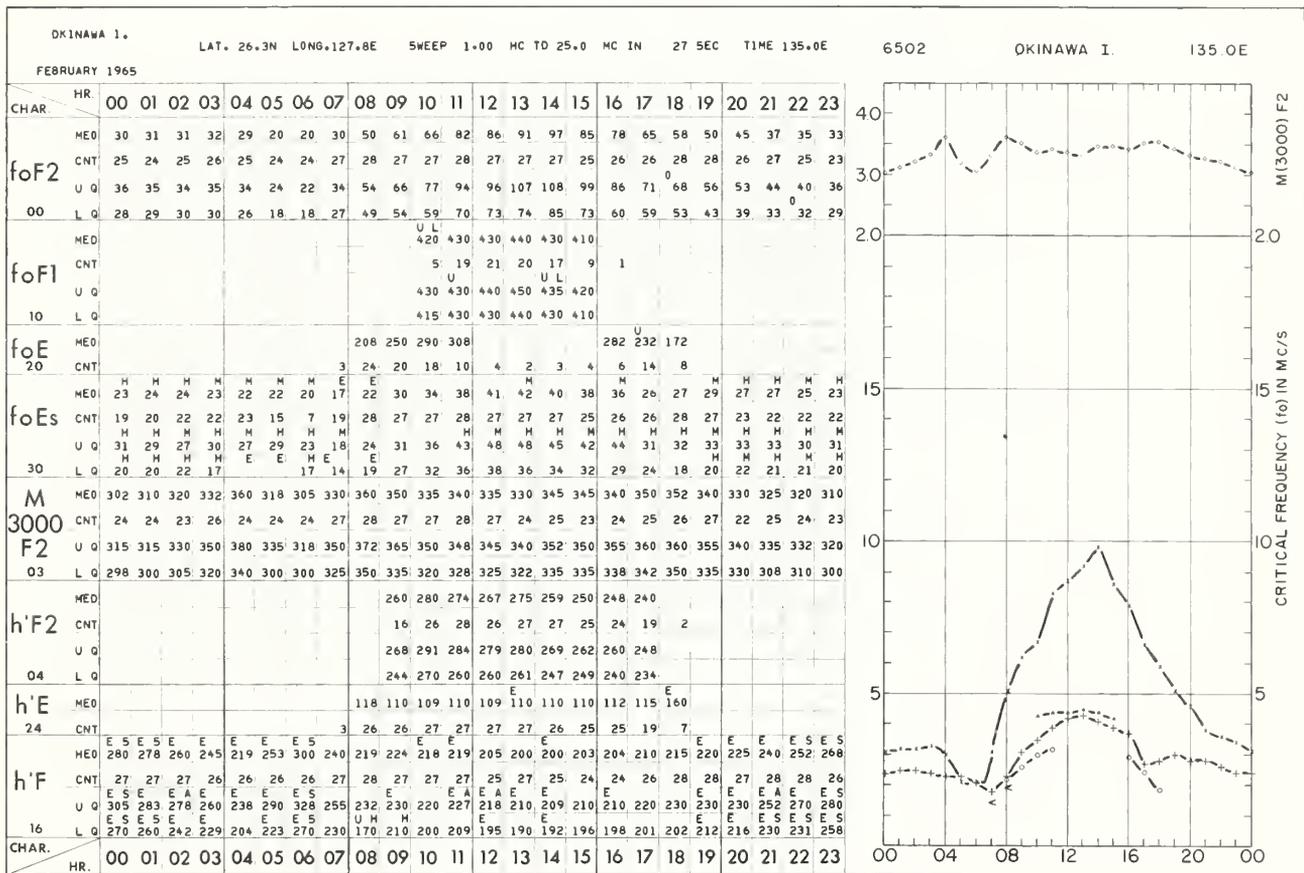
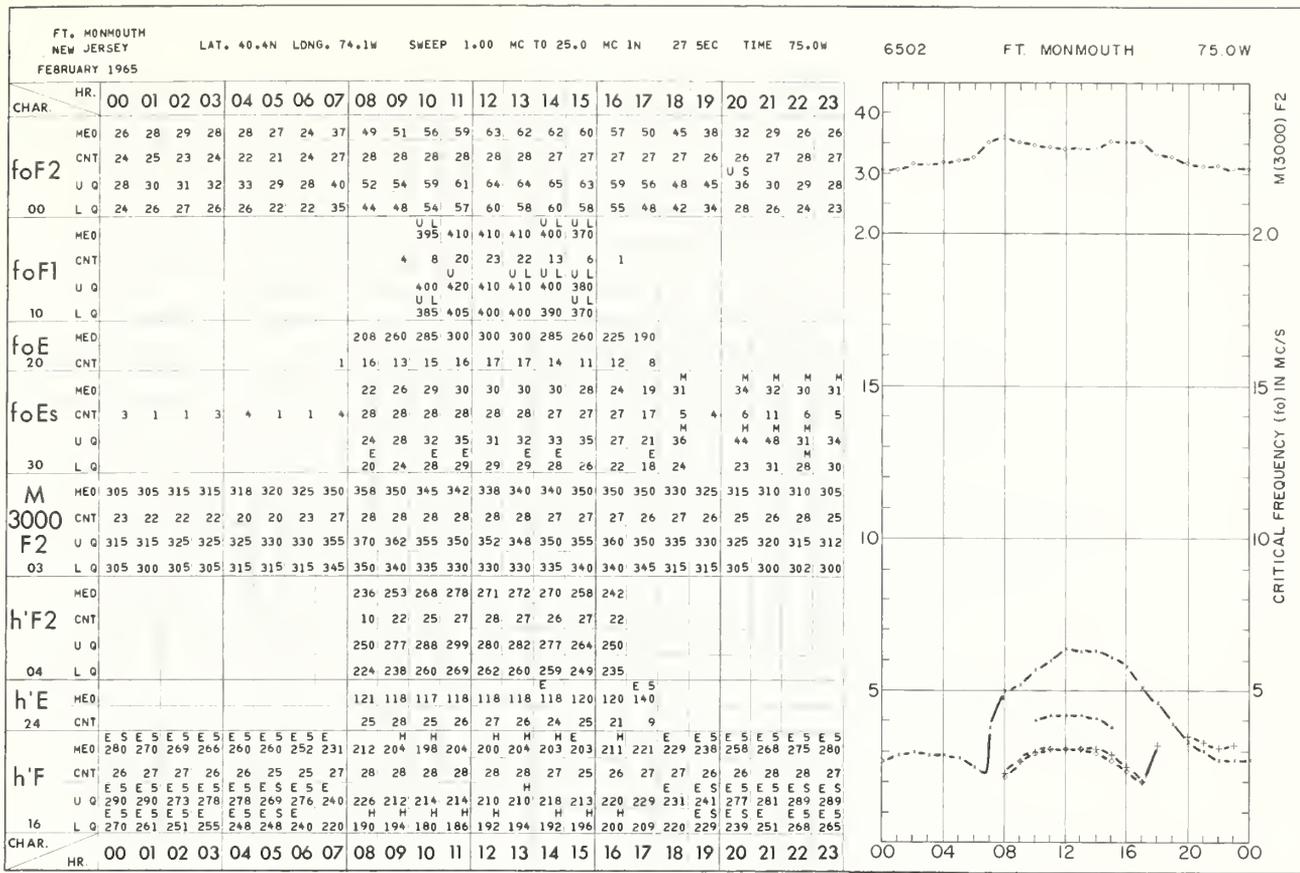
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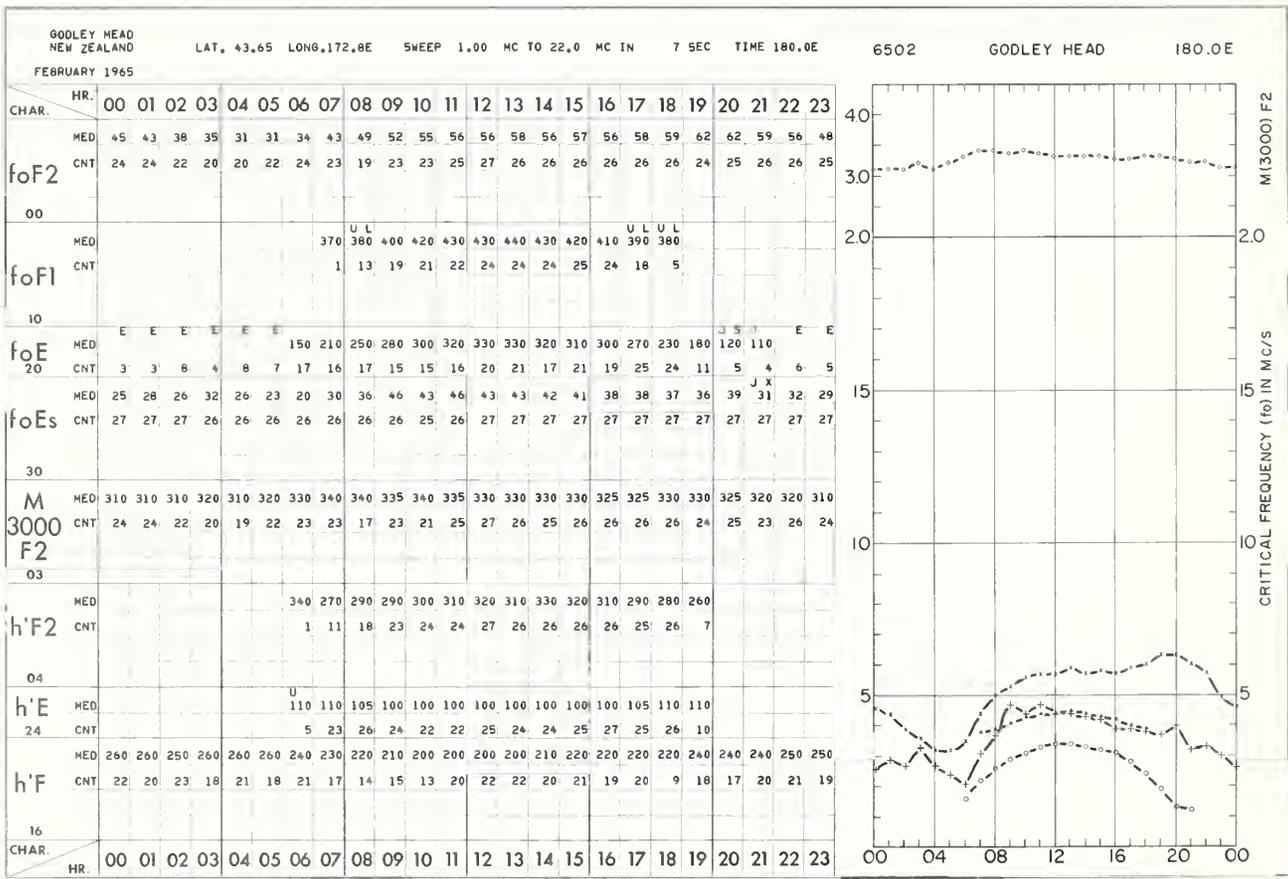
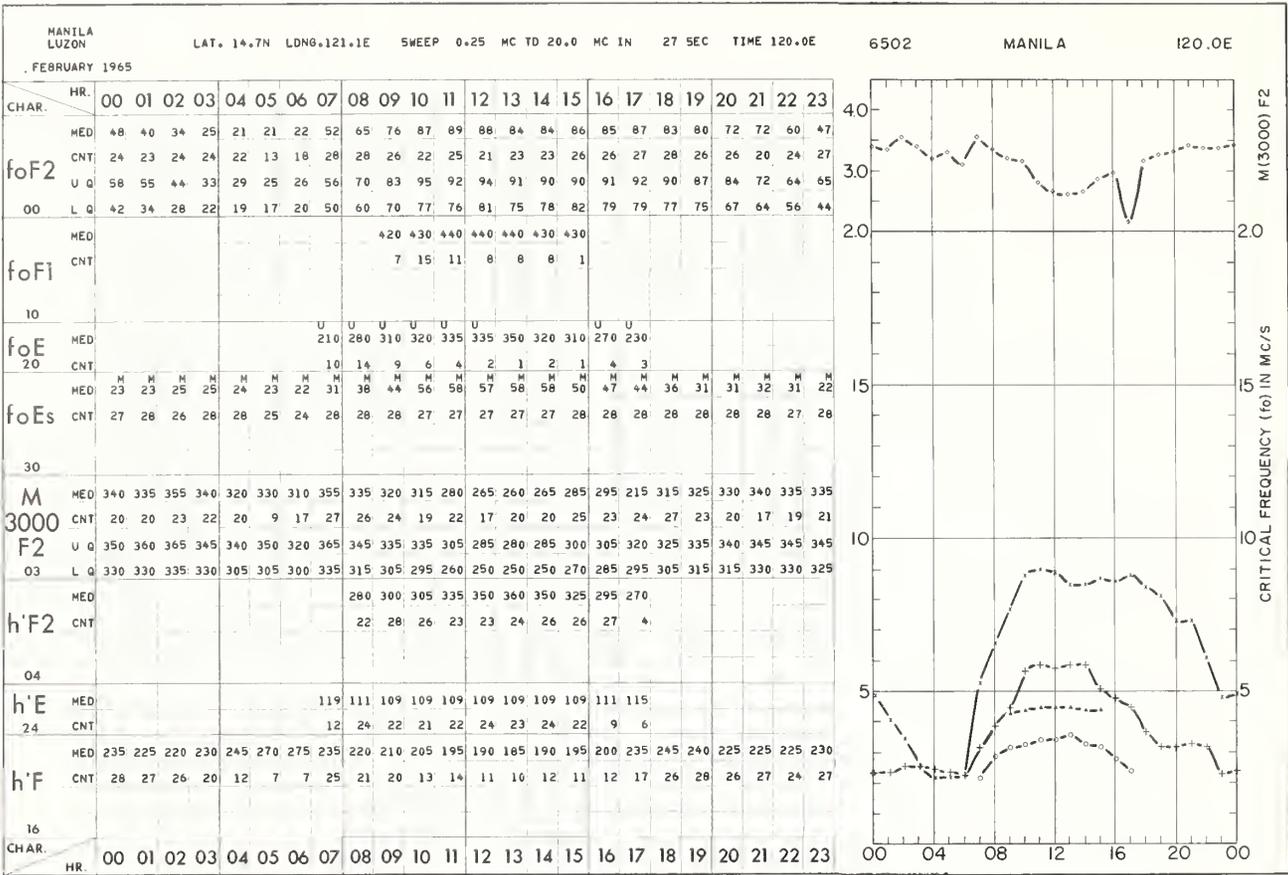
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	CNT	23	24	24	24	23	23	24	23	25	25	24	25	24	23	25	26	26	26	26	24	24	25	23	24	
	U Q	32	34	34	33	29	25	25	41	52	57	60	61	61	61	64	62	56	53	47	39	34	32	32	31	
	L Q	28	28	29	29	25	21	21	35	48	51	56	56	57	57	58	55	50	43	37	28	26	26	26	27	
foF1	MED								230	250	335	370	378	380	375	348										
	CNT								1	1	1	3	6	10	9	2										
	U Q												375	390	380	382										
	L Q												345	365	355	368										
foE	MED								E	110	180	225	250	260	265	260	248	228	180	130						
	CNT								21	21	22	23	24	25	24	24	22	17	13							
	U Q								E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
	L Q																									
foEs	MED	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
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	L Q									11	18	22	25	26	26	26	25	23	18	13						
M 3000 F2	MED	310	310	310	312	315	333	327	359	374	367	364	361	355	359	363	357	364	357	342	336	323	319	317	310	
	CNT	23	24	24	24	23	23	24	23	25	25	23	25	24	23	25	26	26	26	26	24	24	25	23	24	
	U D	319	318	314	317	333	337	336	369	381	376	375	368	365	367	367	365	372	362	349	341	332	332	323	320	
	L Q	303	304	304	306	308	321	318	351	364	356	353	346	339	345	351	354	359	349	328	327	317	314	309	305	
h'F2	MED								258	240	240	250	258	260	255	255	245	235								
	CNT								2	3	9	16	24	22	21	24	20	3								
	U Q													250	262	270	262	270	270	262	250	242				
	L Q													238	232	242	250	250	248	250	240	235				
h'E	MED								E	122	121	121	120	121	121	121	122	124								
	CNT								14	25	25	23	25	25	25	25	26	21	11							
	U Q																									
	L Q																									
h'F	MED	272	270	270	268	260	245	246	235	230	230	230	218	218	220	230	230	230	225	230	240	250	250	270	271	
	CNT	24	24	24	24	23	23	24	23	25	25	24	25	25	25	25	26	26	26	26	25	24	25	23	24	
	U D	285	285	278	272	270	250	260	240	230	232	235	232	228	233	238	235	235	230	240	246	262	272	278	285	
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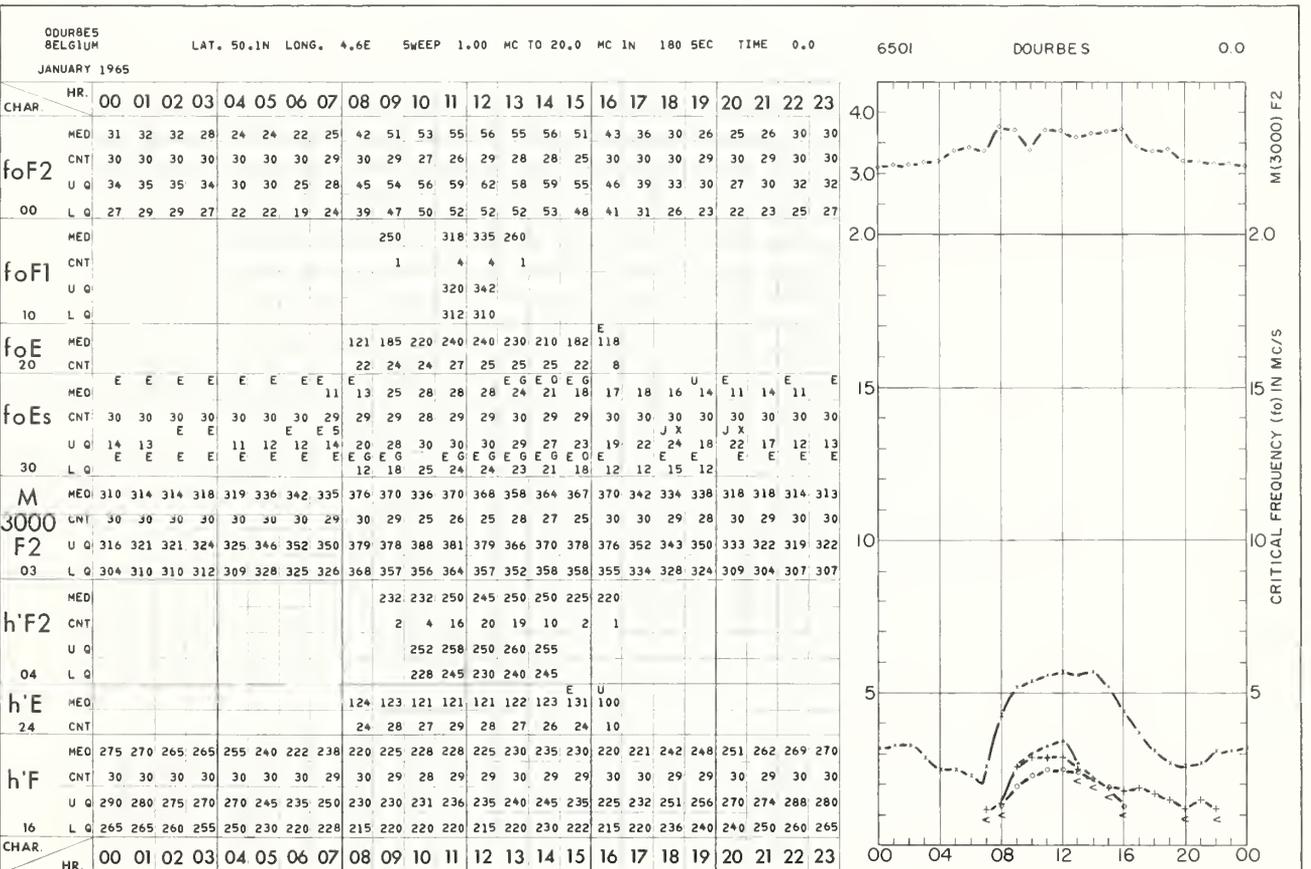
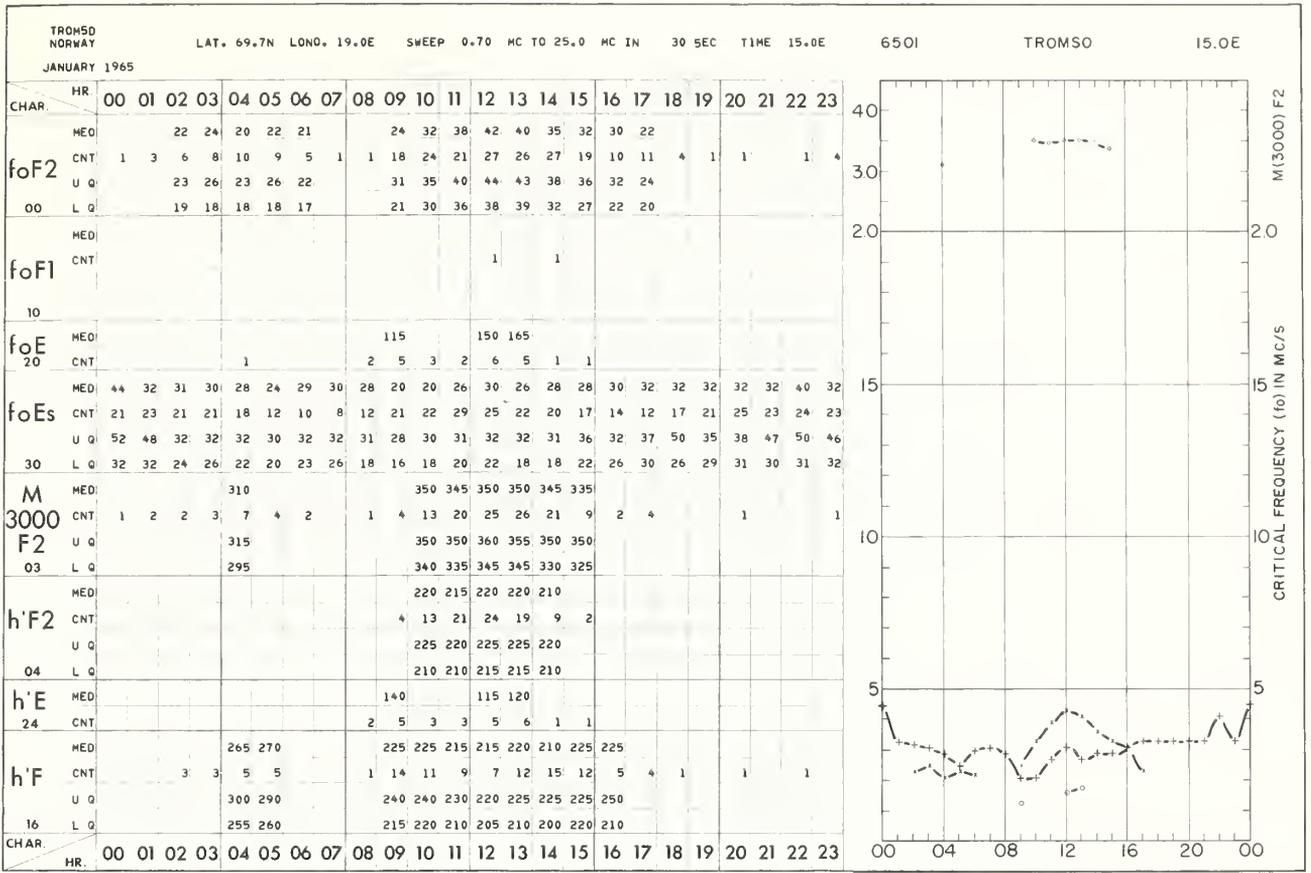


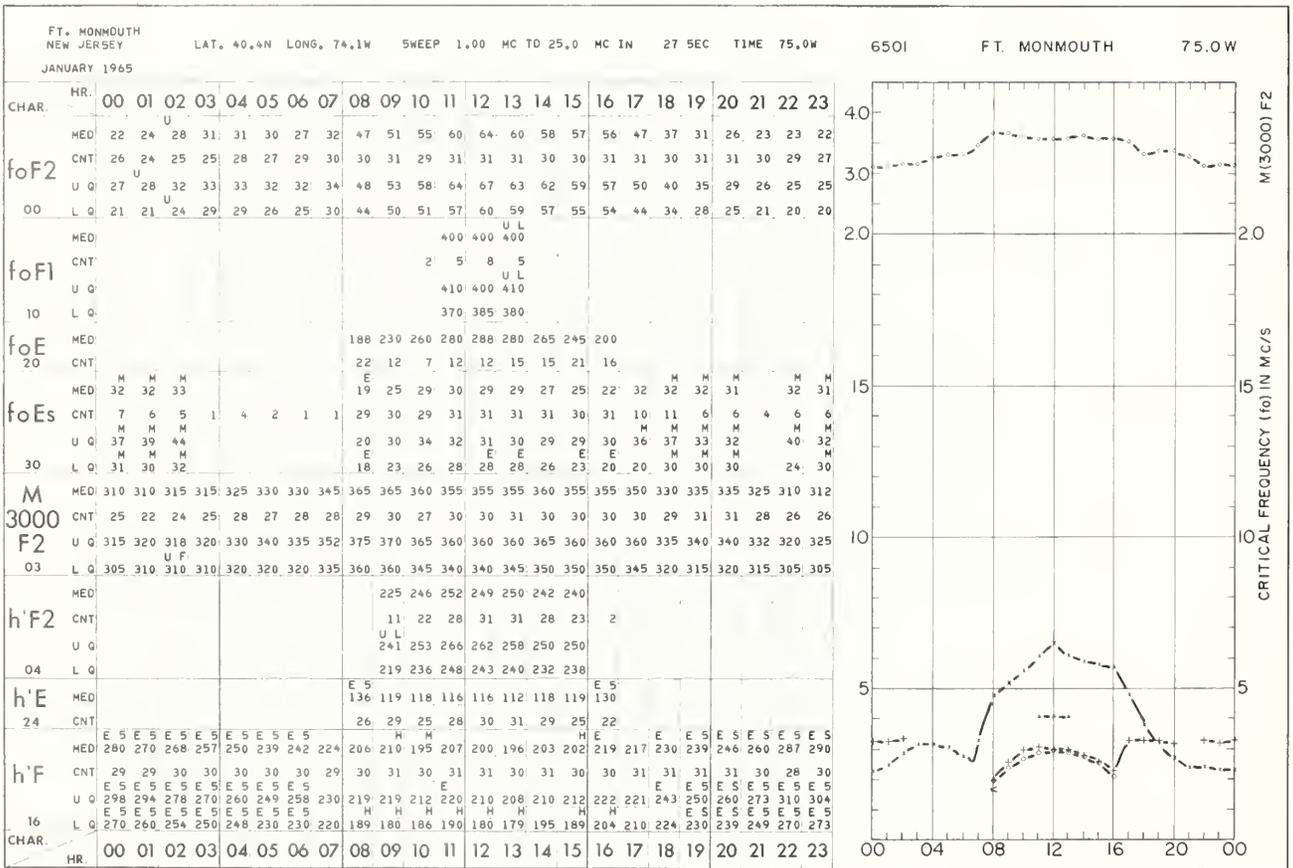
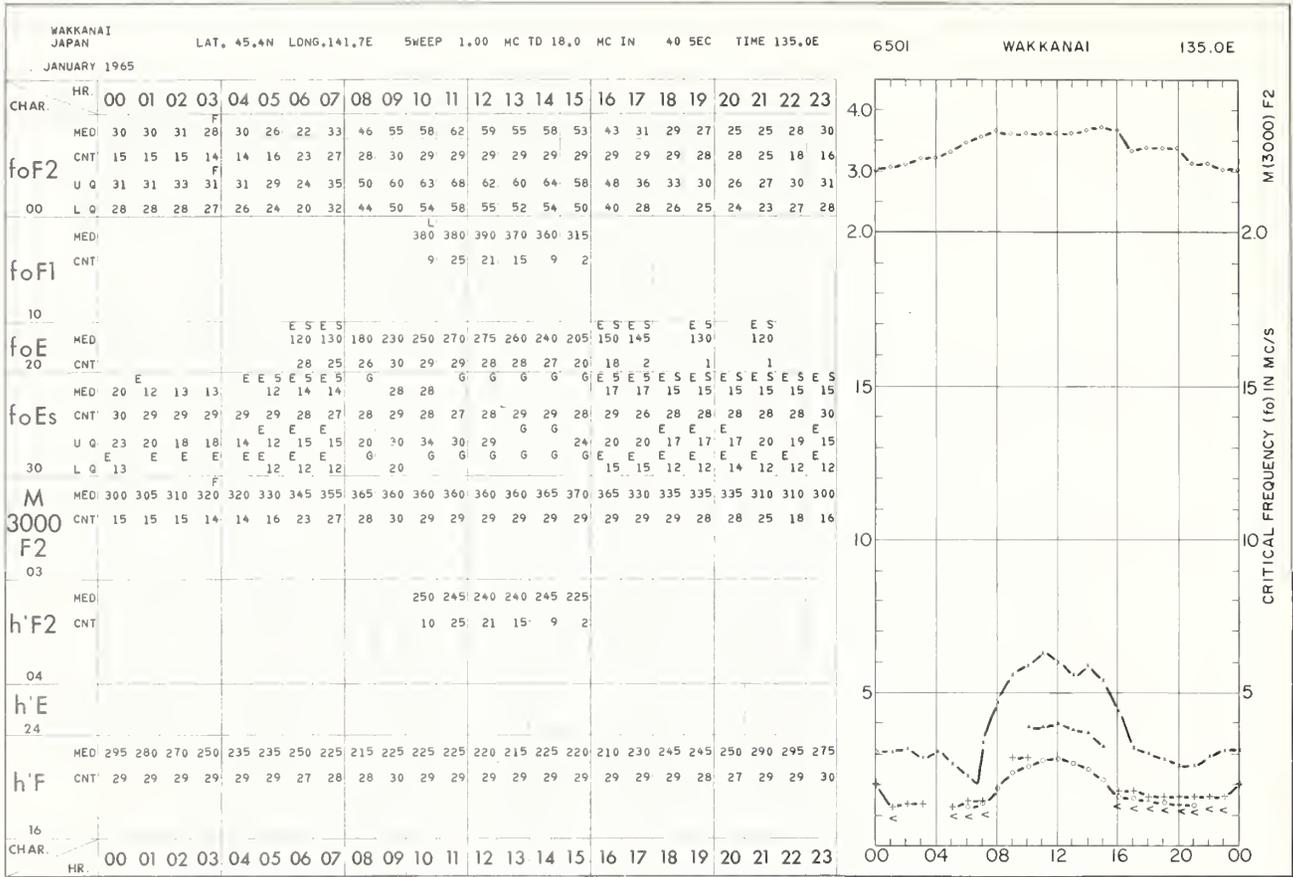


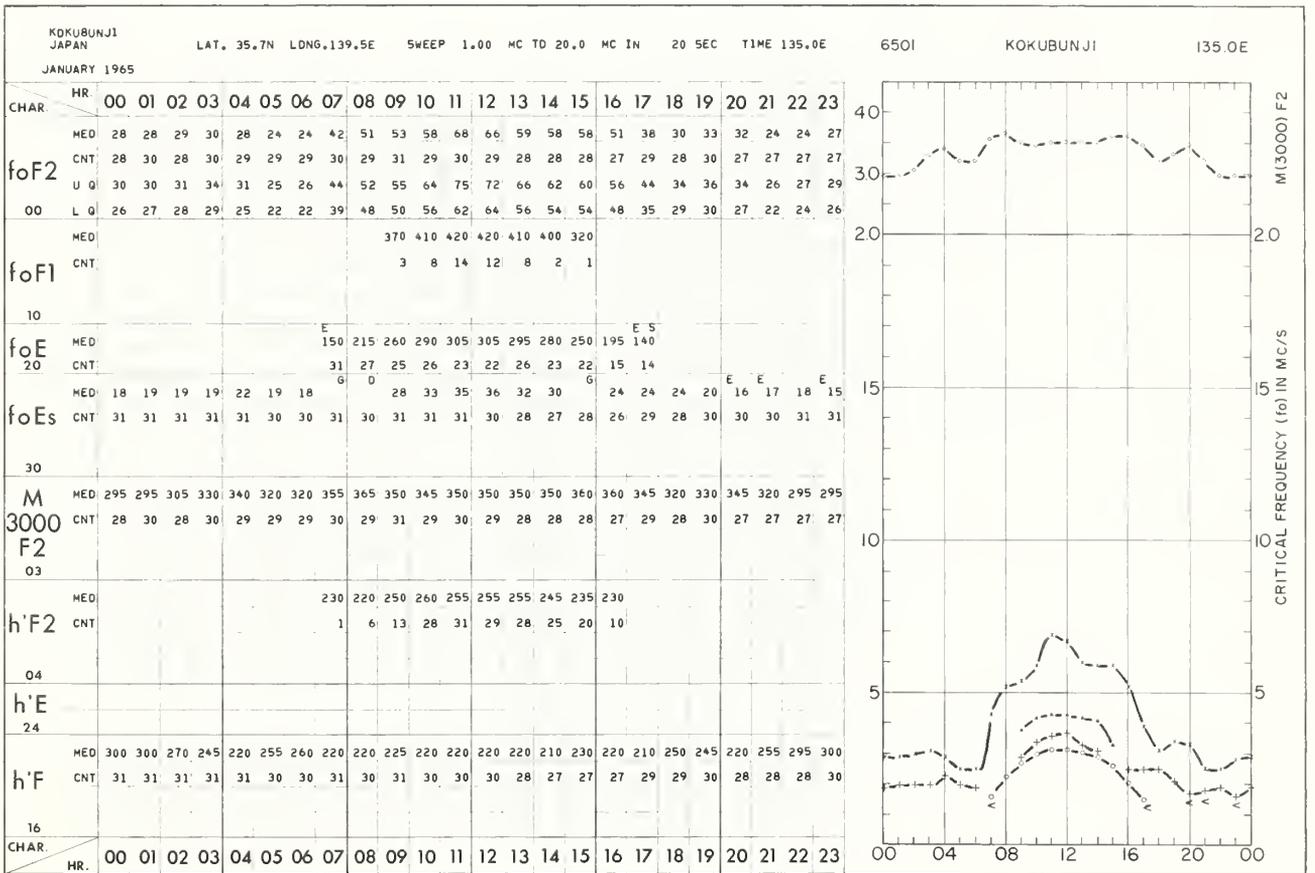
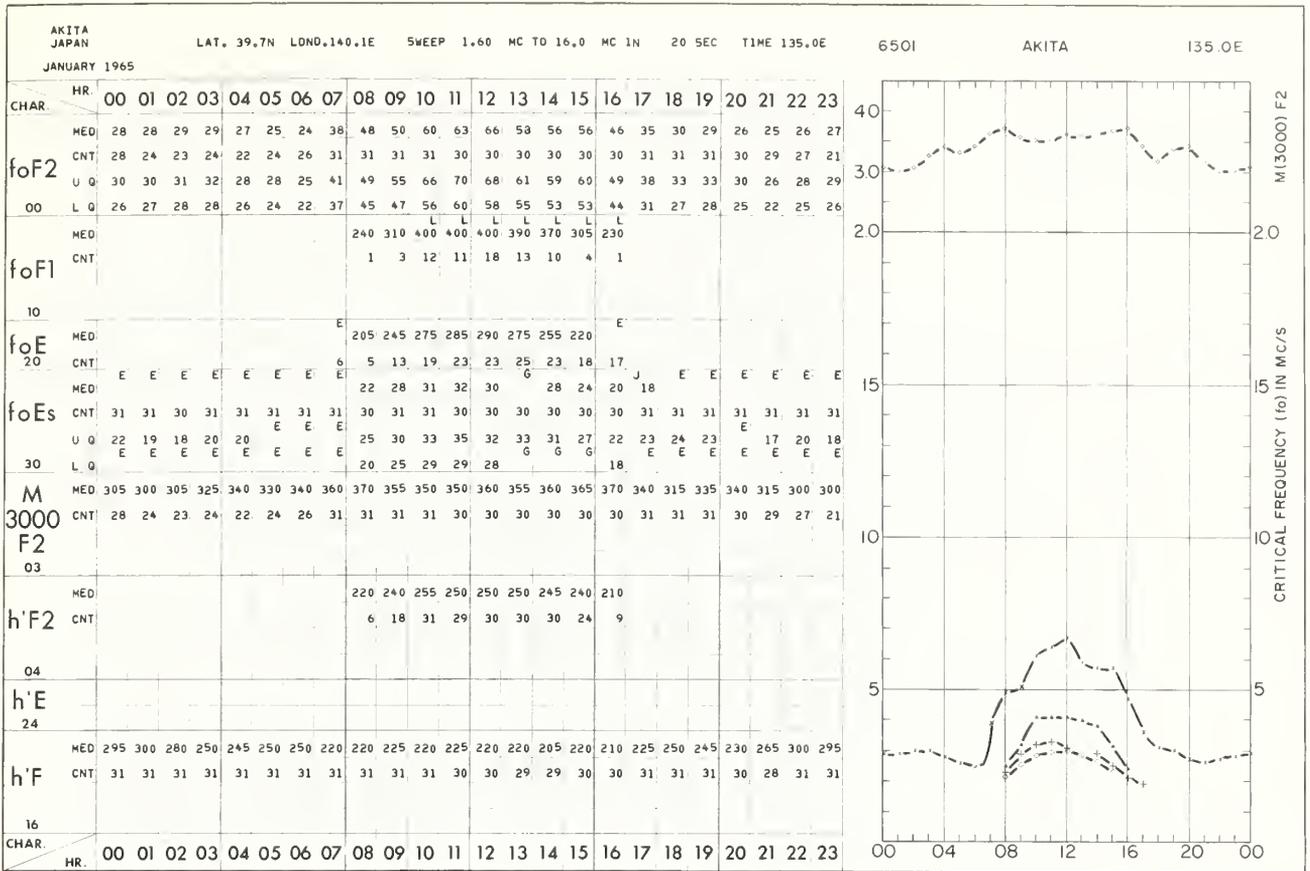


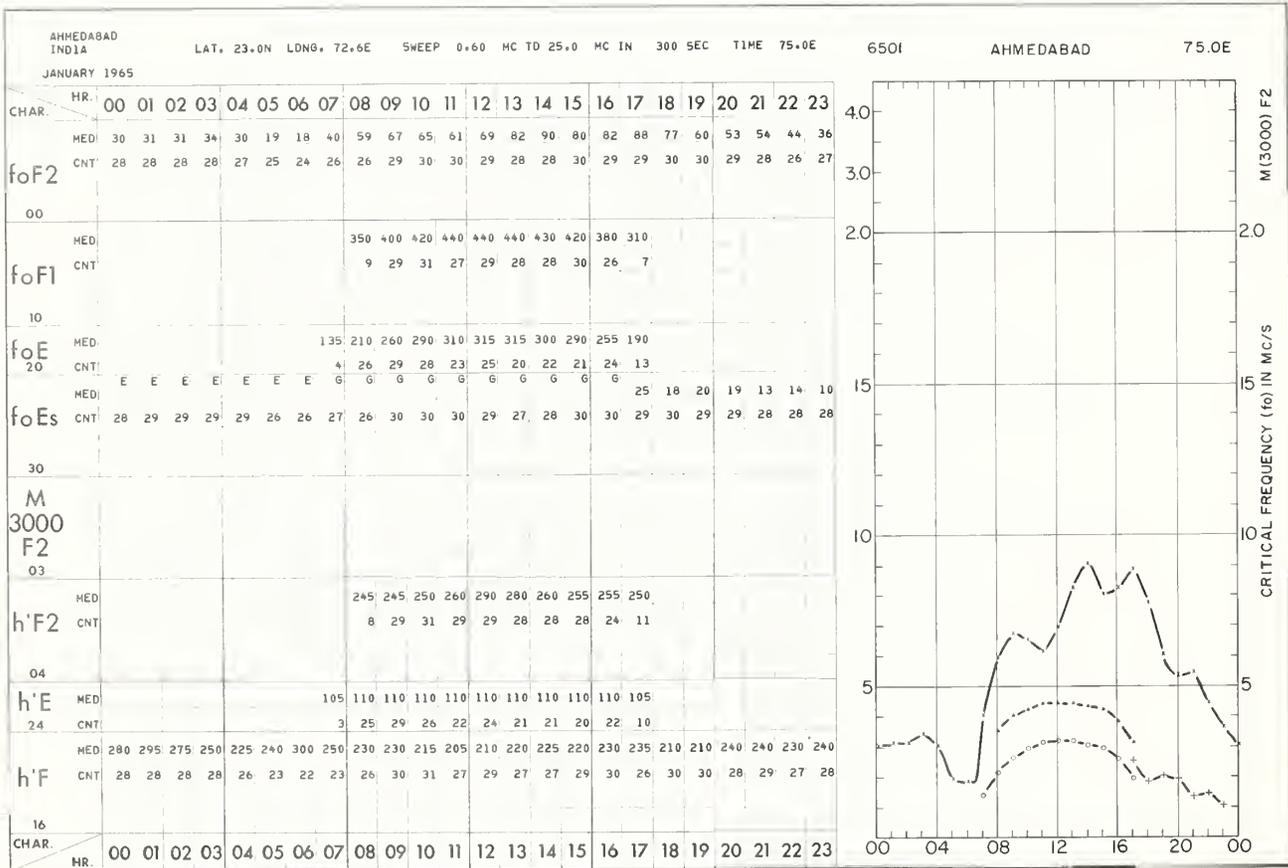
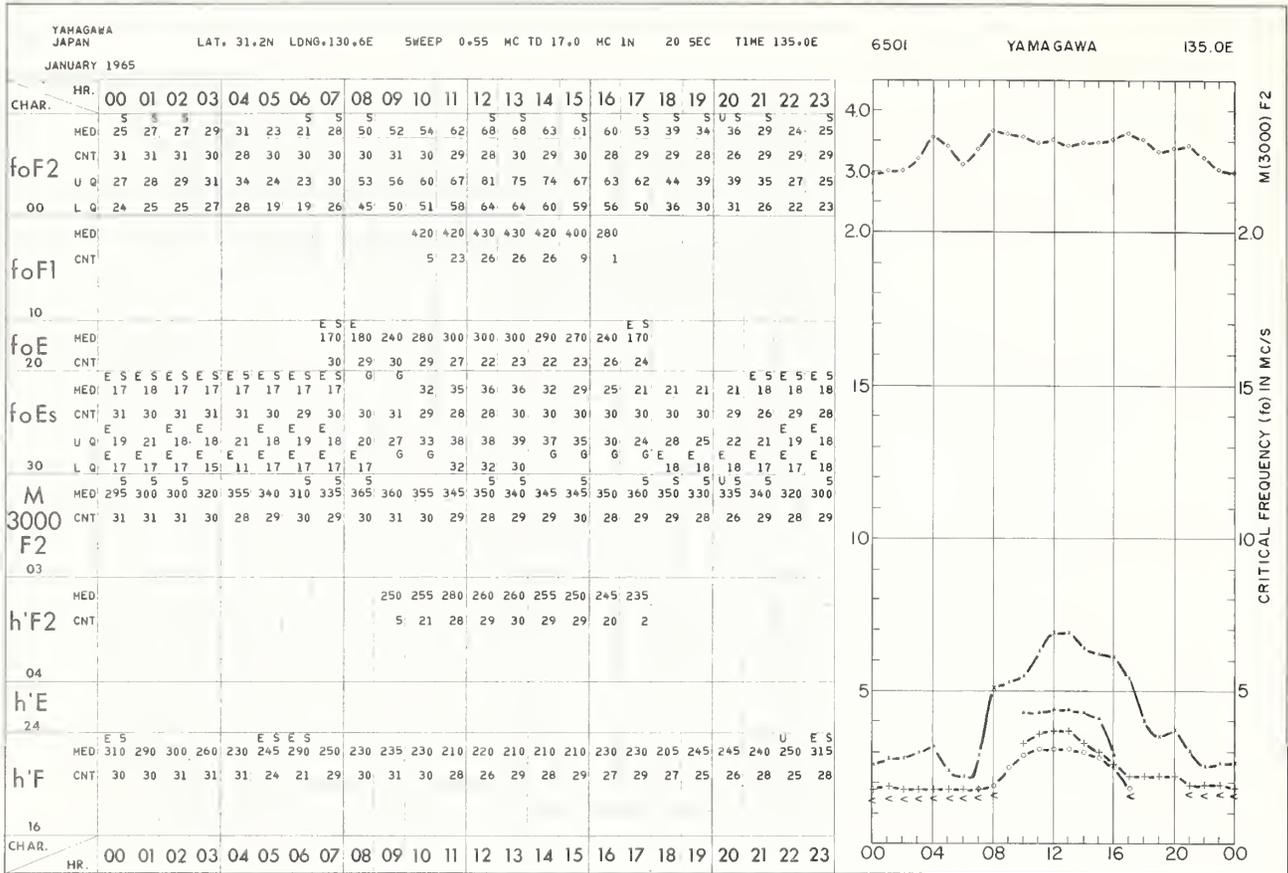


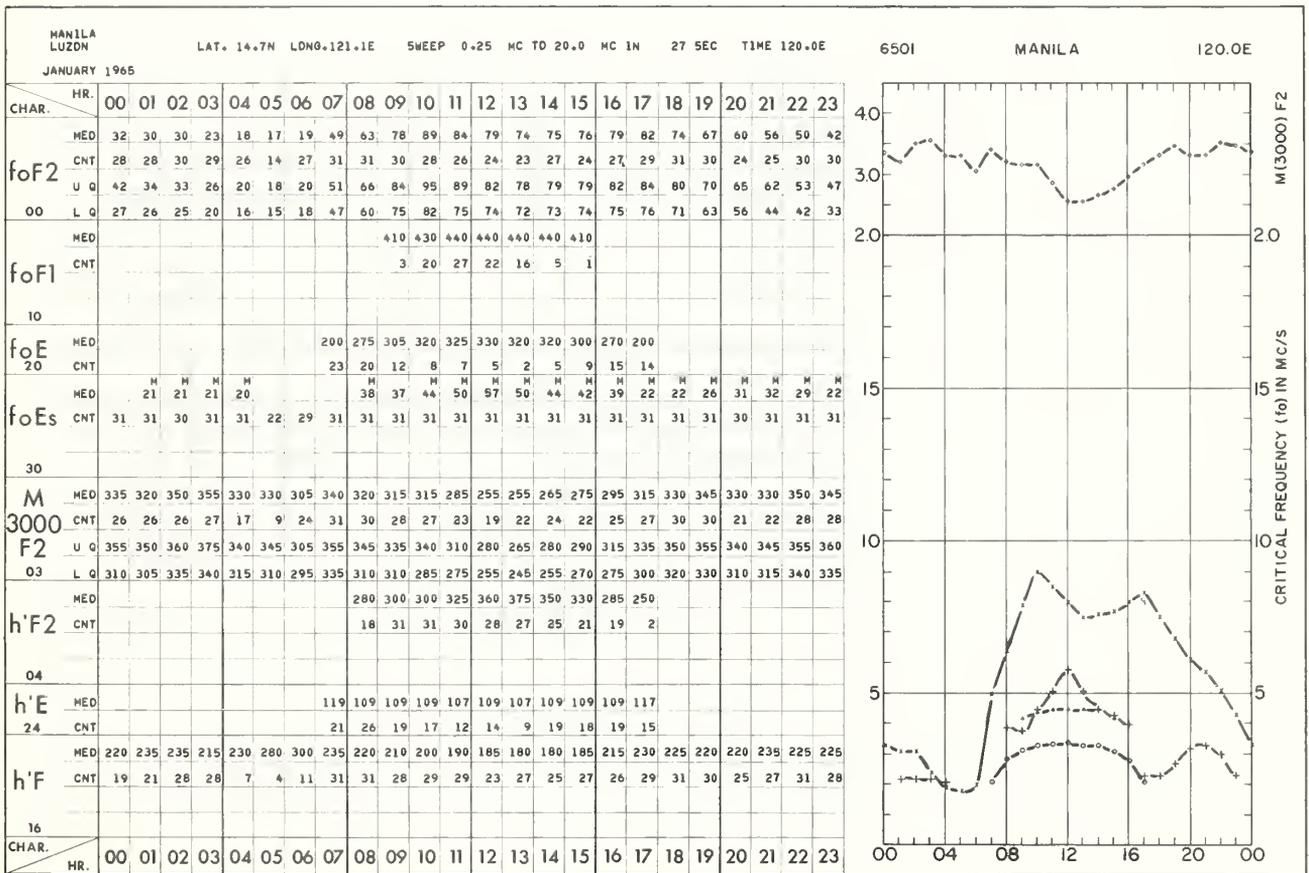
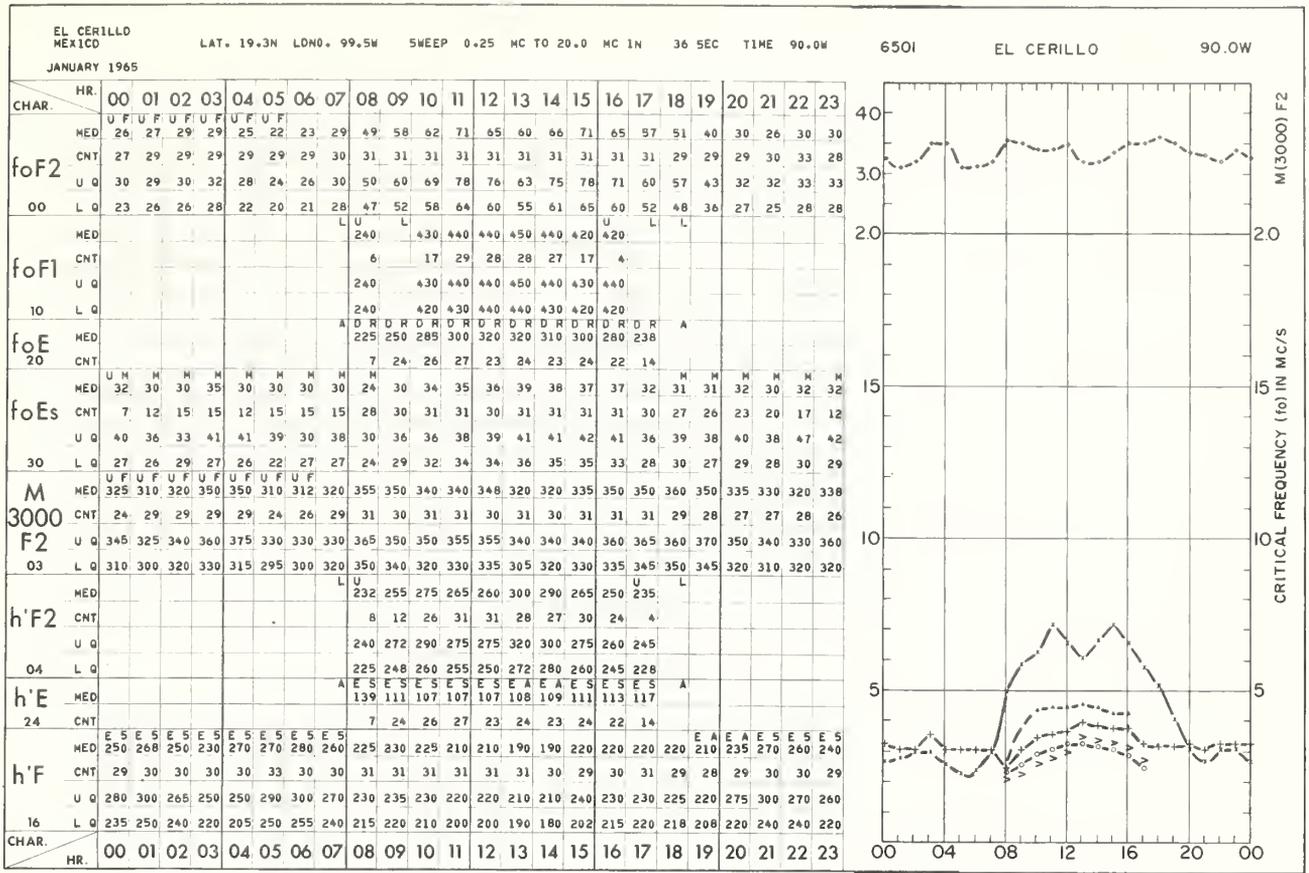


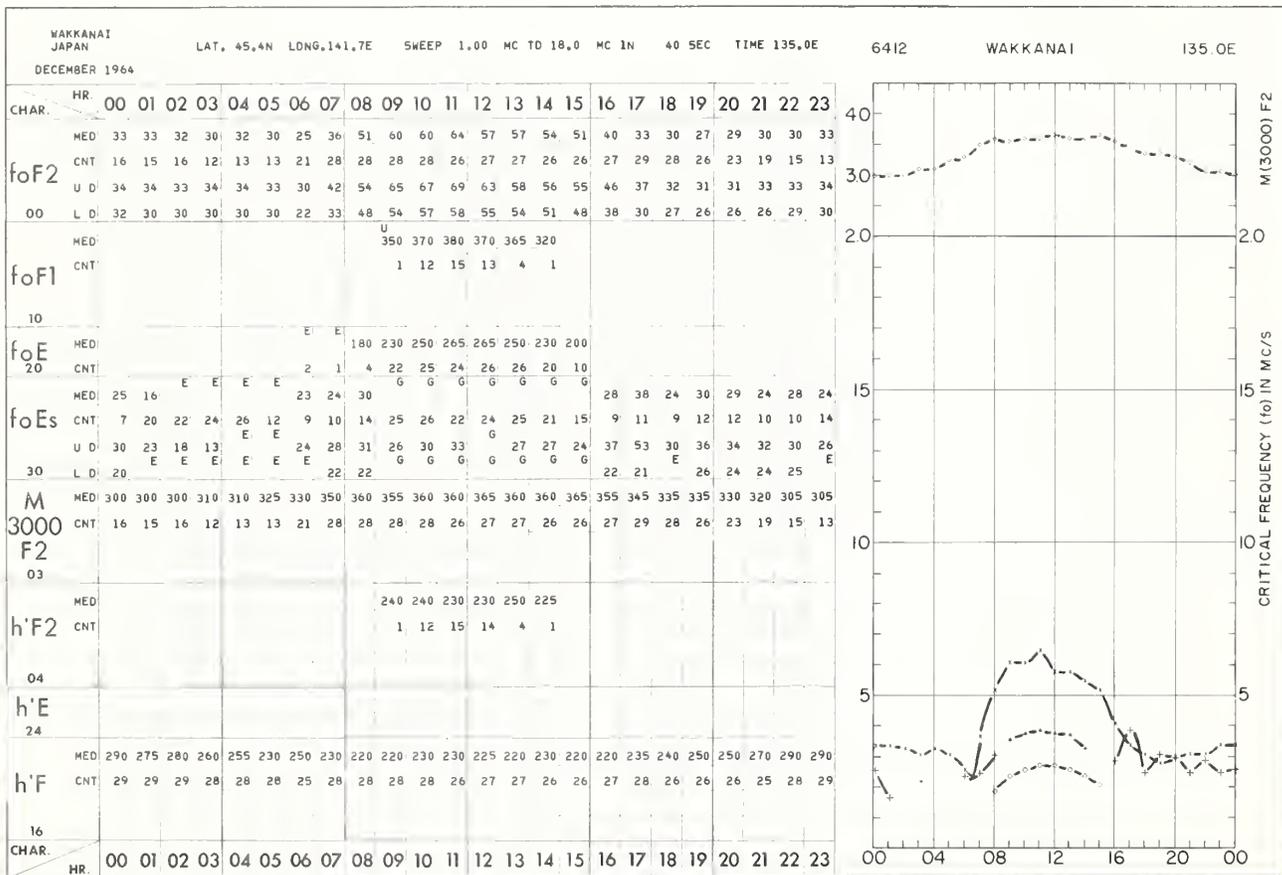
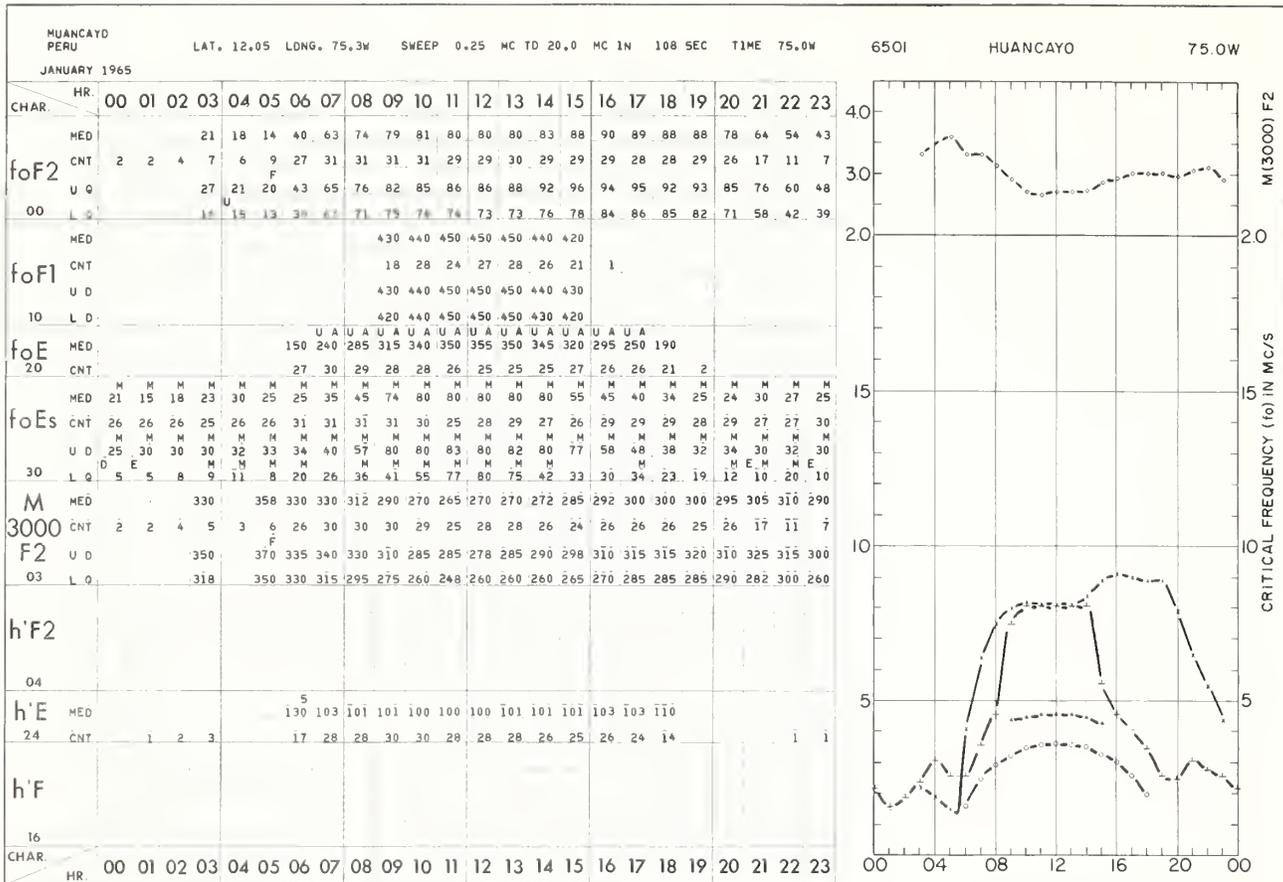


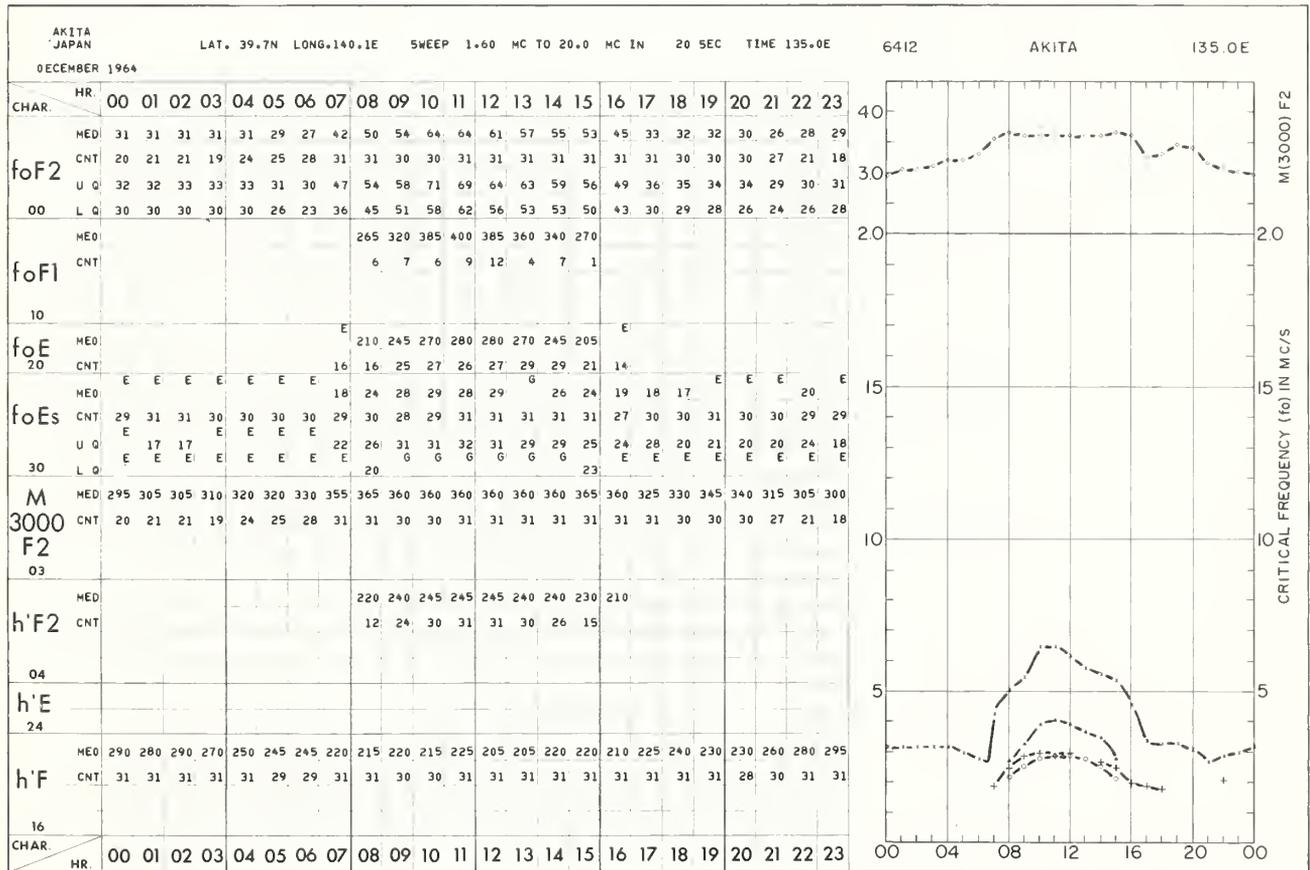
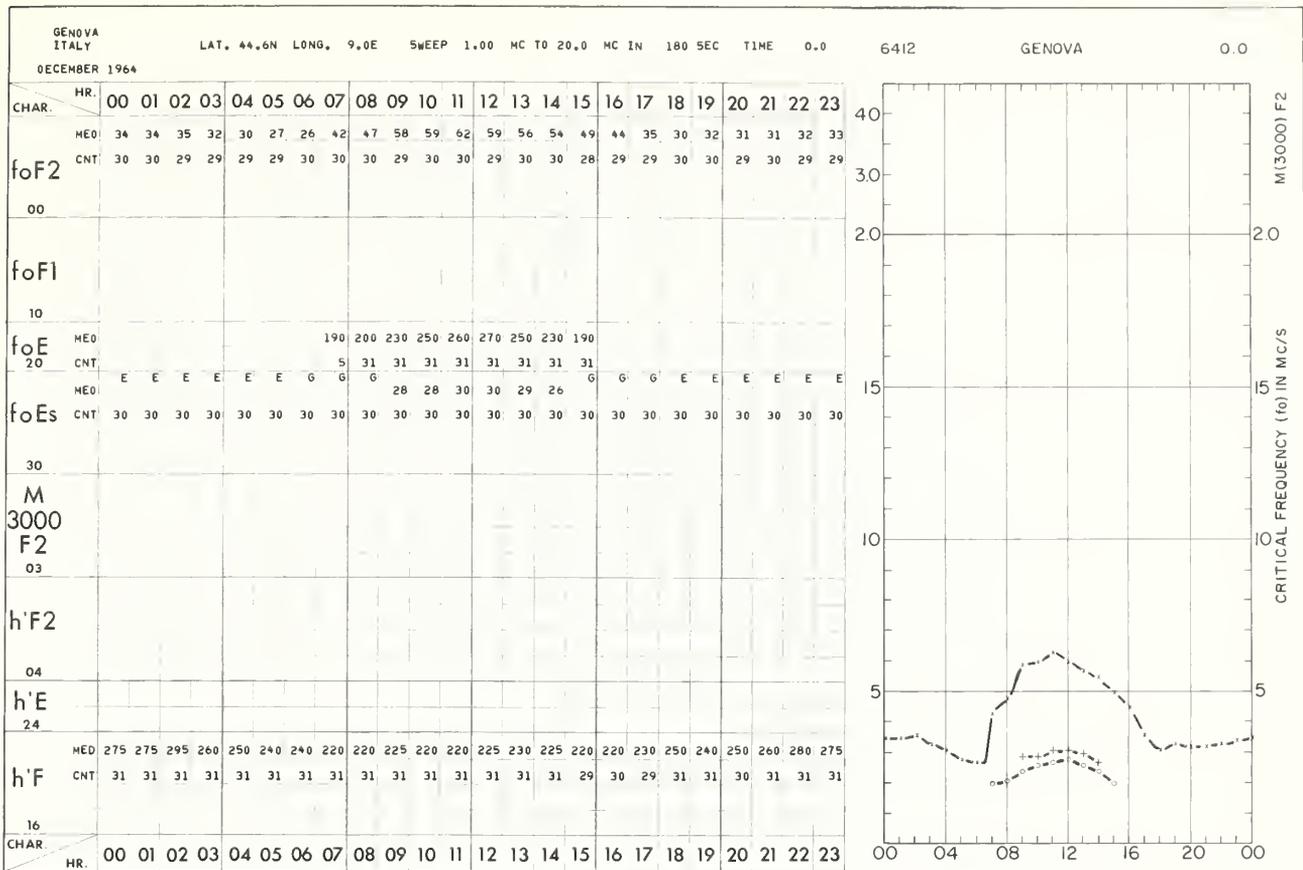


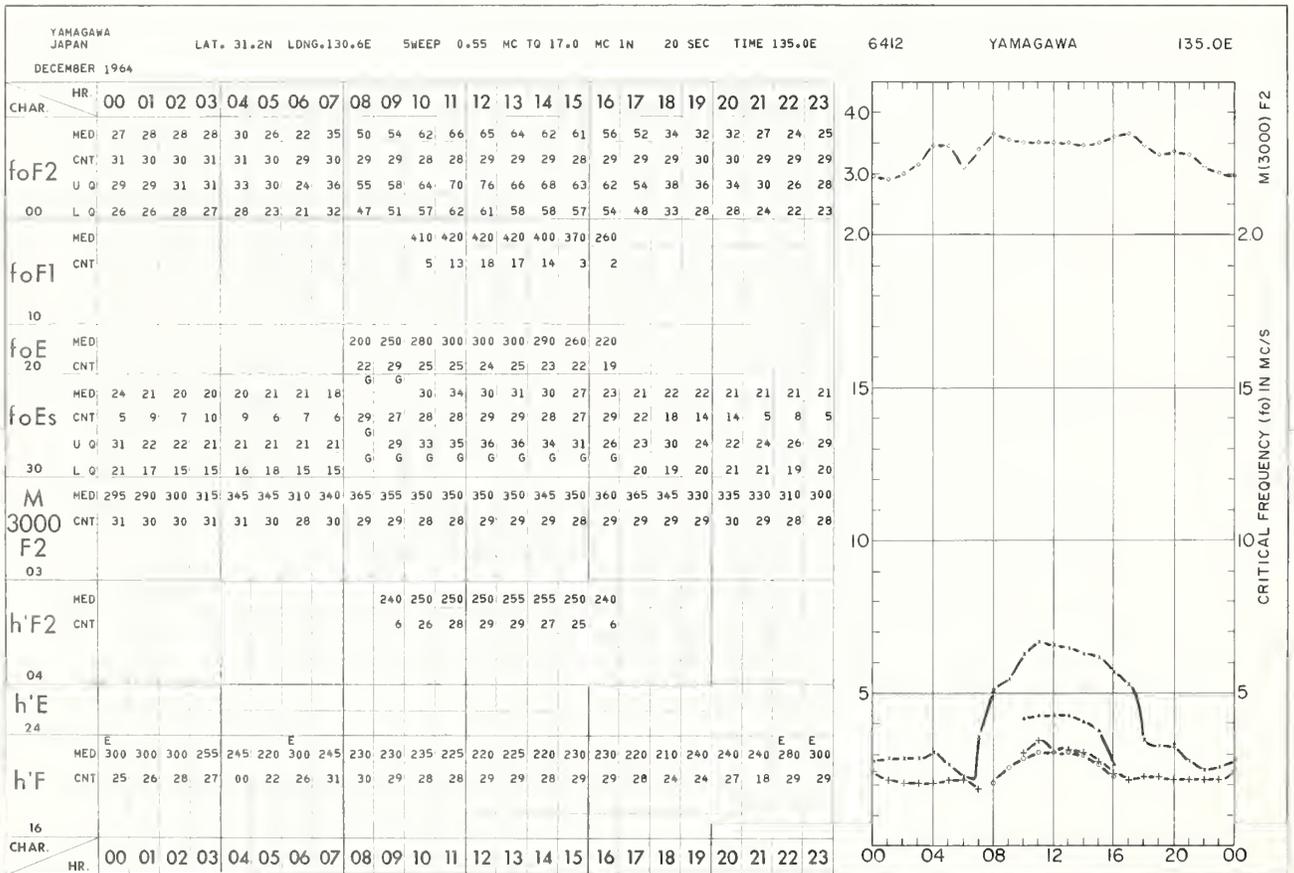
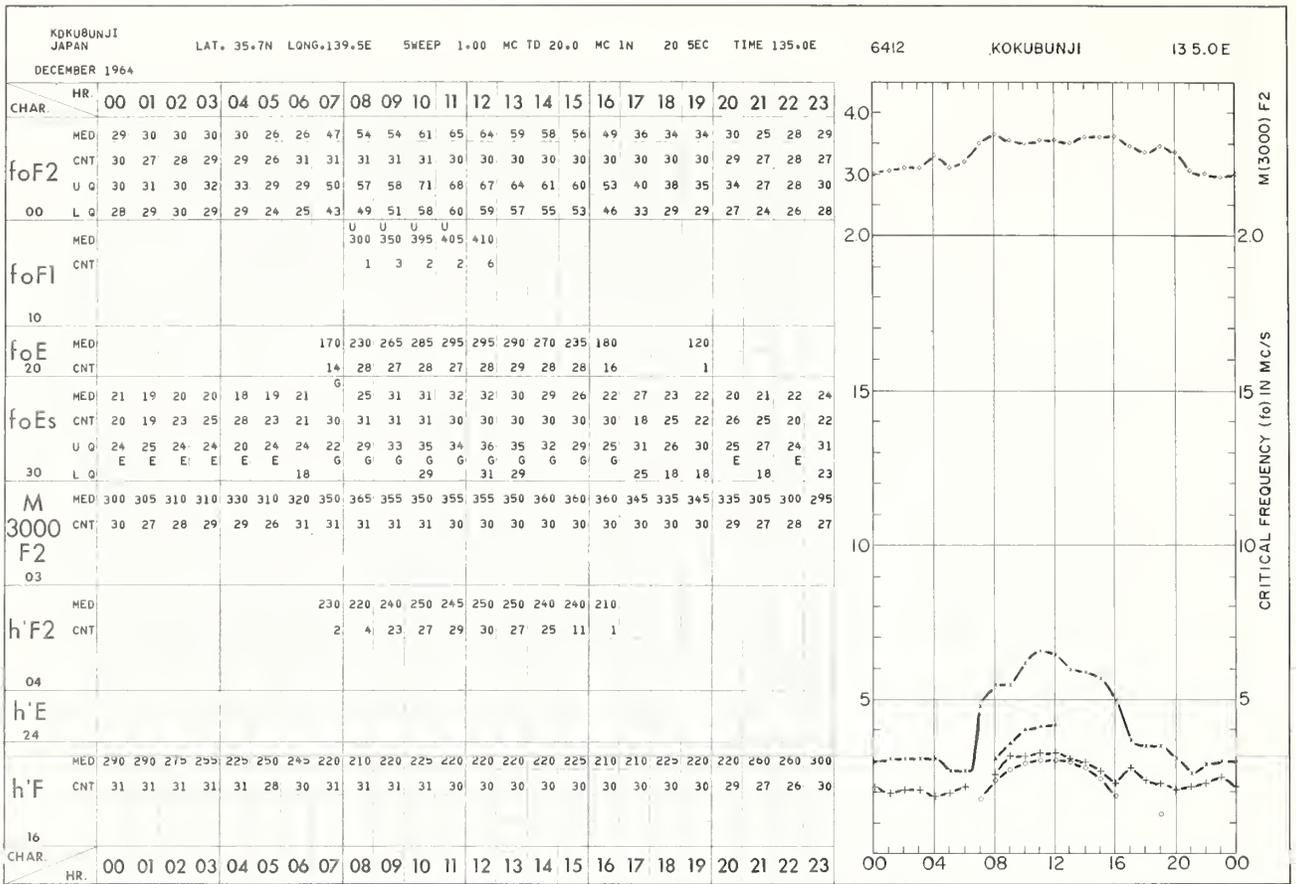






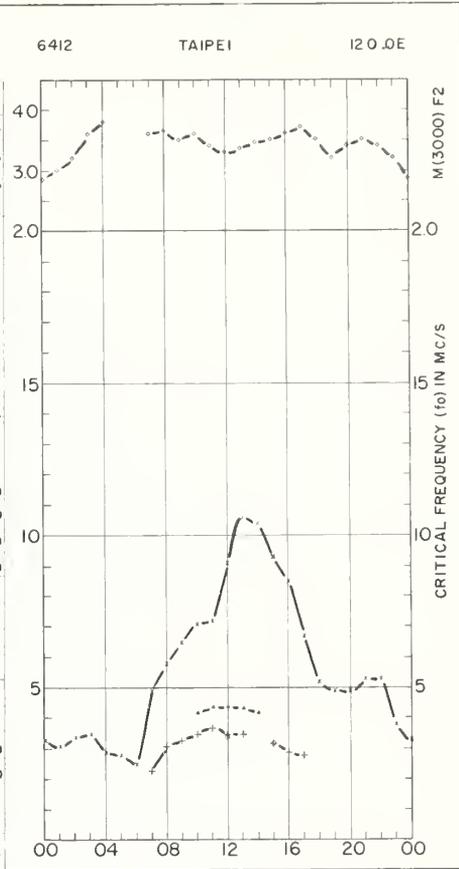






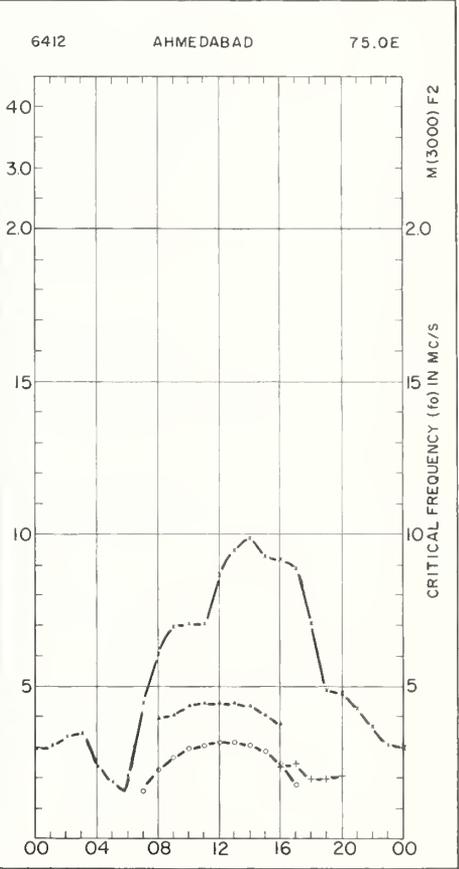
TAIPEI CHINA
DECEMBER 1964
LAT. 25.0N LONG.121.5E SWEEP 1.00 MC TD 25.0 MC IN 27 SEC TIME 120.0E

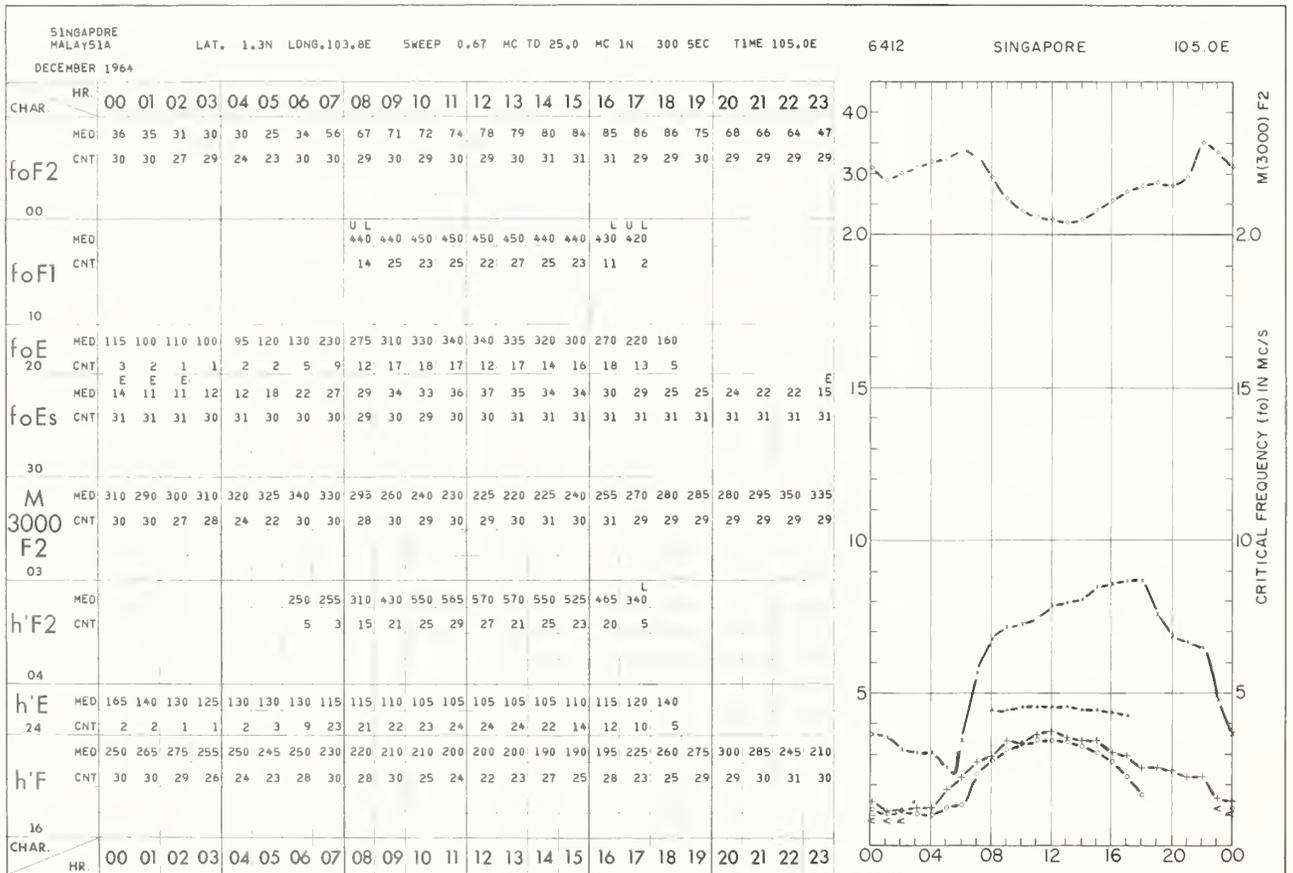
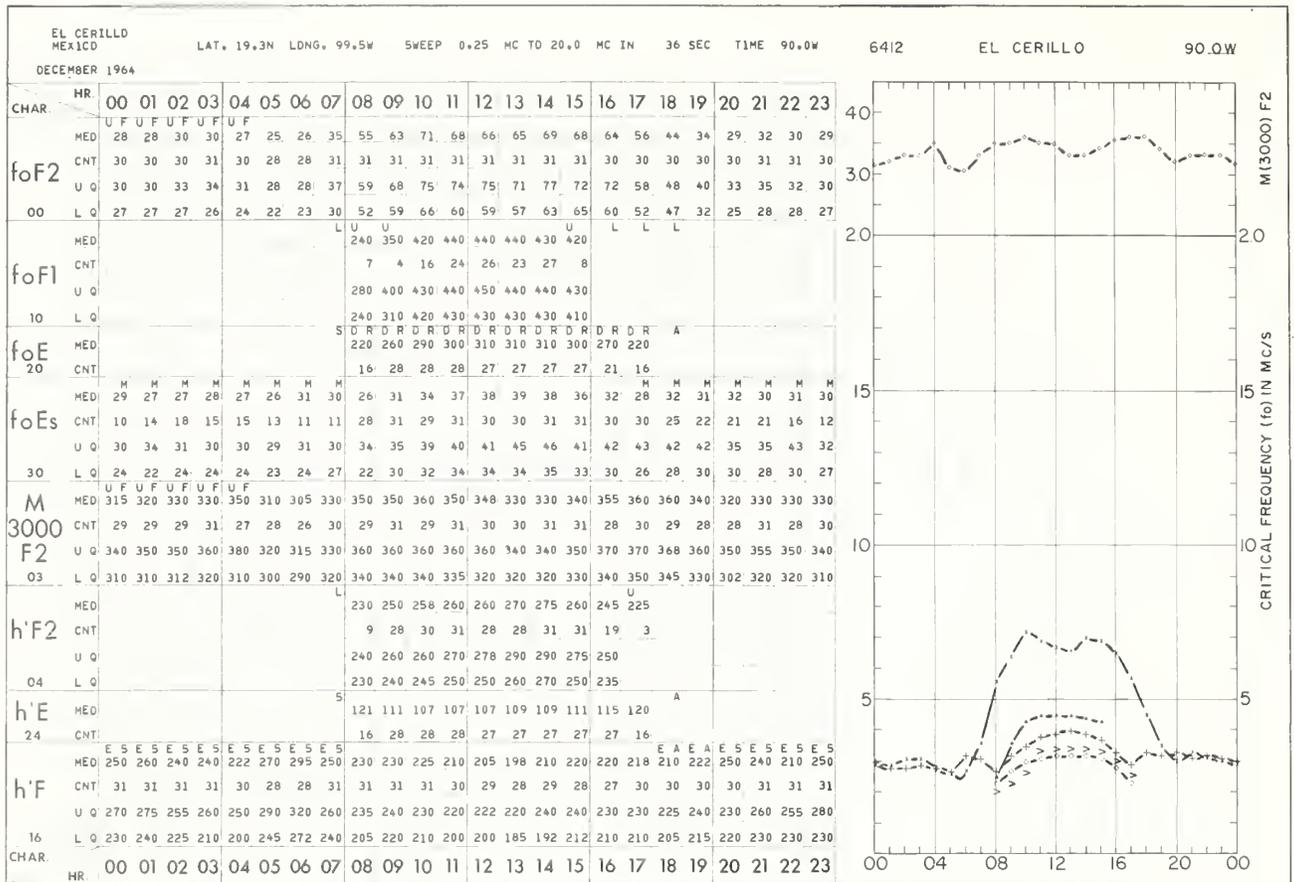
CHAR.	HR.	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	32	30	33	34	28	27	24	48	57	64	70	71	90	105	103	92	84	66	51	48	48	52	52	37
	CNT	16	26	27	28	25	1	1	30	30	28	28	29	27	21	22	24	27	28	29	17	18	8	2	15
	U Q	38	35	40	41	33			51	63	70	79	88	106	124	131	107	98	88	60	53	57	54		44
foF1	OD	L	Q	28	27	28	28	24		45	55	58	64	63	76	88	87	80	71	60	44	44	45	36	31
	MED													410	430	430	425	410							
	CNT													9	12	16	12	2							
foE	10																	330							
	MED																								
	CNT																								
foEs	20																								
	MED																								
	CNT																								
M 3000 F2	30																								
	MED	285	300	320	360	380			360	365	350	360	340	330	335	345	350	360	370	350	320	340	350	340	320
	CNT	6	15	17	22	16			30	30	28	26	27	26	19	14	22	22	26	26	10	12	5	1	9
h'F2	03																								
	MED	290	330	330	380	390			370	375	370	365	365	345	345	350	360	365	380	370	335	360	350		340
	CNT	7	18	28	31	22	1	30	27	28	28	27	28	23	23	24	25	30	29	15	18	9	6	10	
h'E	16																								
	MED	310	285	270	250	205	260	225	230	220	215	205	200	195	210	215		220	200	200	245	230	230	245	250
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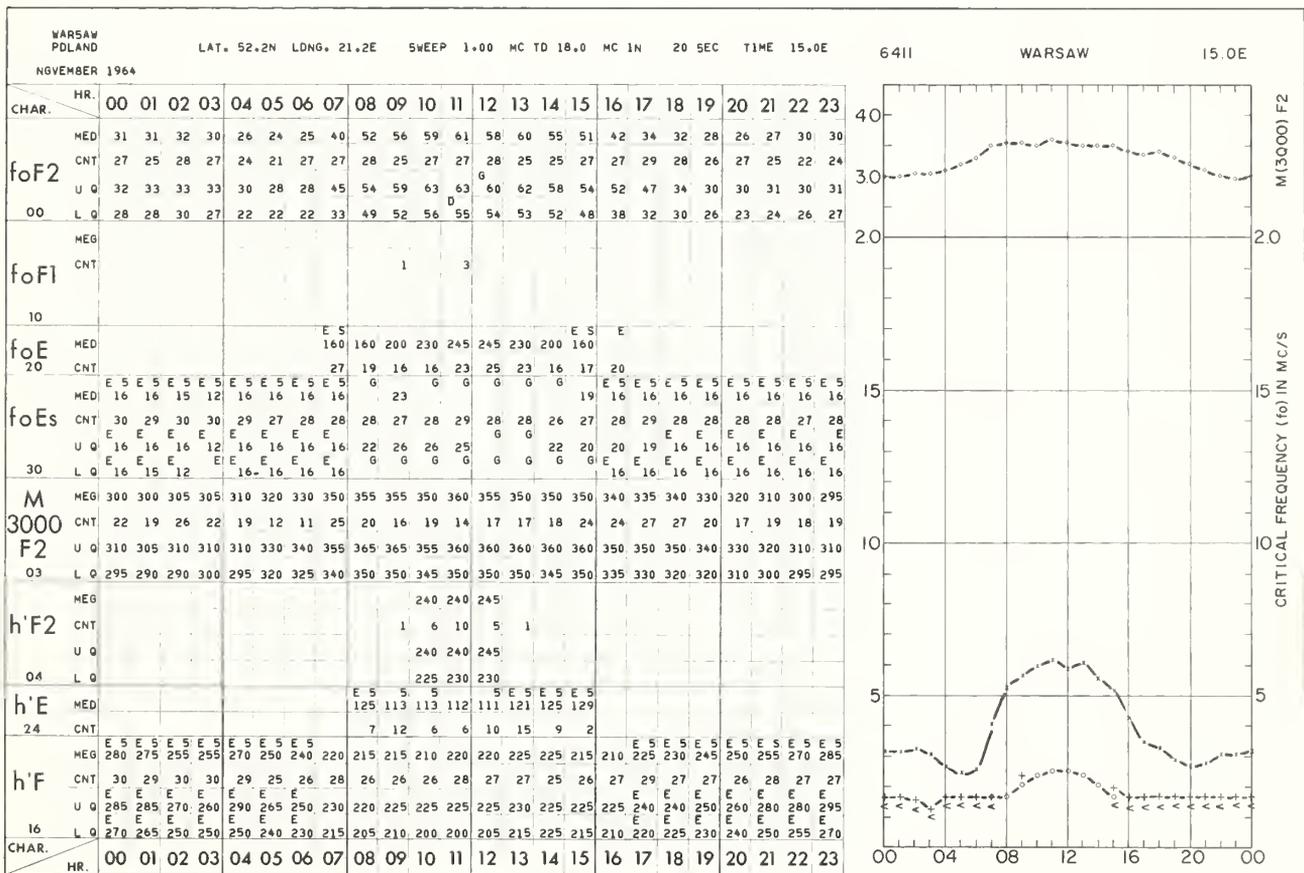
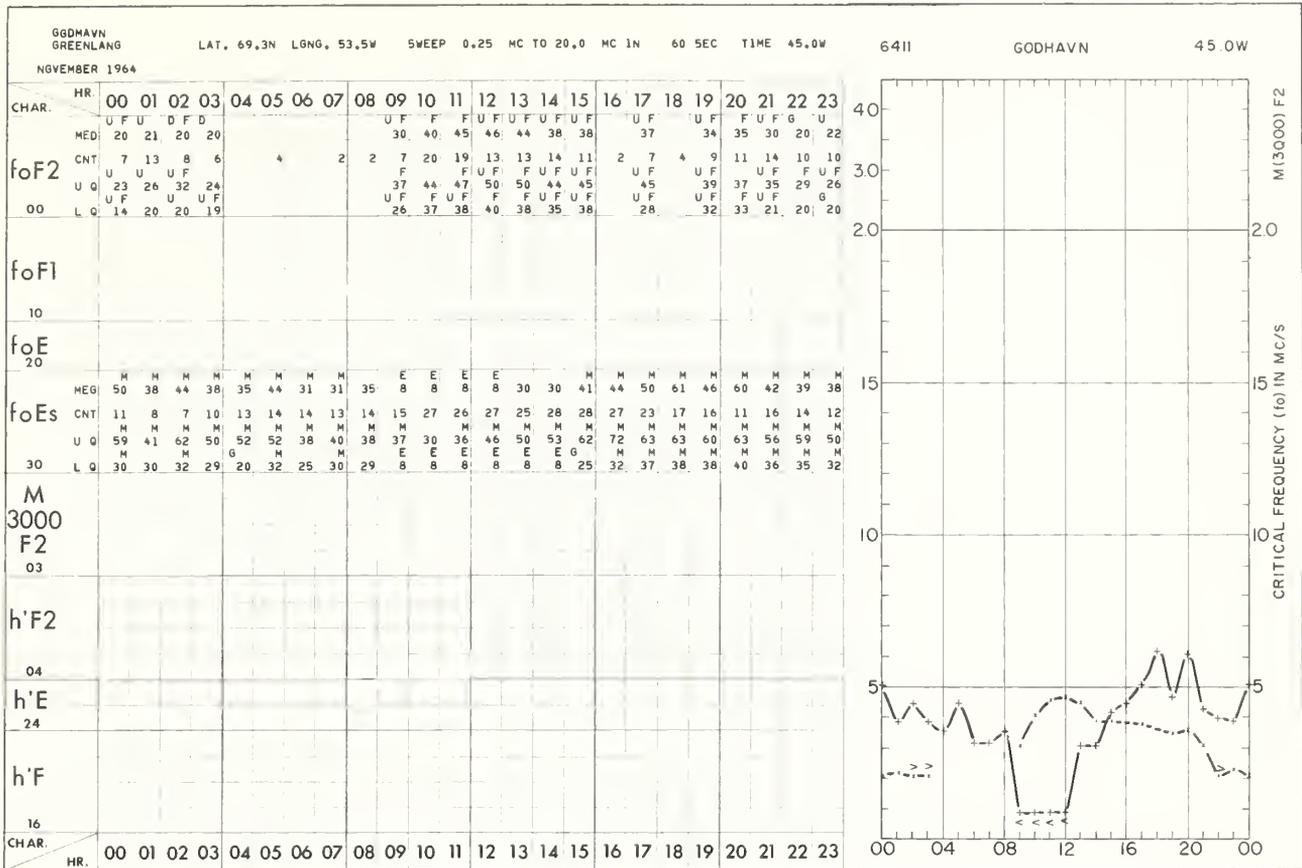


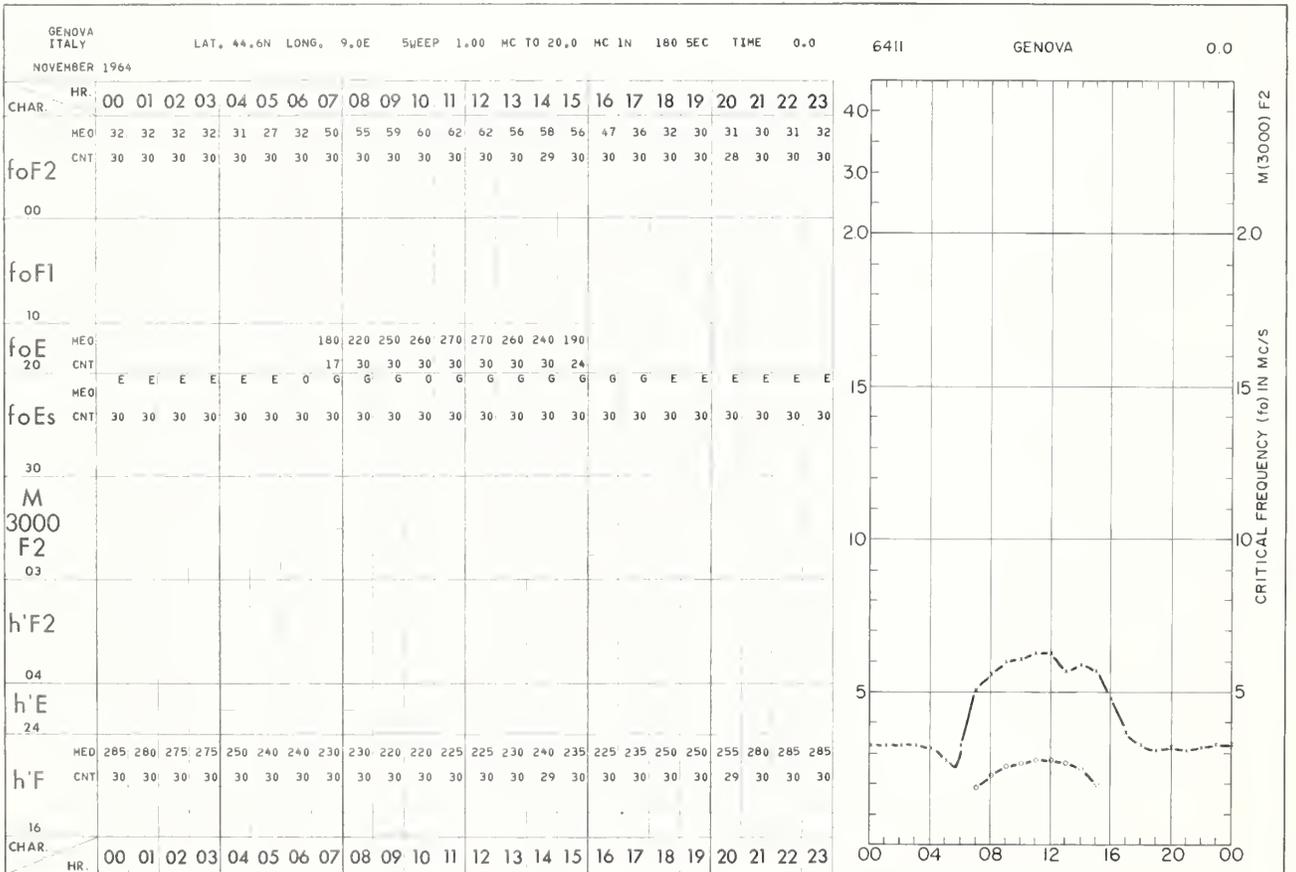
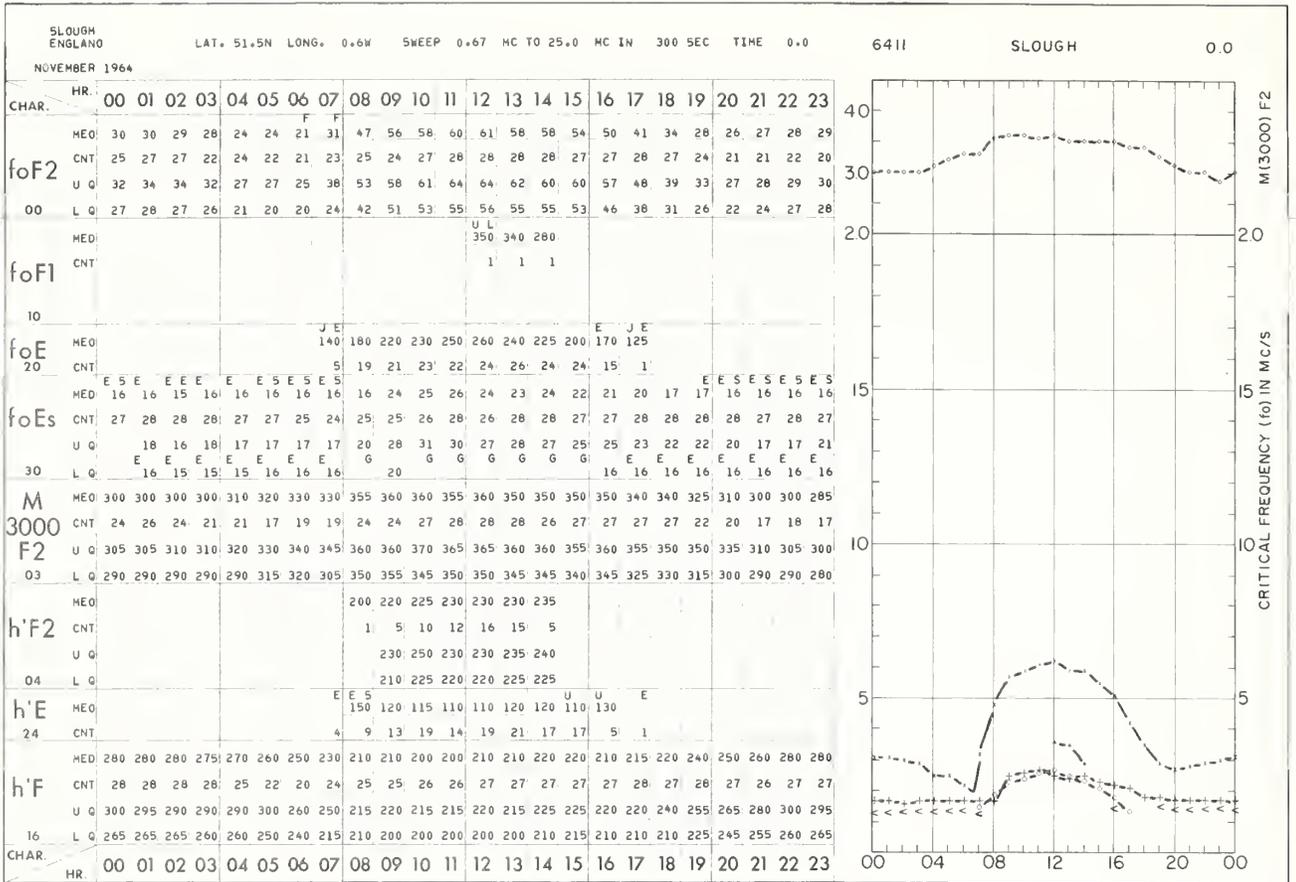
AHMEDABAD INDIA
DECEMBER 1964
LAT. 23.0N LDNG. 72.6E SWEEP 0.60 MC TD 25.0 MC IN 300 SEC TIME 75.0E

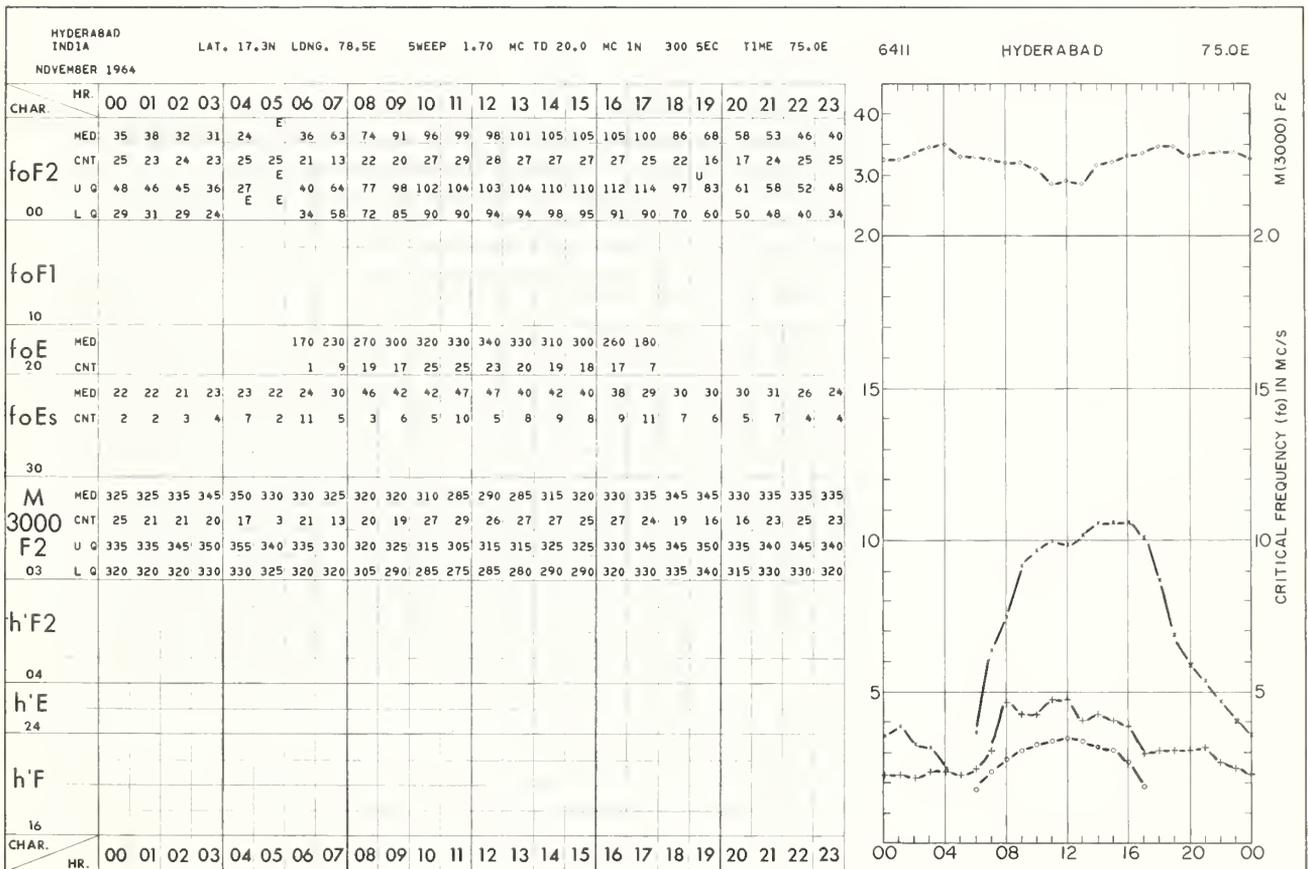
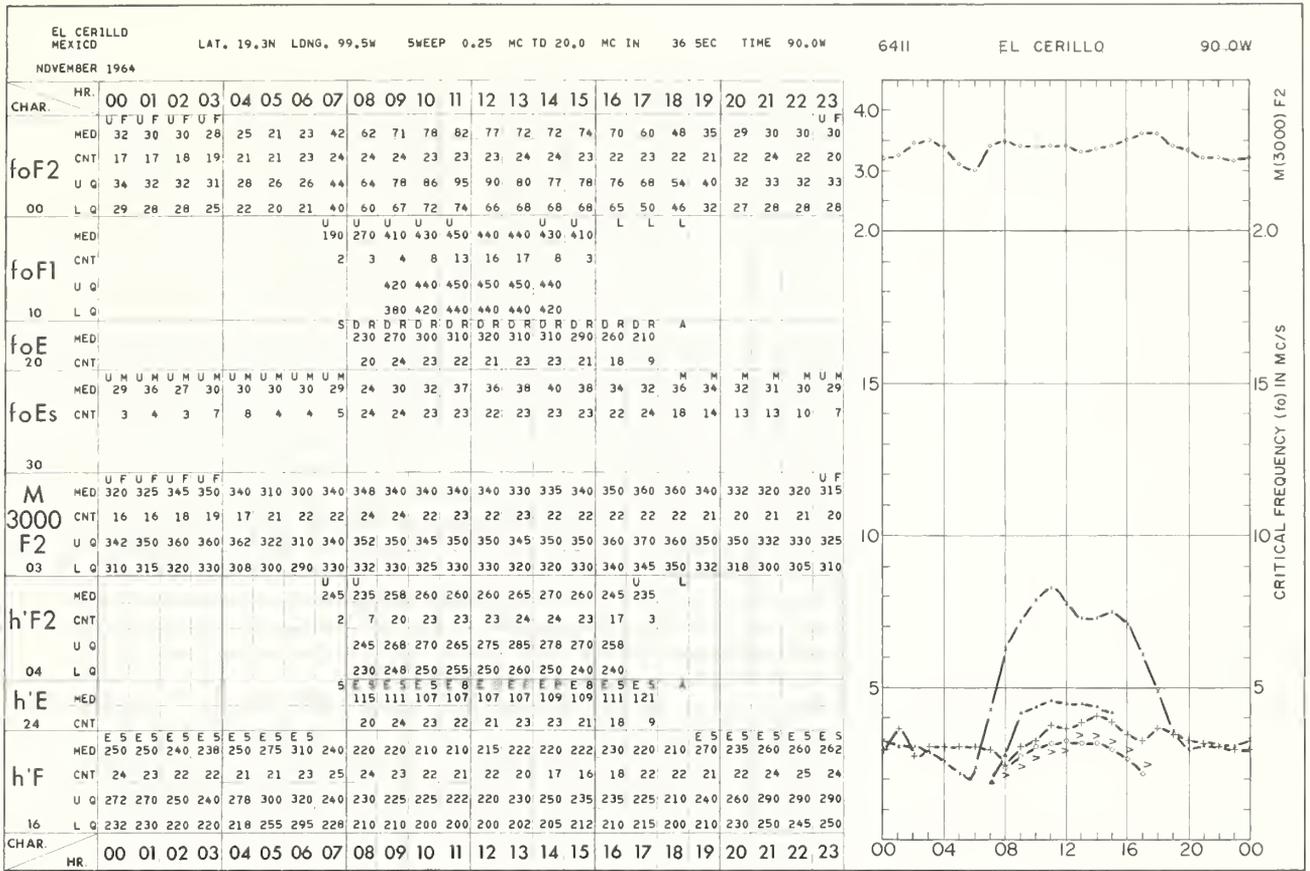
CHAR.	HR.	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	29	30	33	34	23	18	20	44	60	69	70	70	86	94	98	92	91	88	70	48	47	42	36	30
	CNT	27	27	26	25	28	24	25	25	26	30	28	28	28	27	30	30	29	27	27	27	29	27	27	26
	00																								
foF1	MED																								
	CNT																								
	10																								
foE	20																								
	MED																								
	CNT																								
foEs	30																								
	MED																								
	CNT																								
M 3000 F2	03																								
	MED																								
	CNT																								
h'F2	04																								
	MED																								
	CNT																								
h'E	24																								
	MED																								
	CNT																								
h'F	16																								
	MED	295	280	250	225	210	260	270	245	240	230	220	220	205	230	225	215	240	220	205	200	250	230	240	260
	CNT	27	27	27	26	28	23	21	26	26	31	29	27	25	26	28	29	27	28	29	26	26	28	27	27

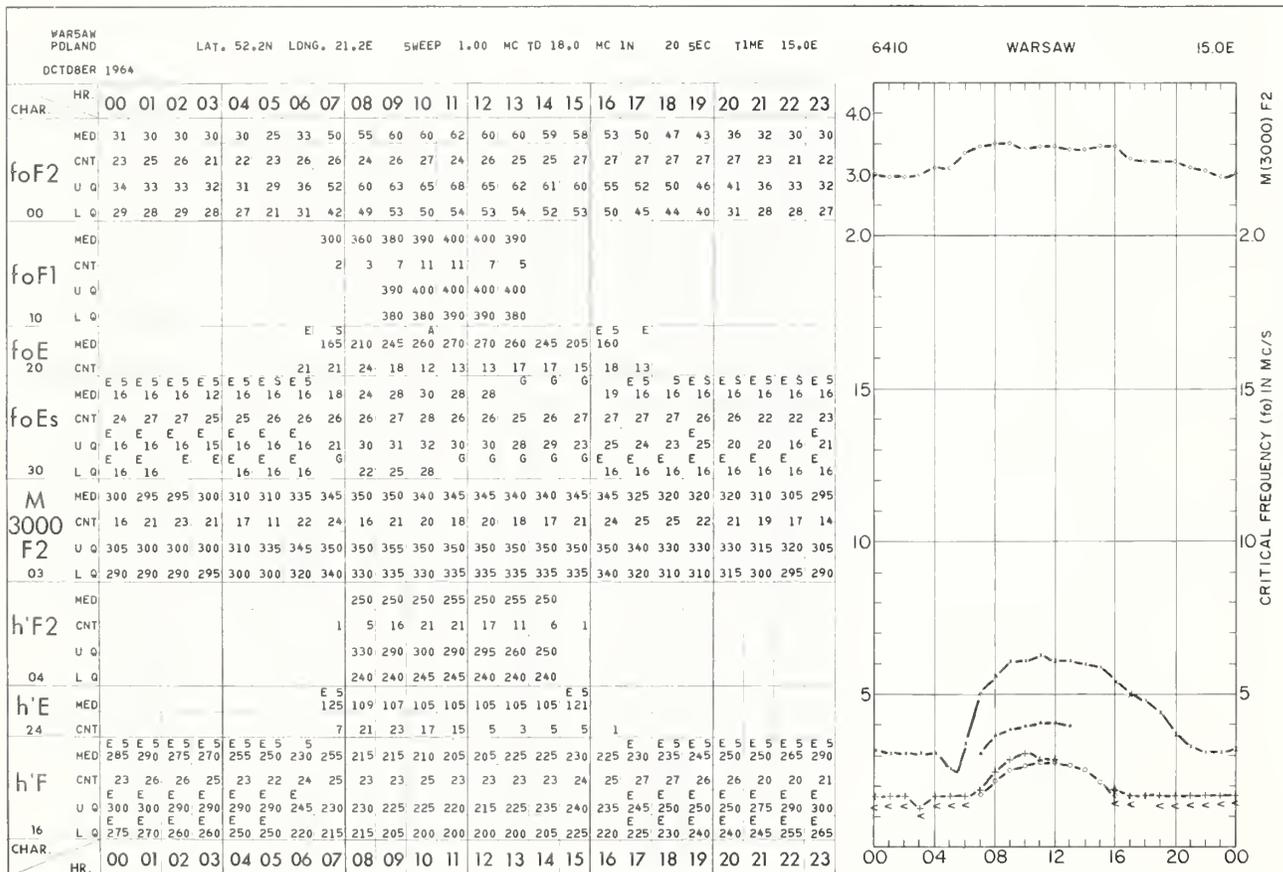
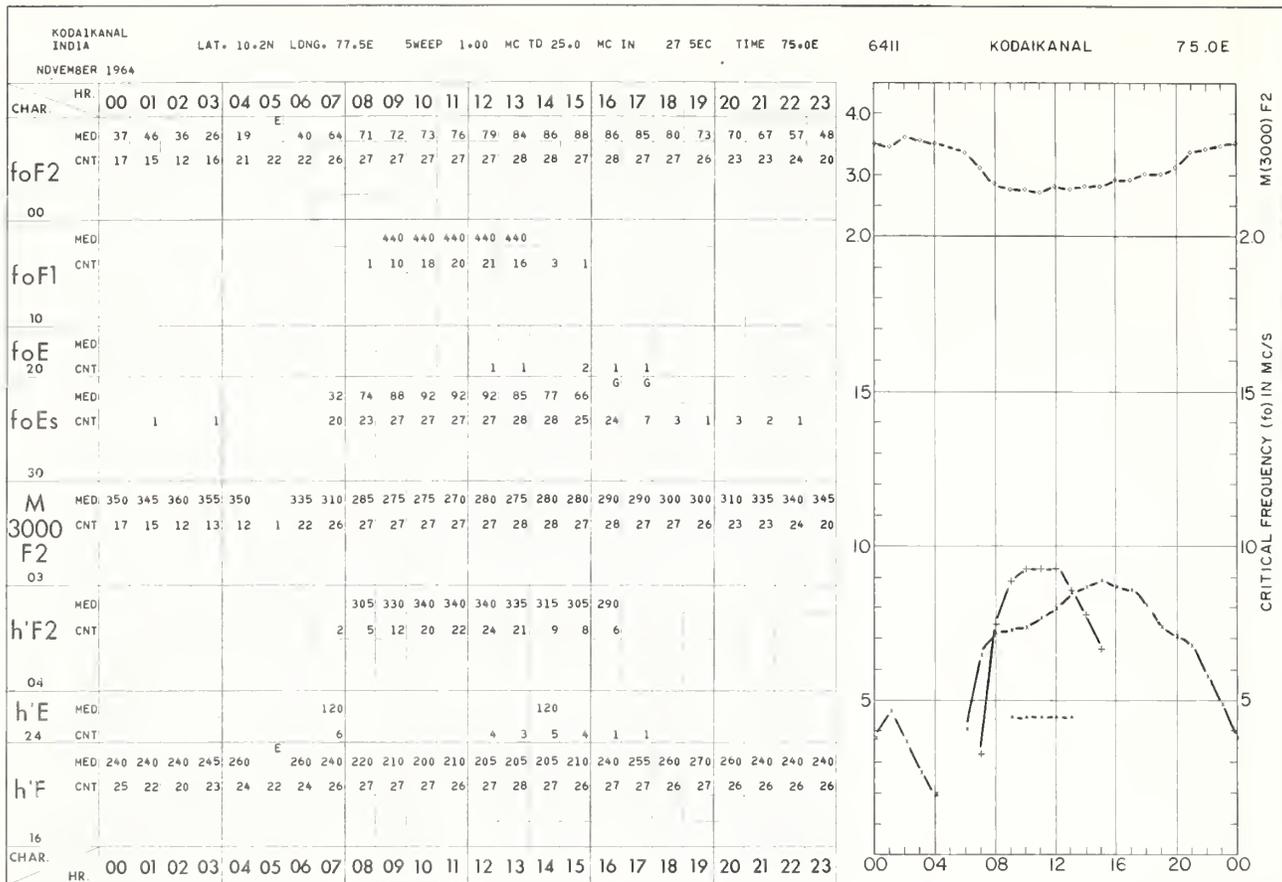


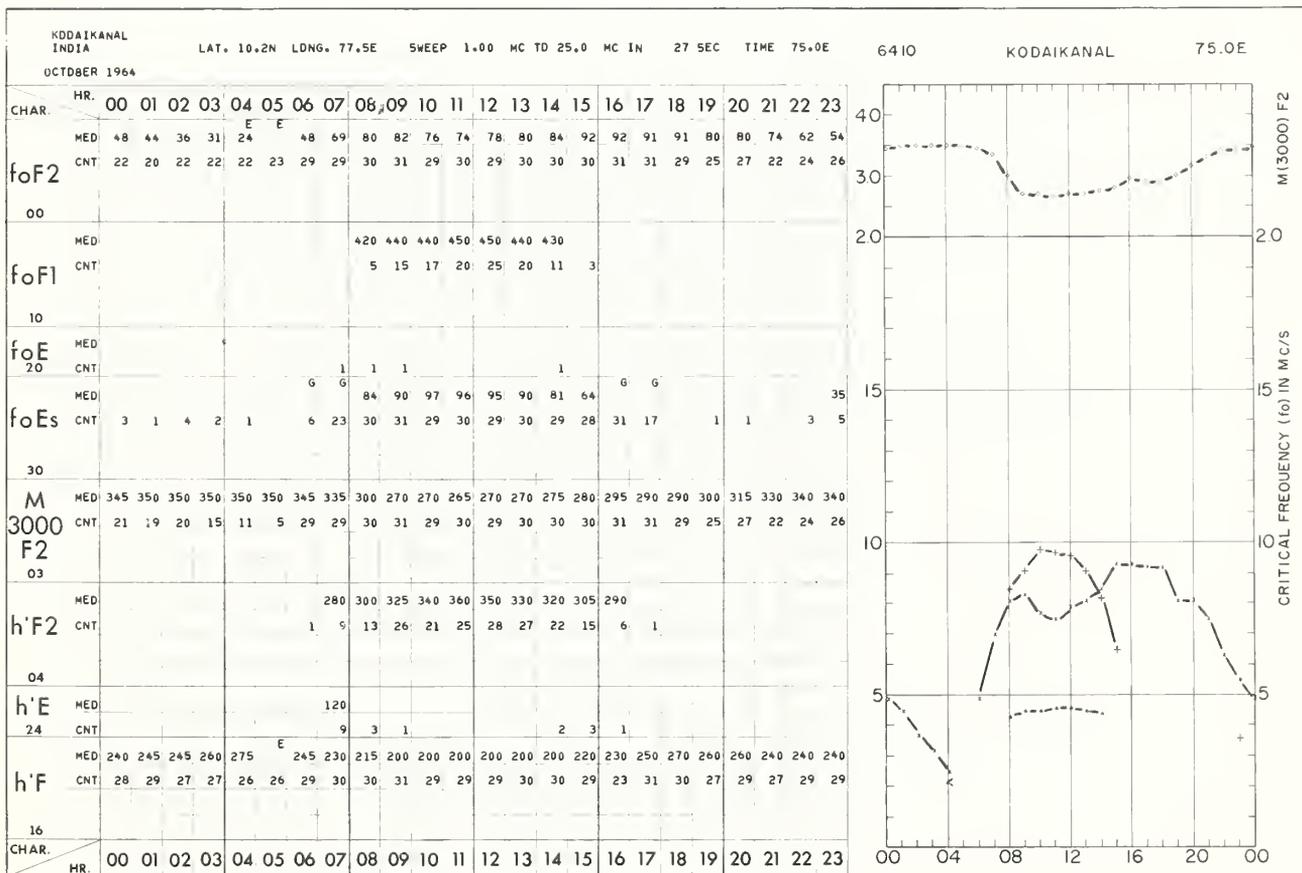
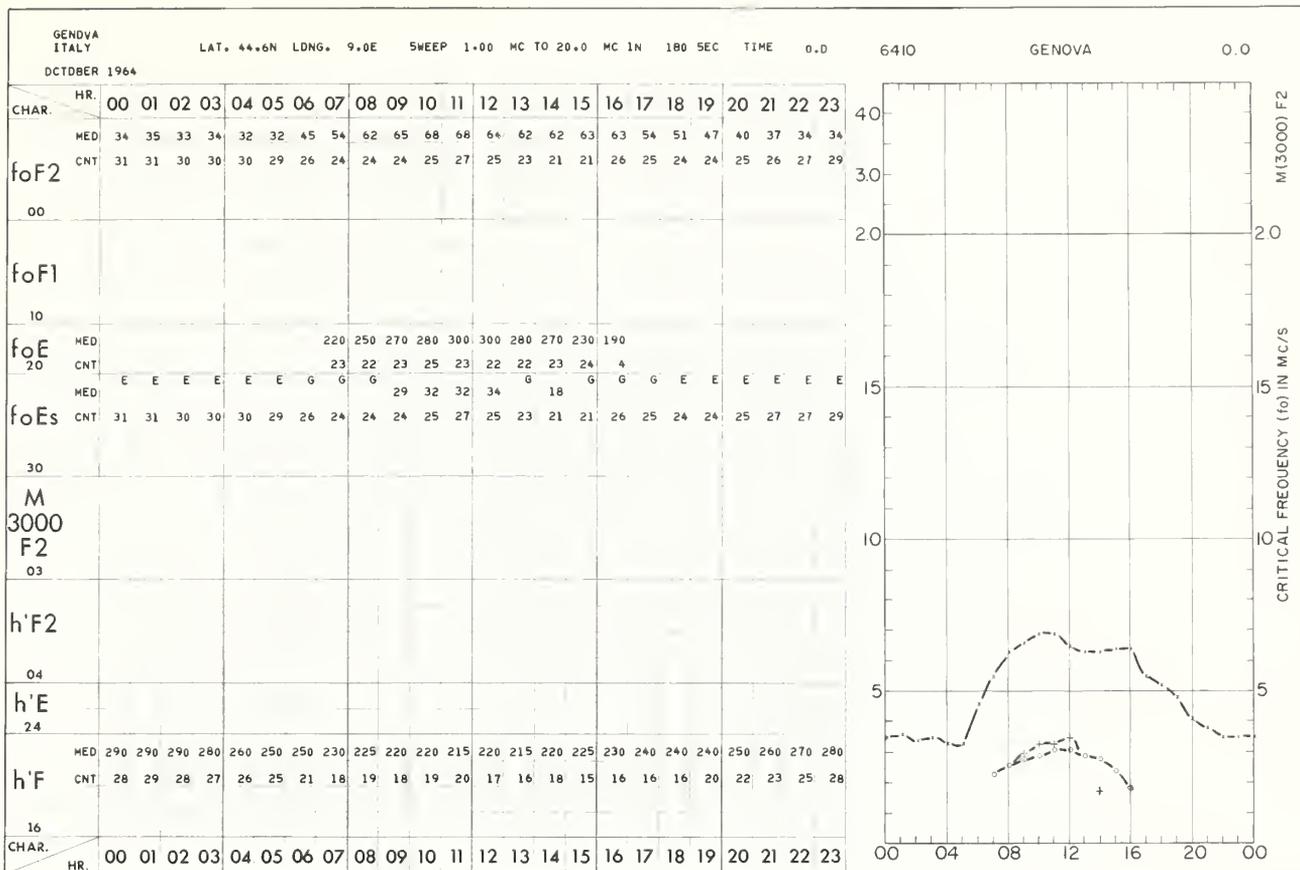


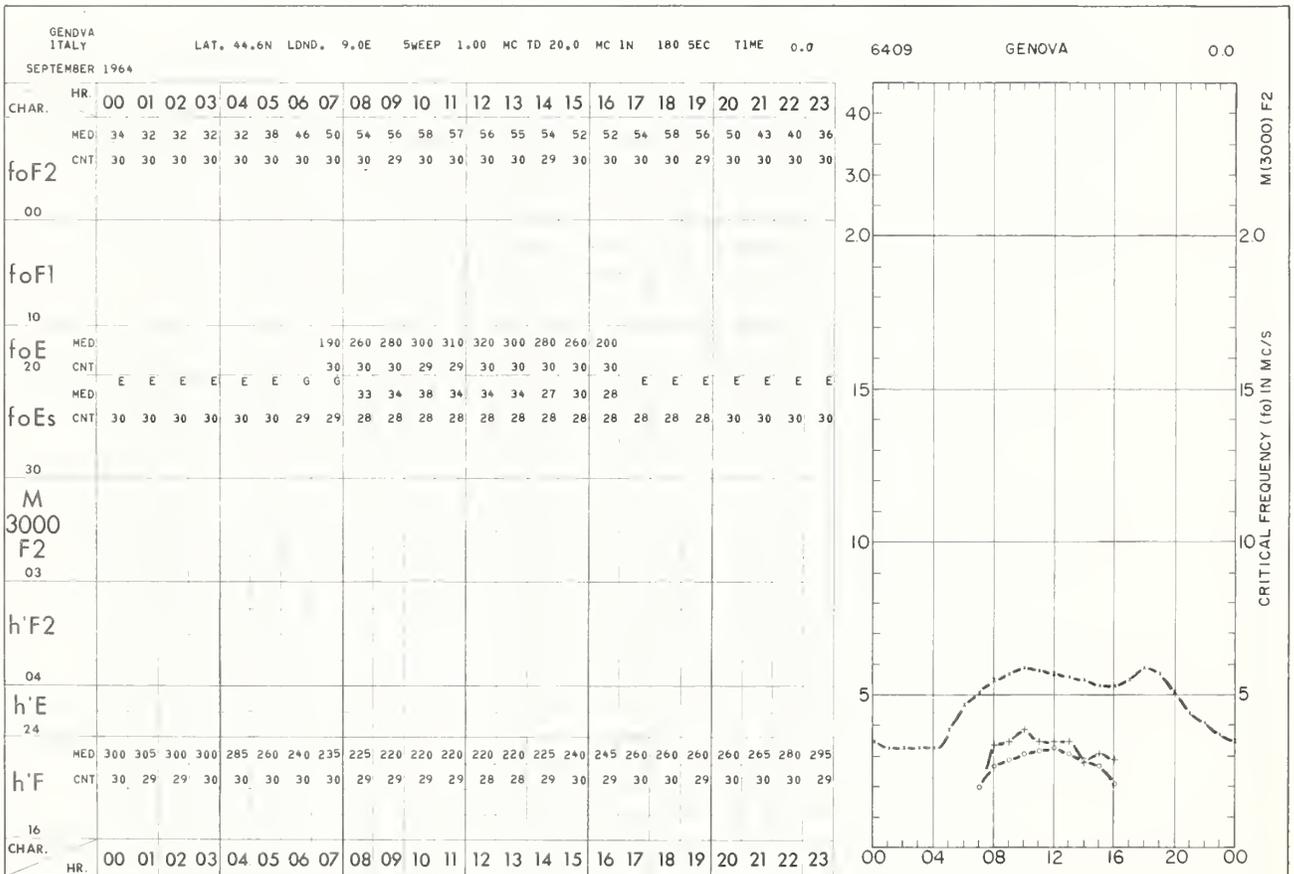
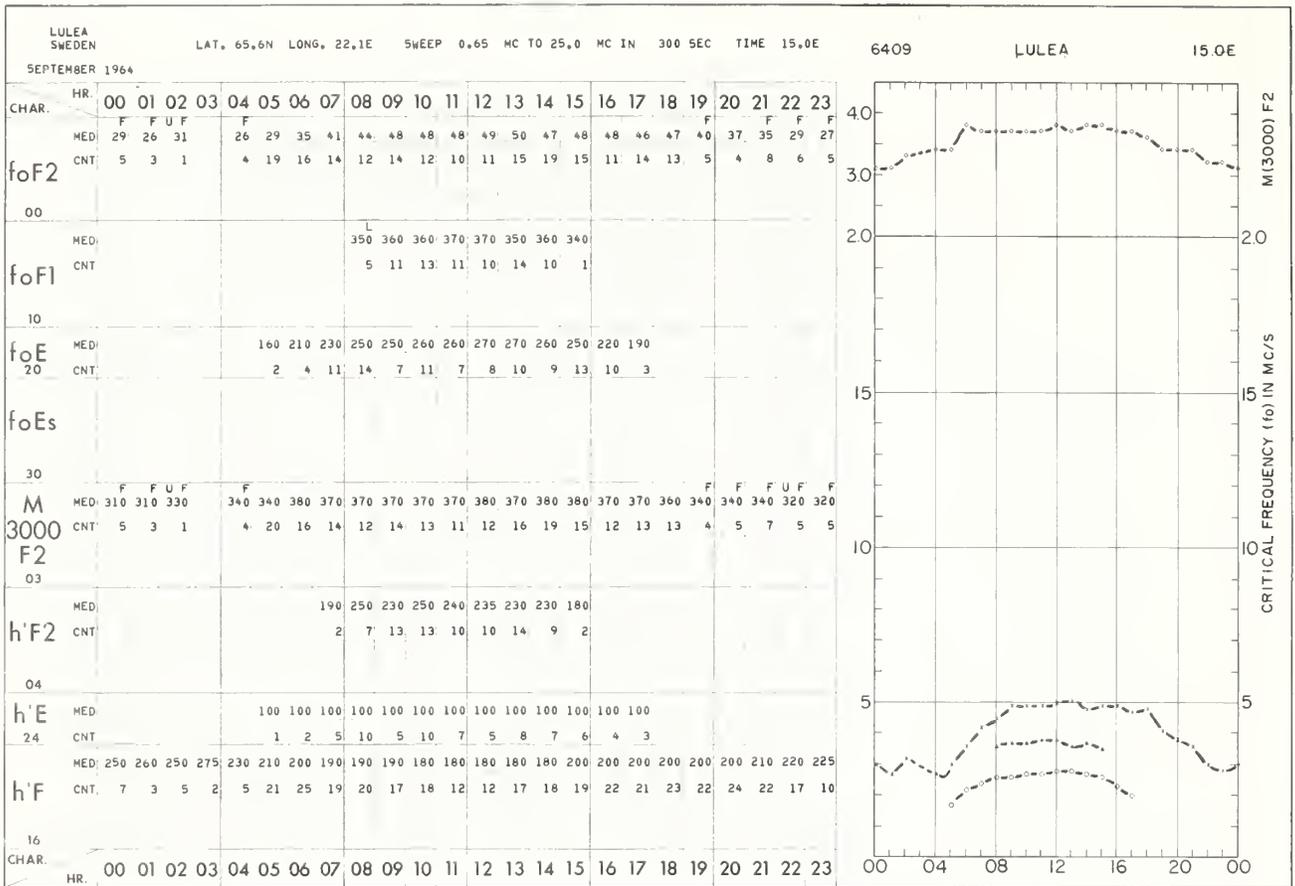


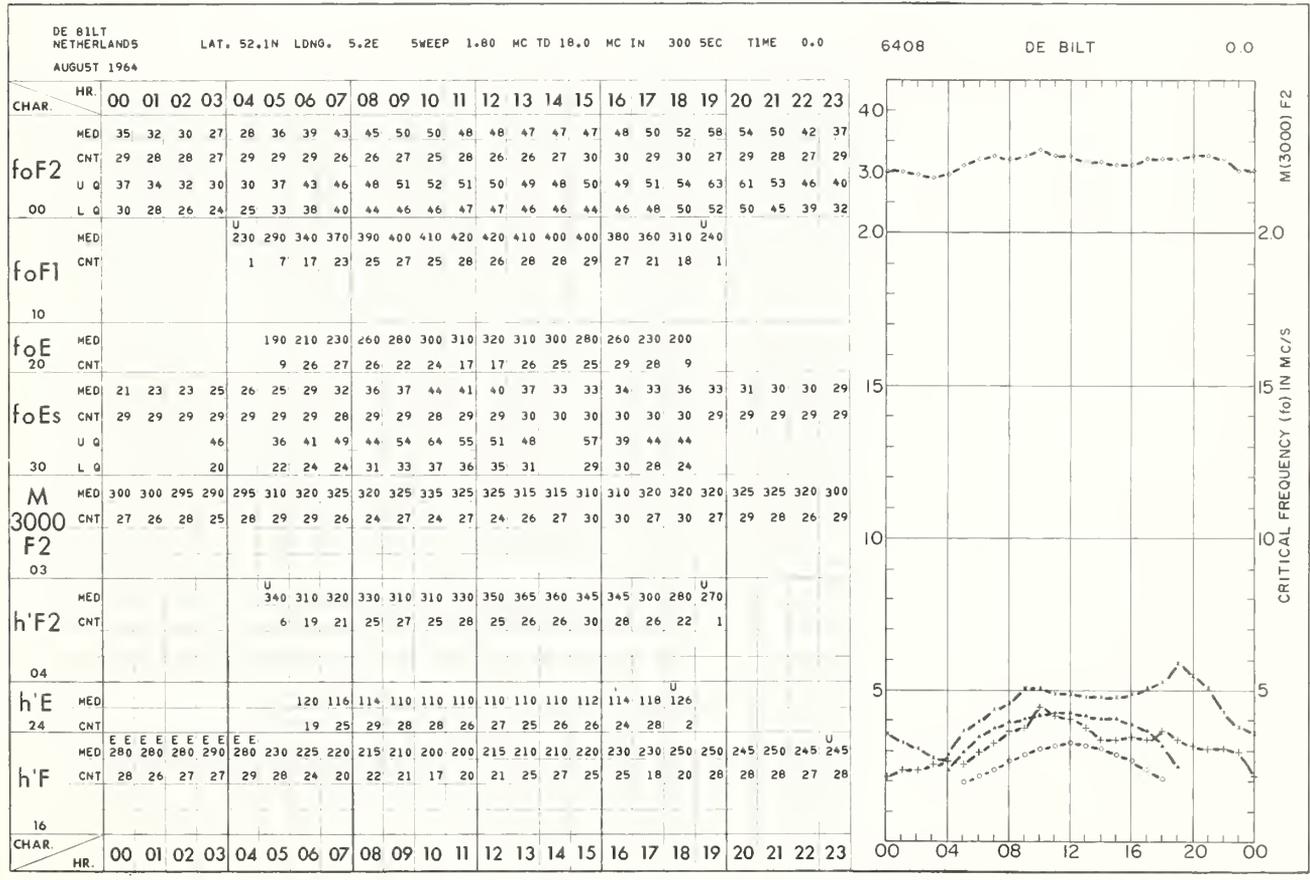
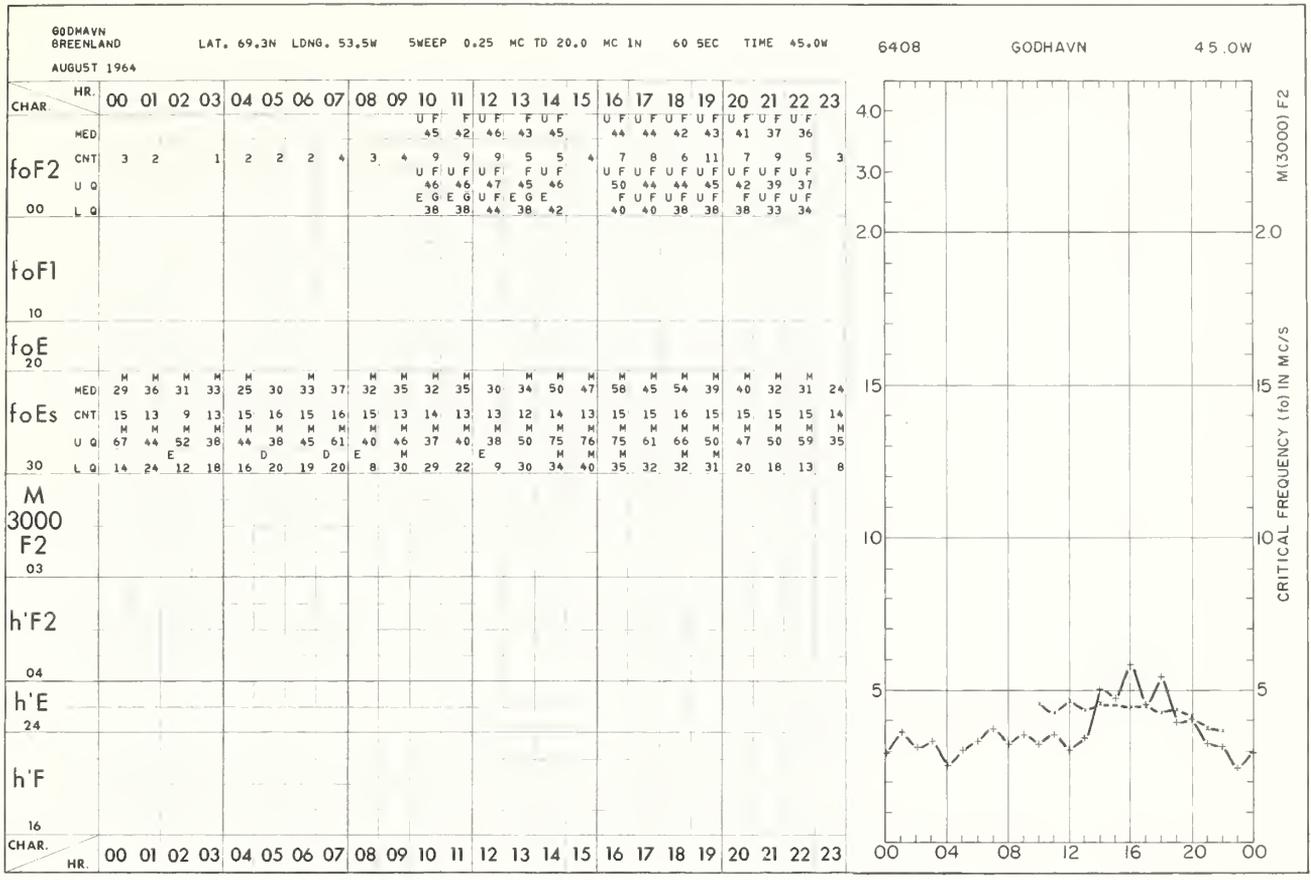


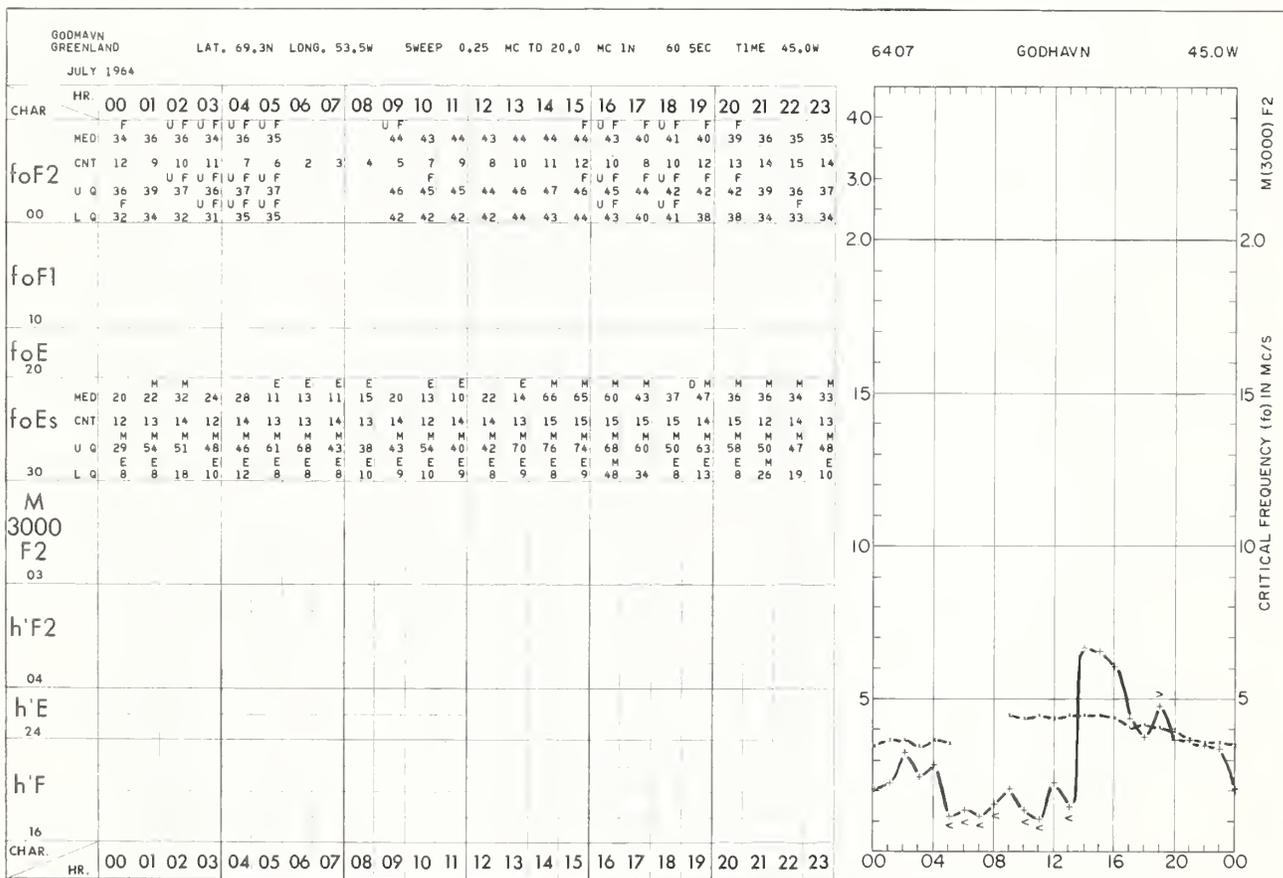
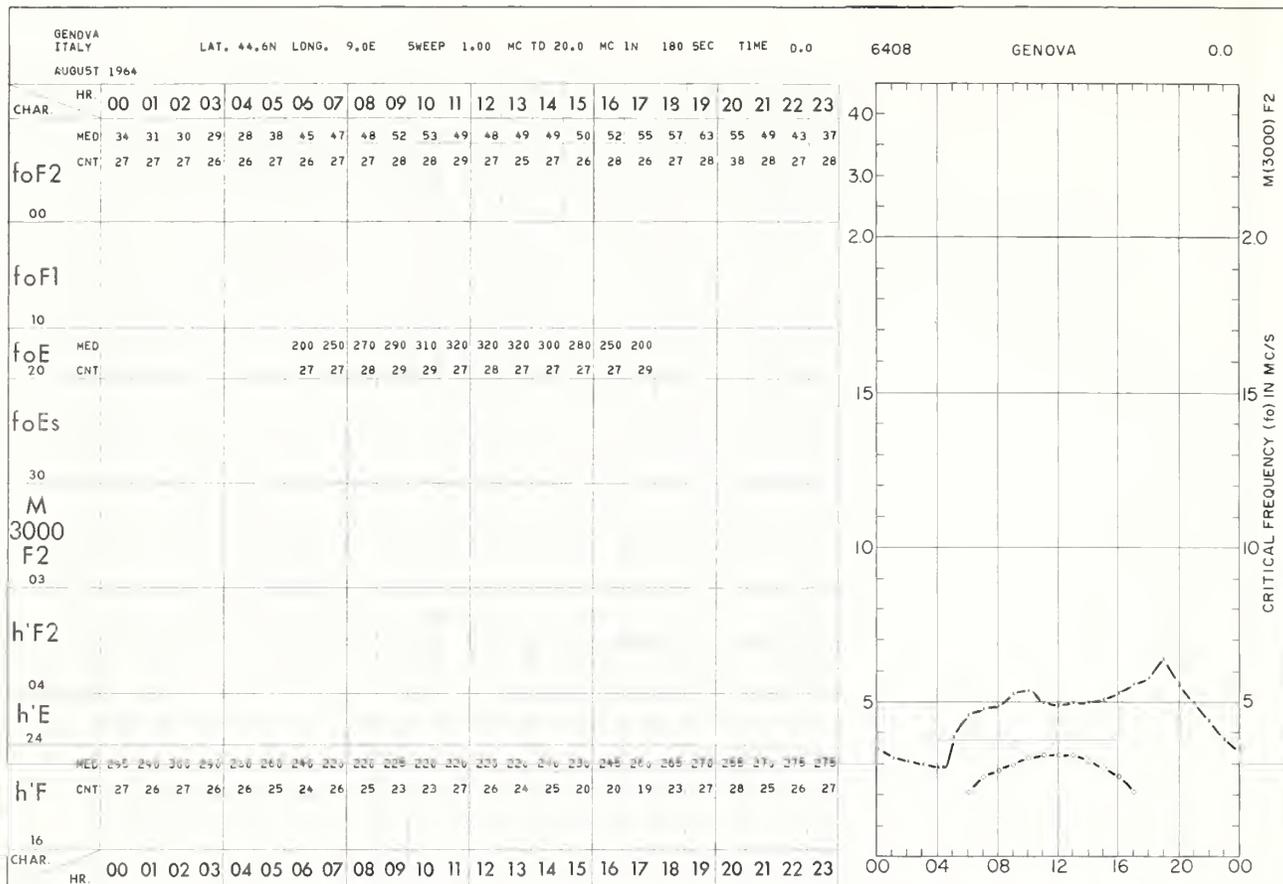


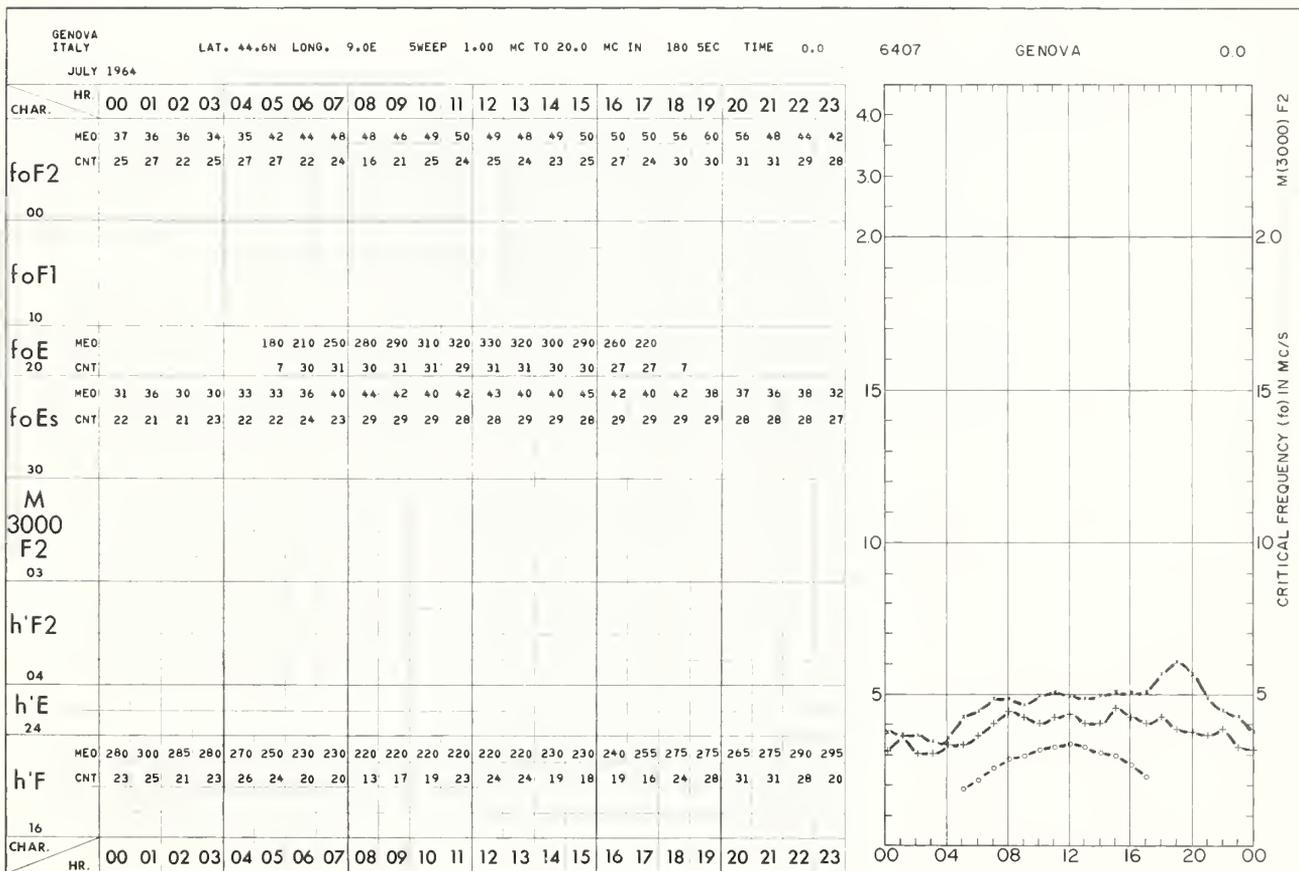
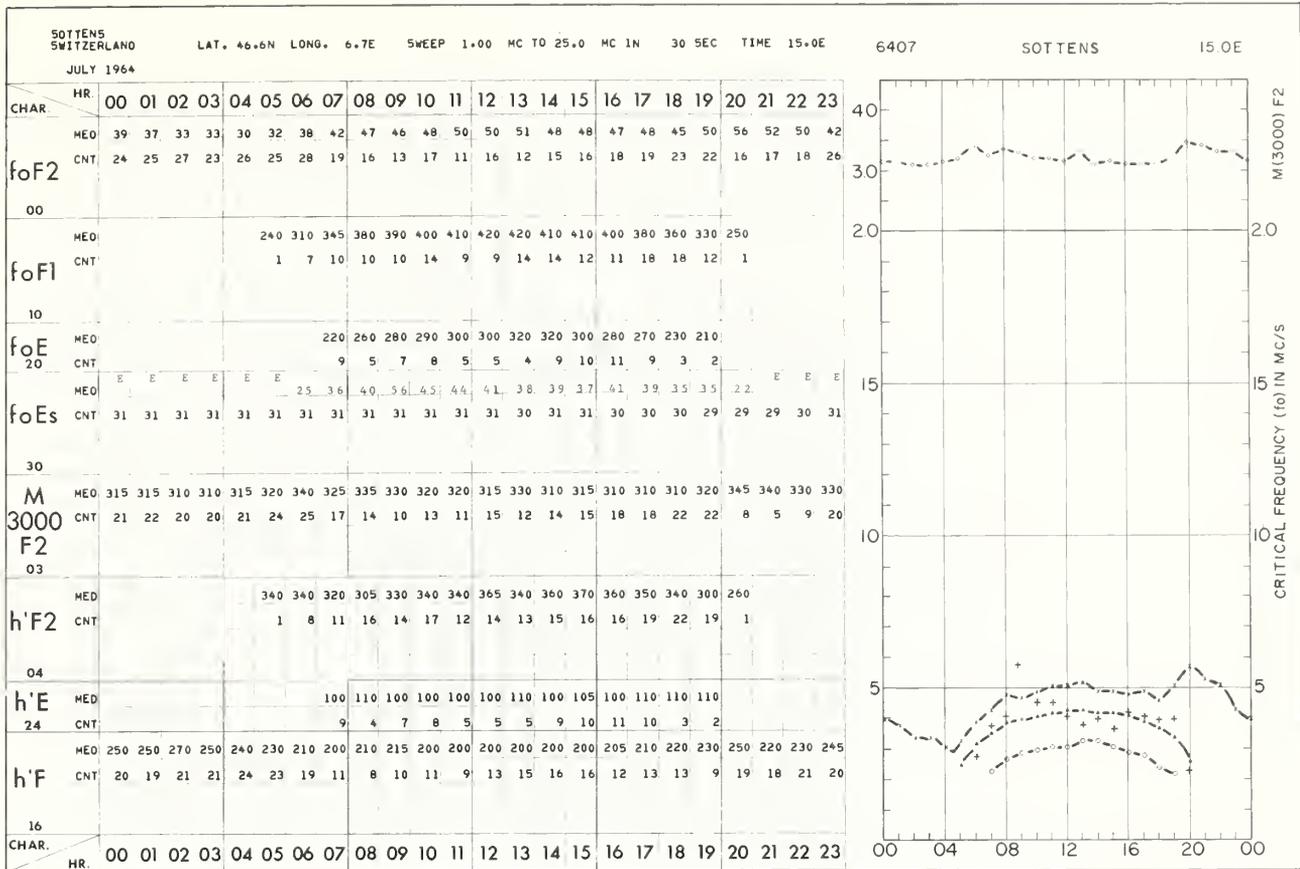


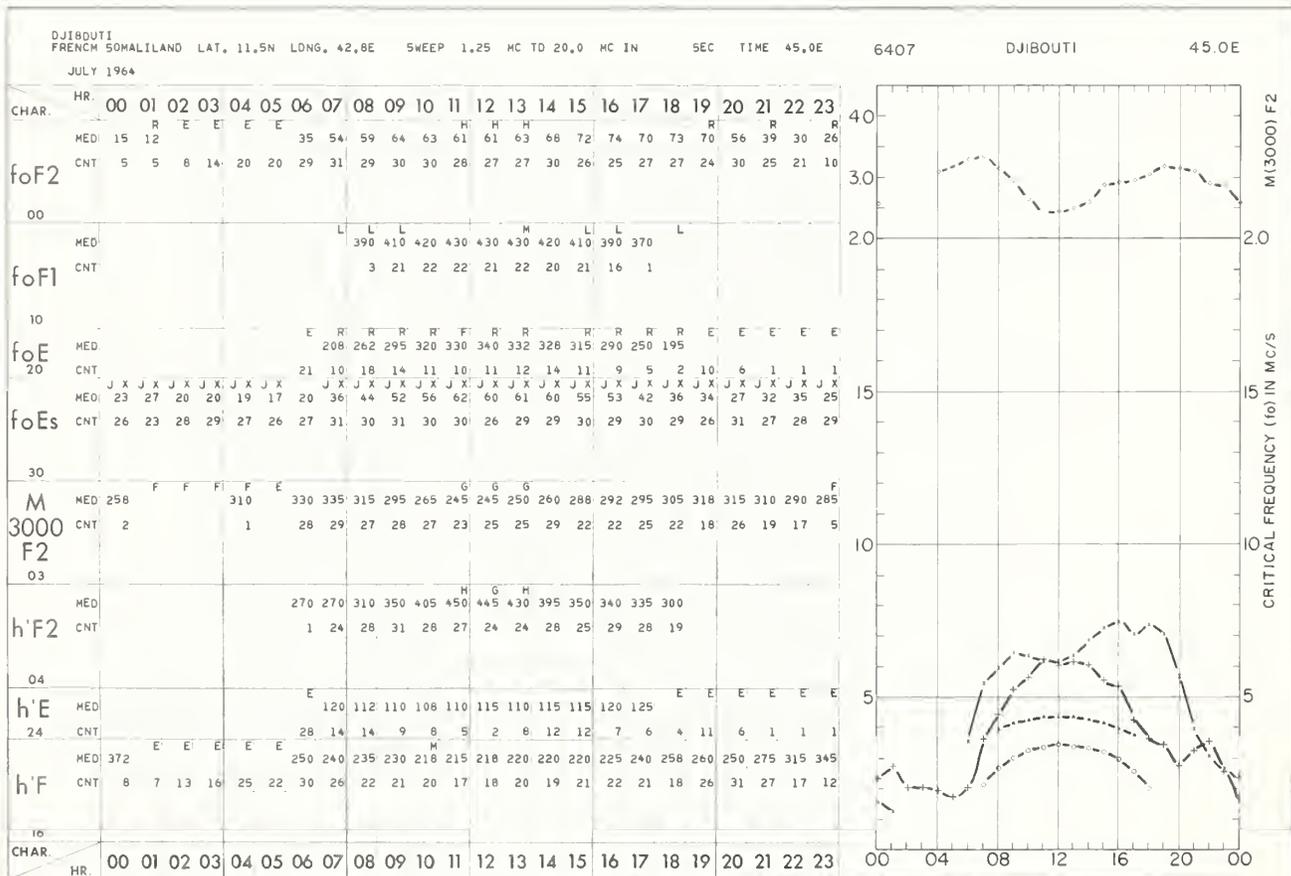
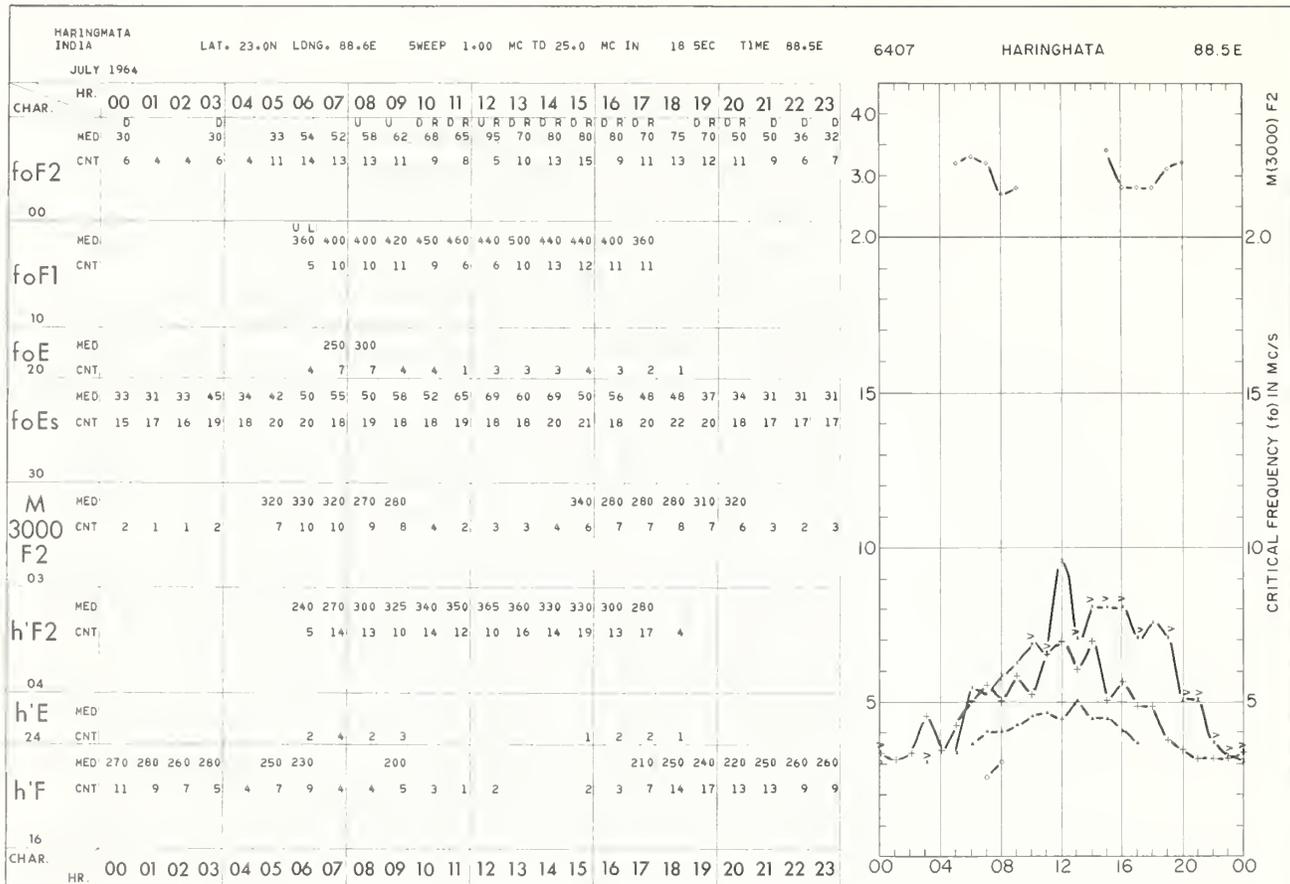


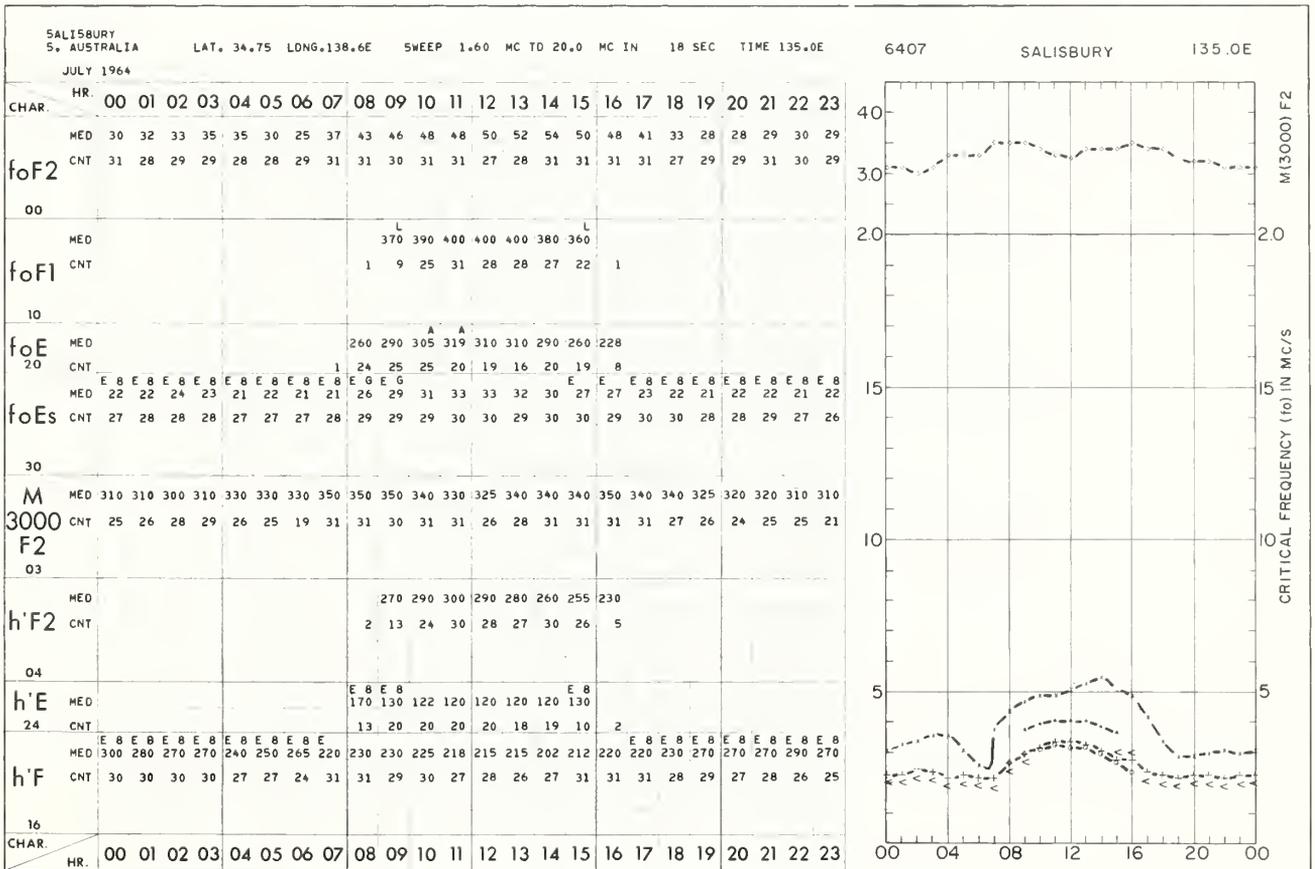
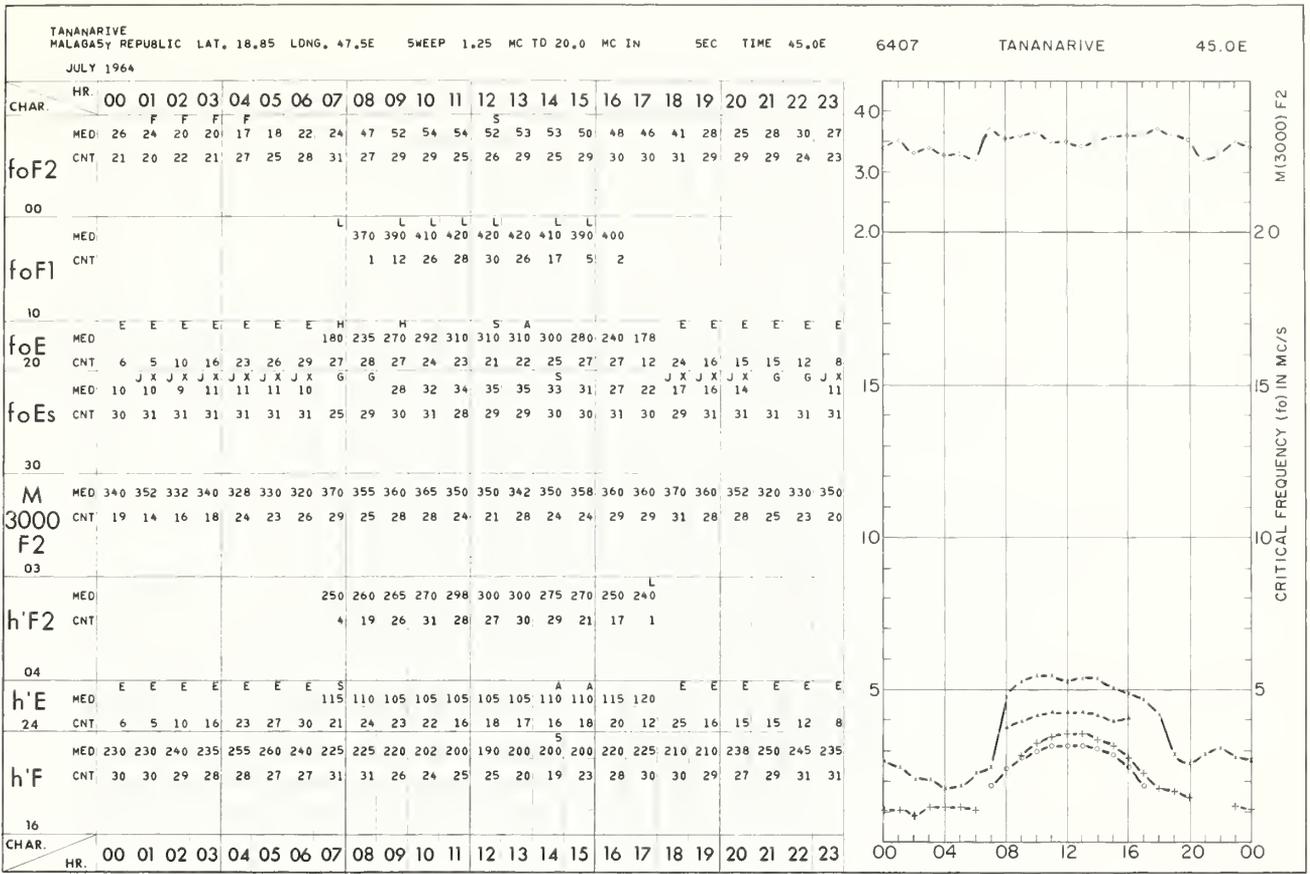


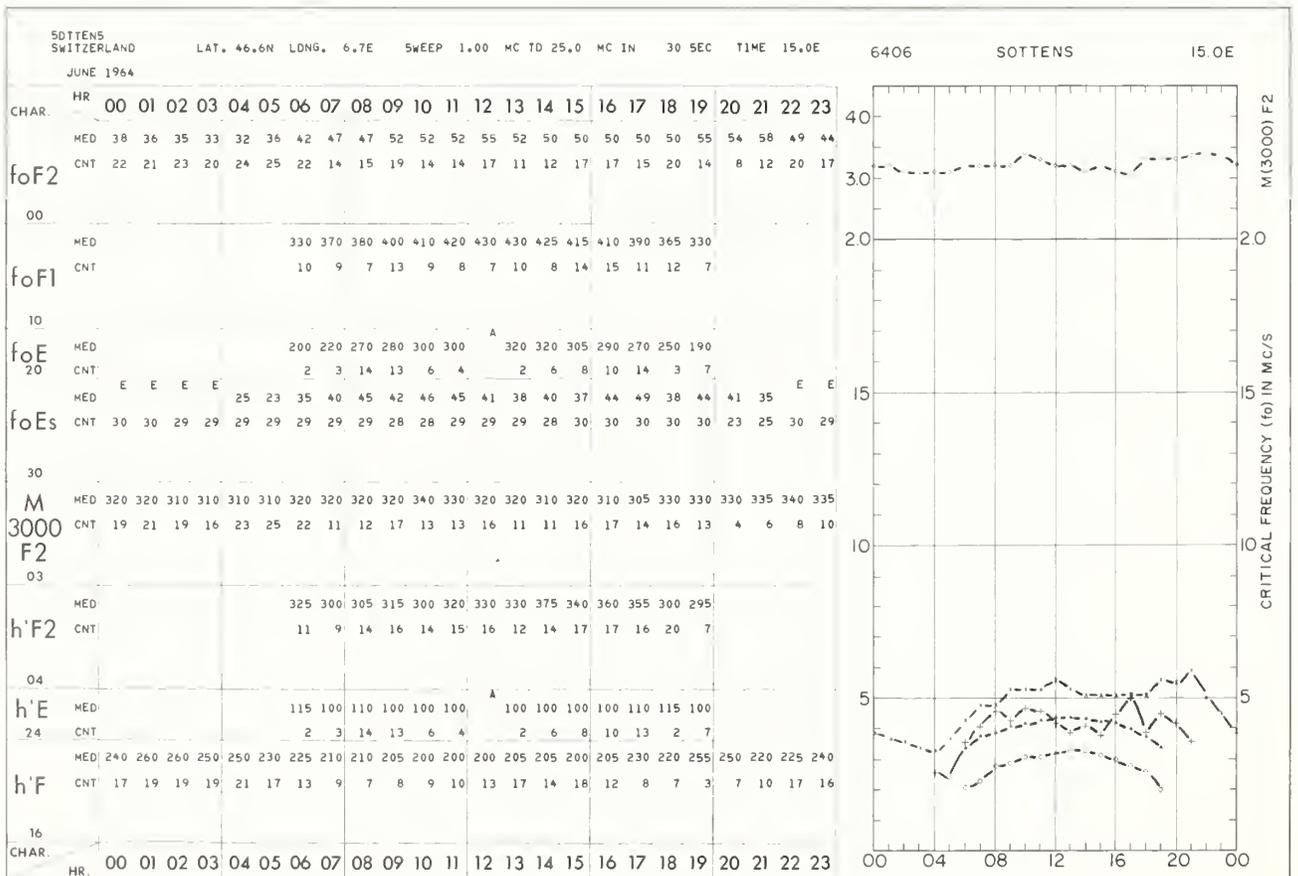
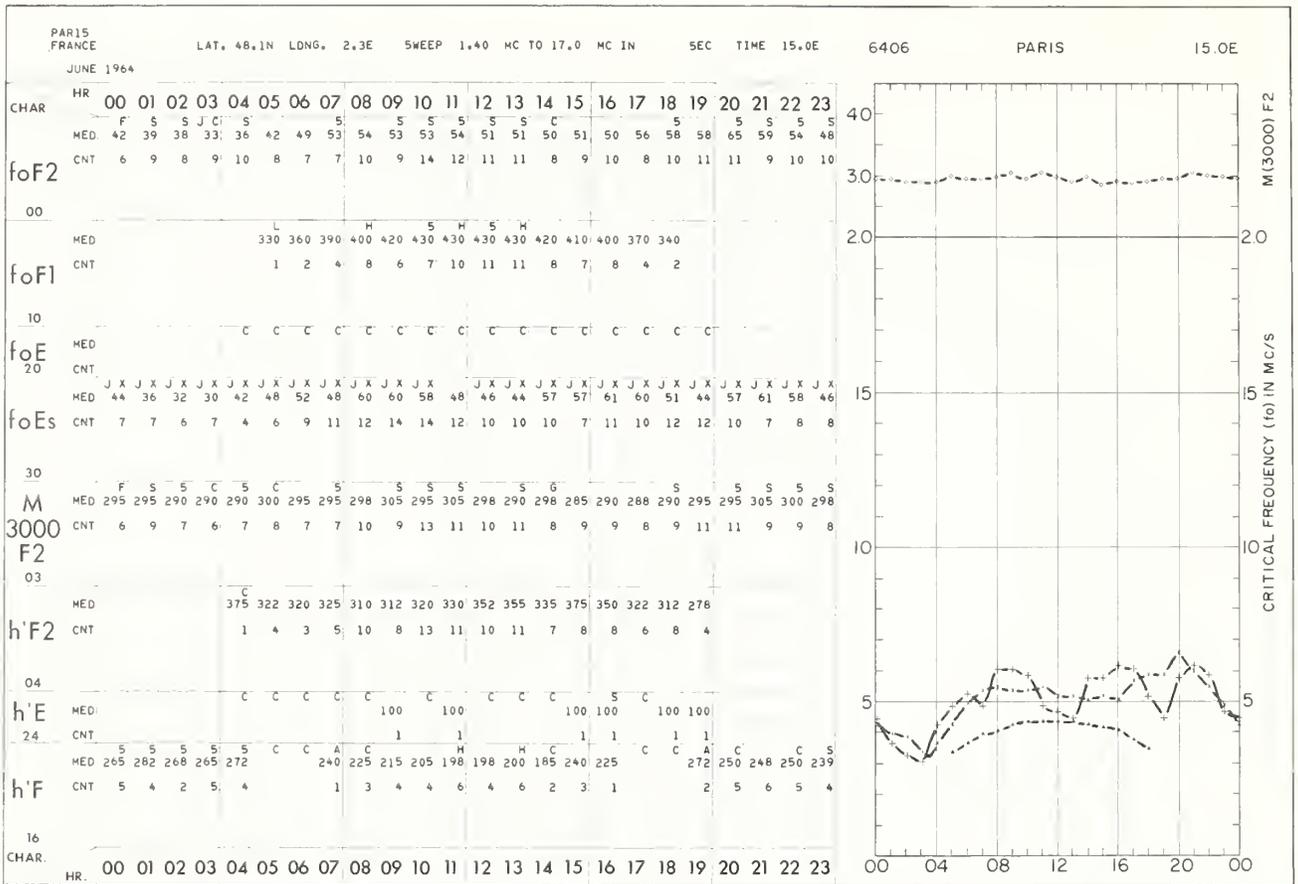


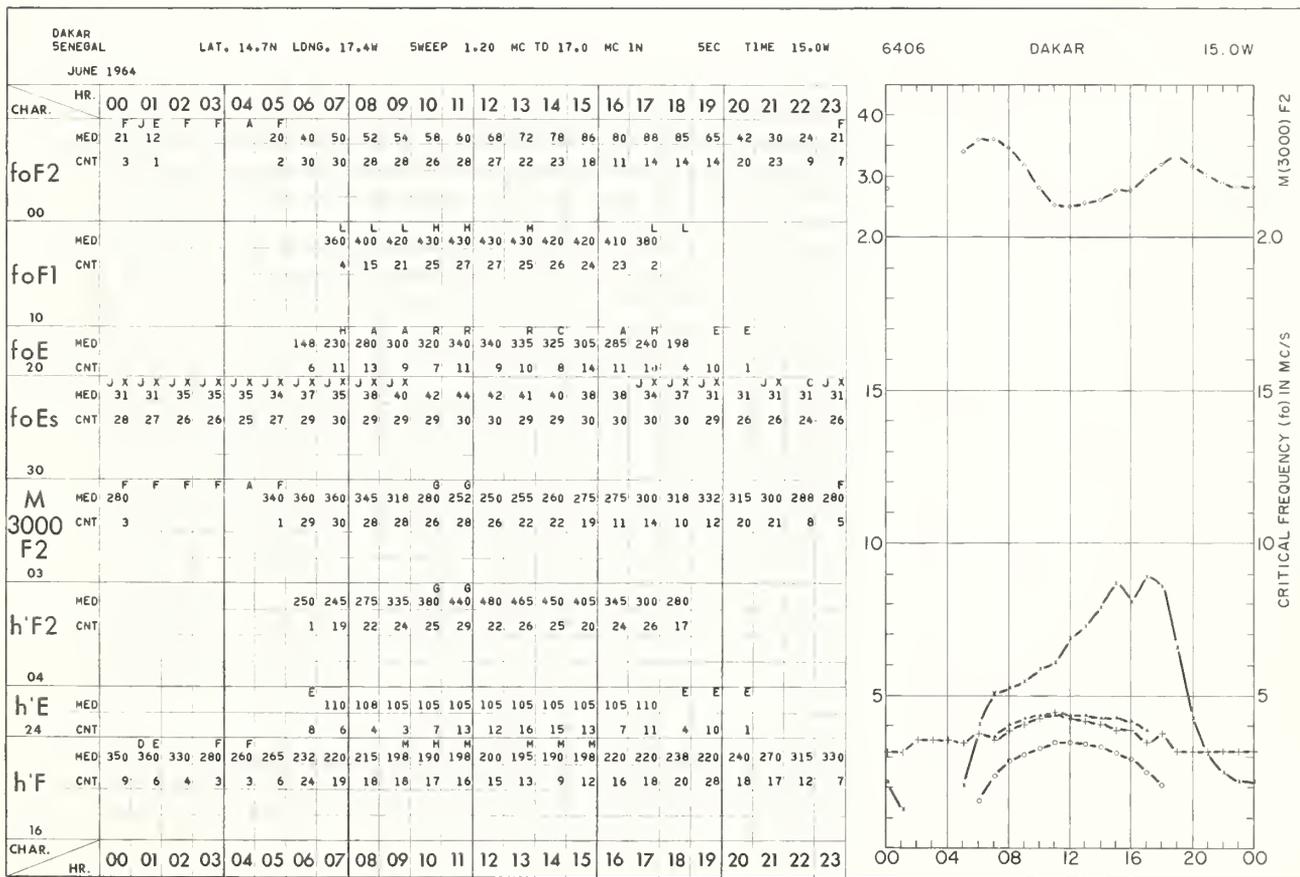
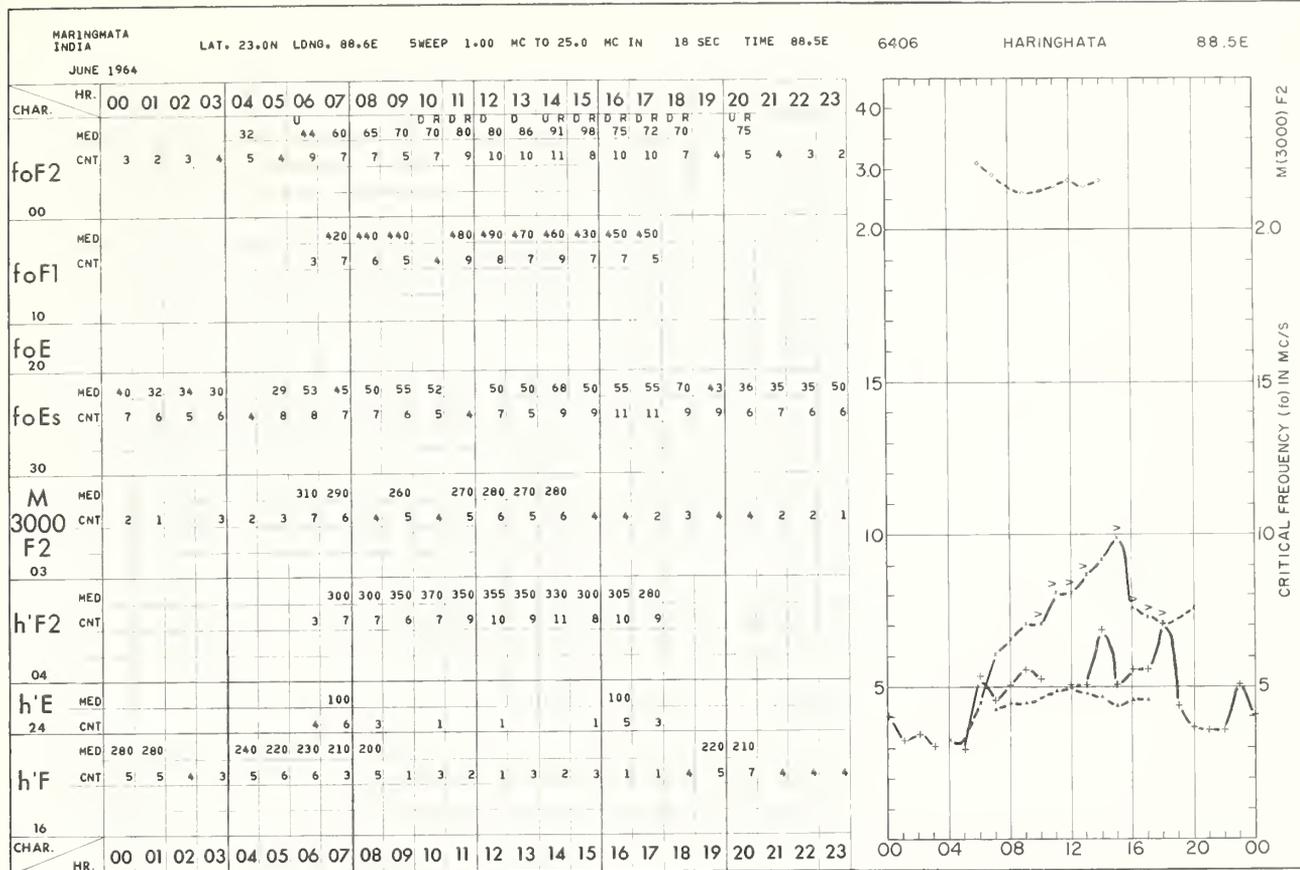


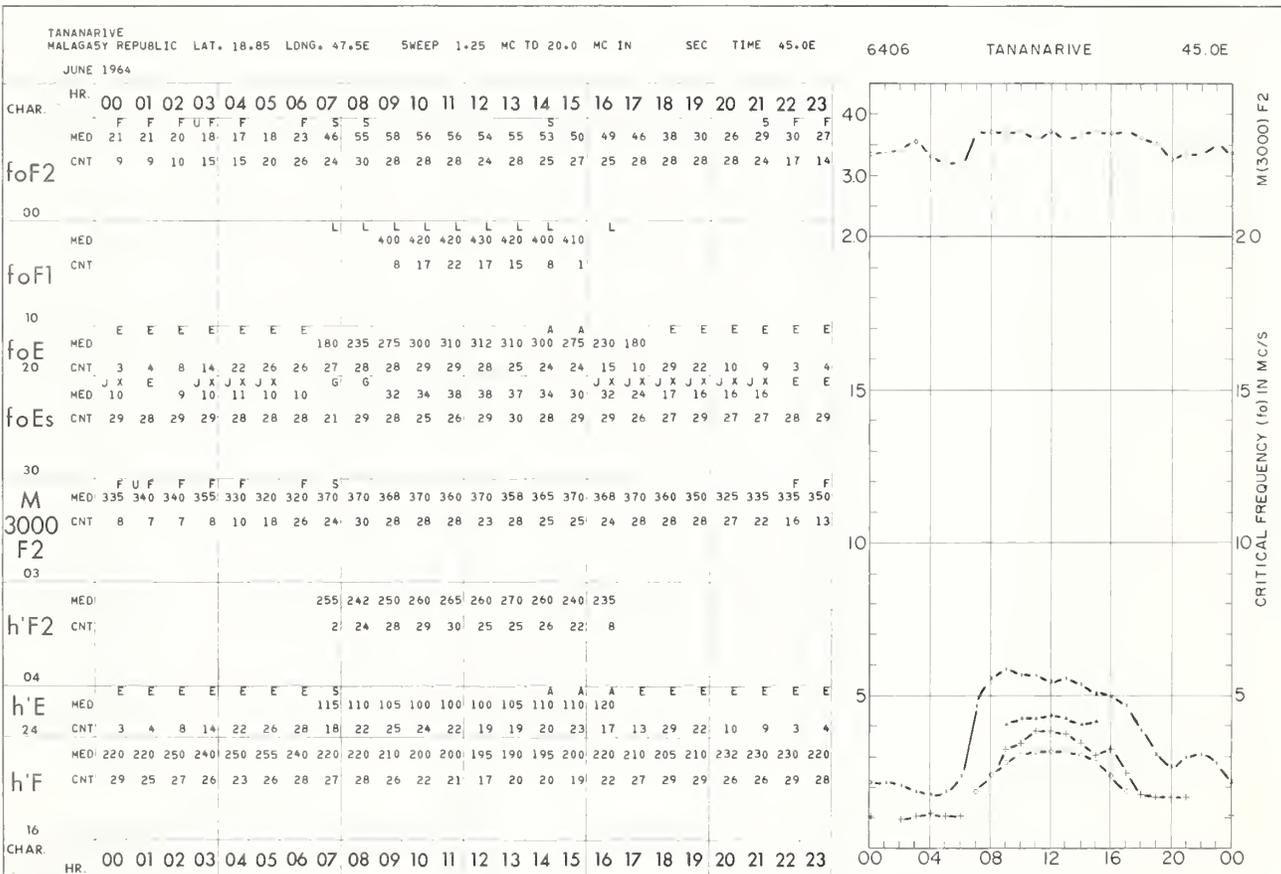
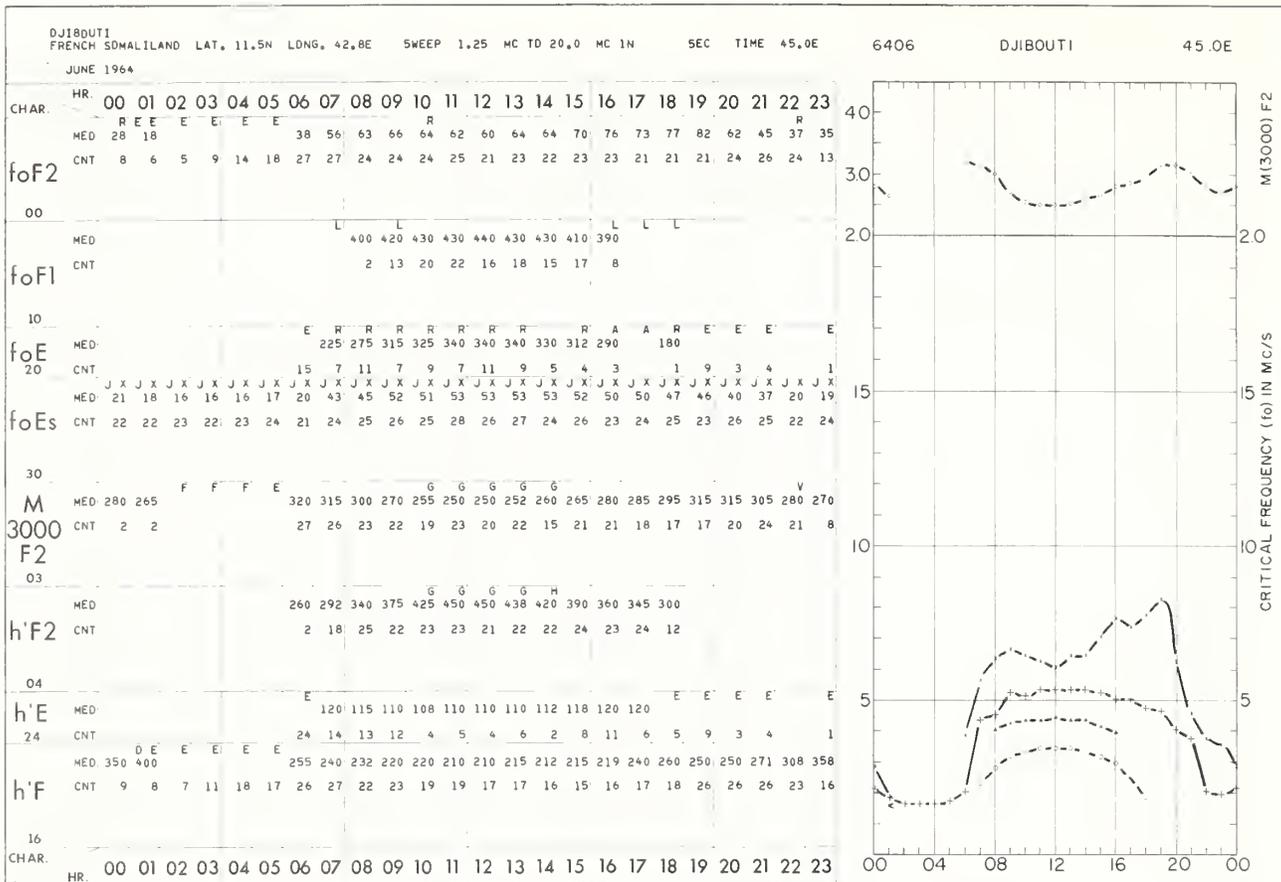


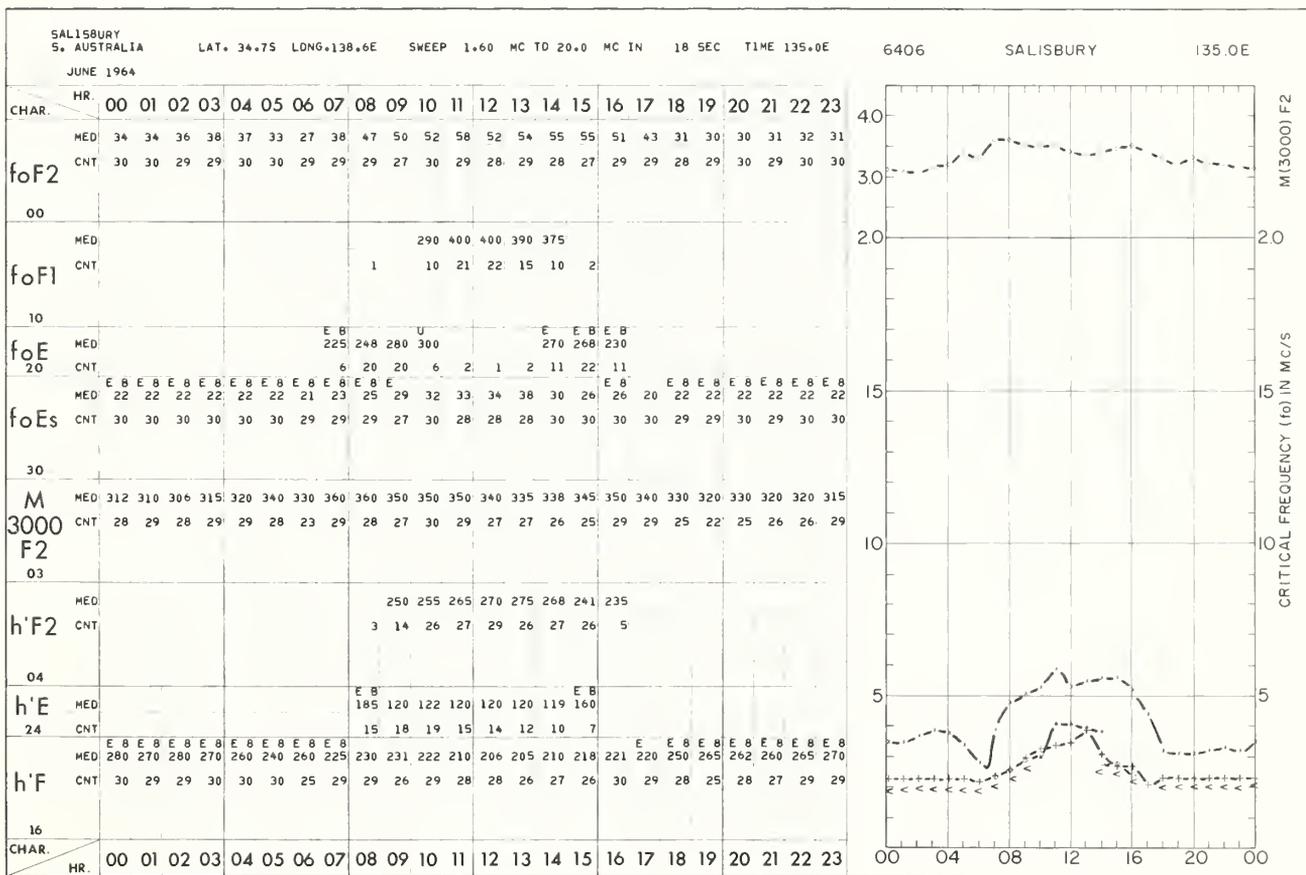
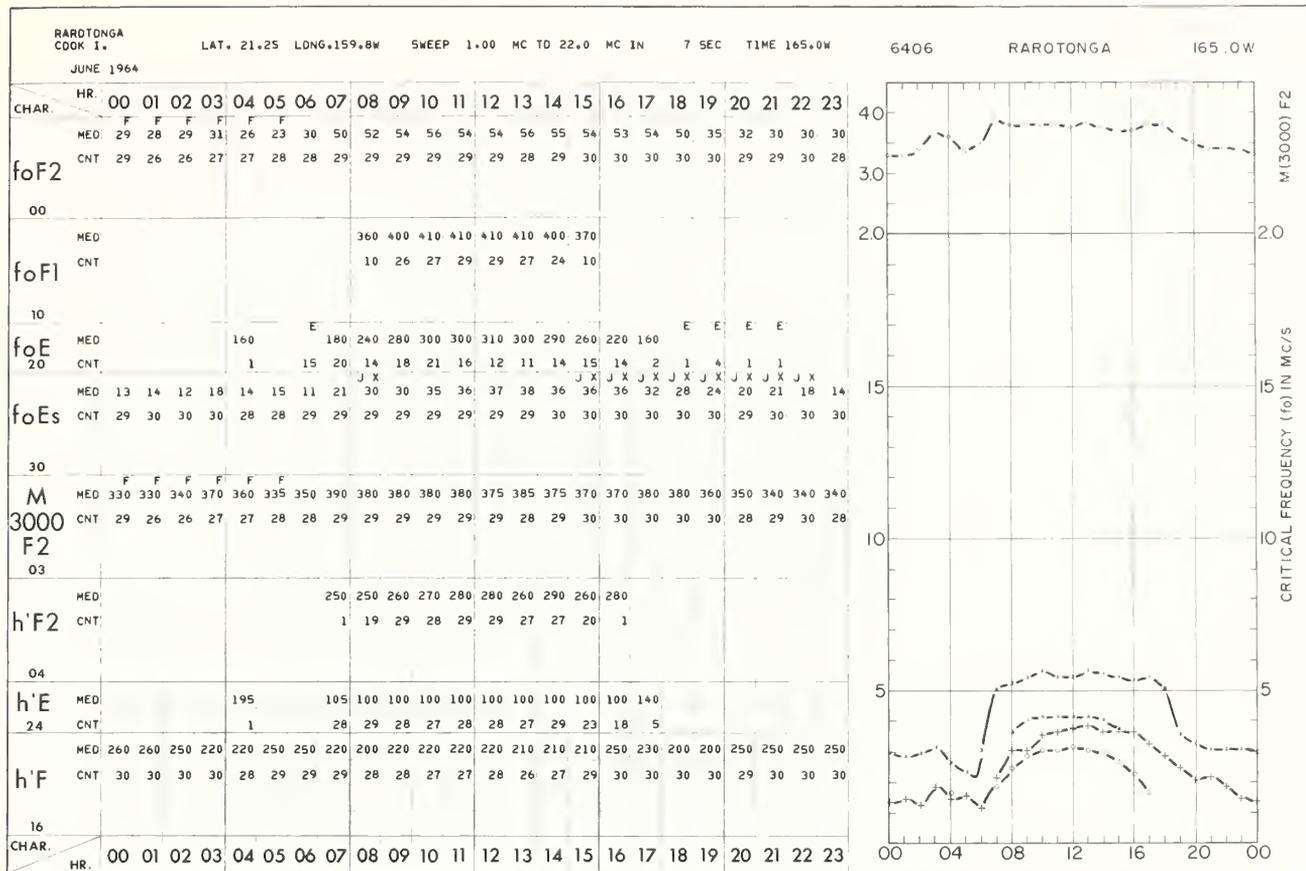


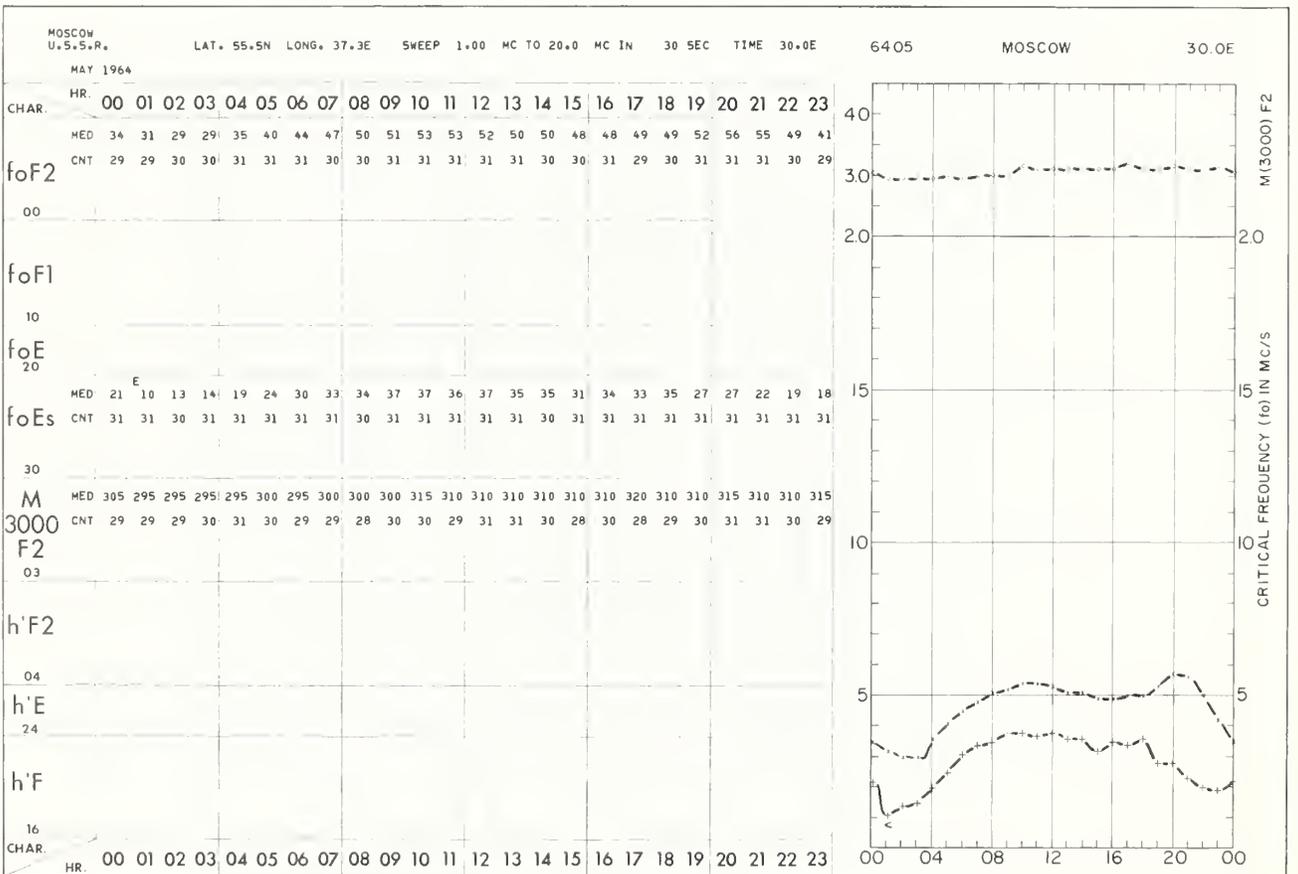
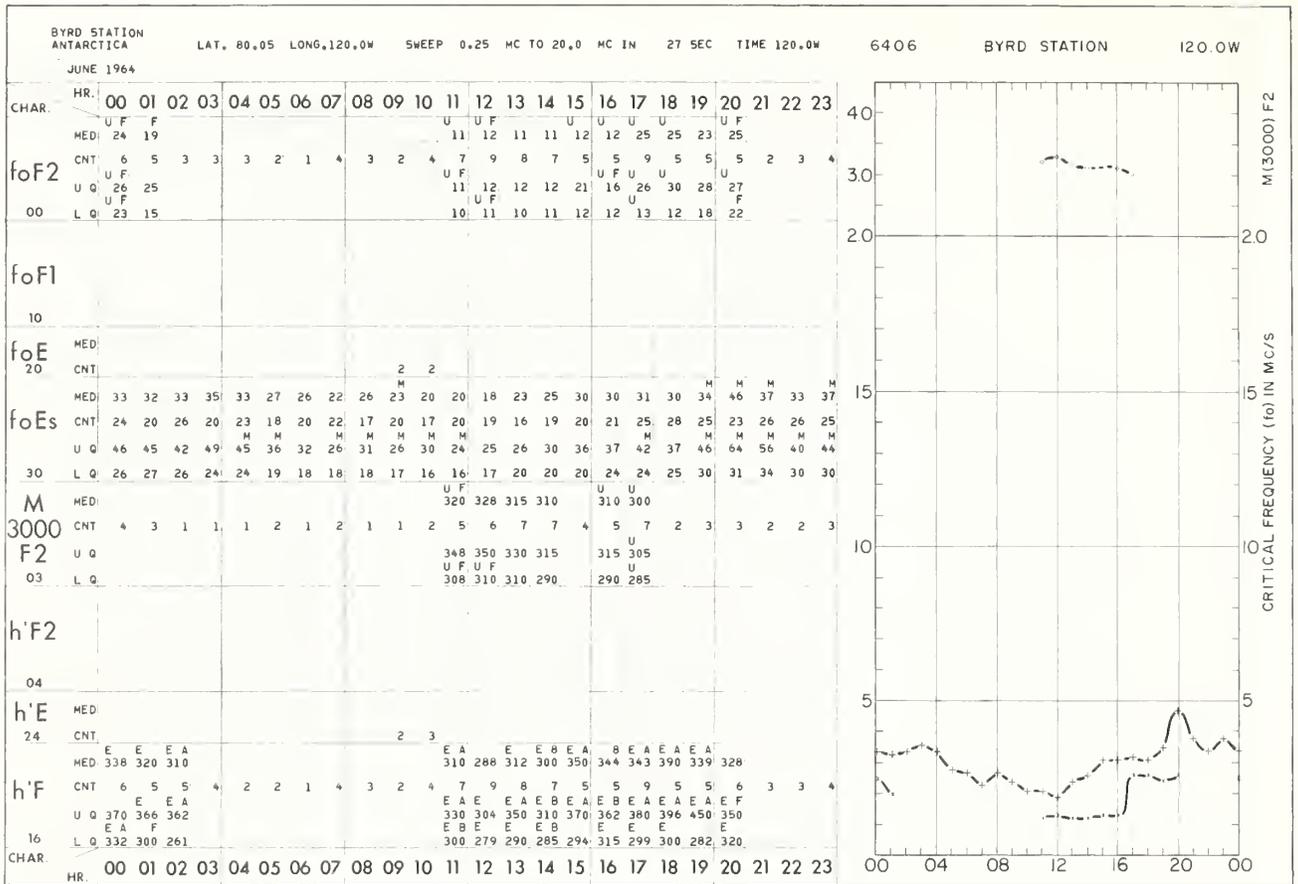


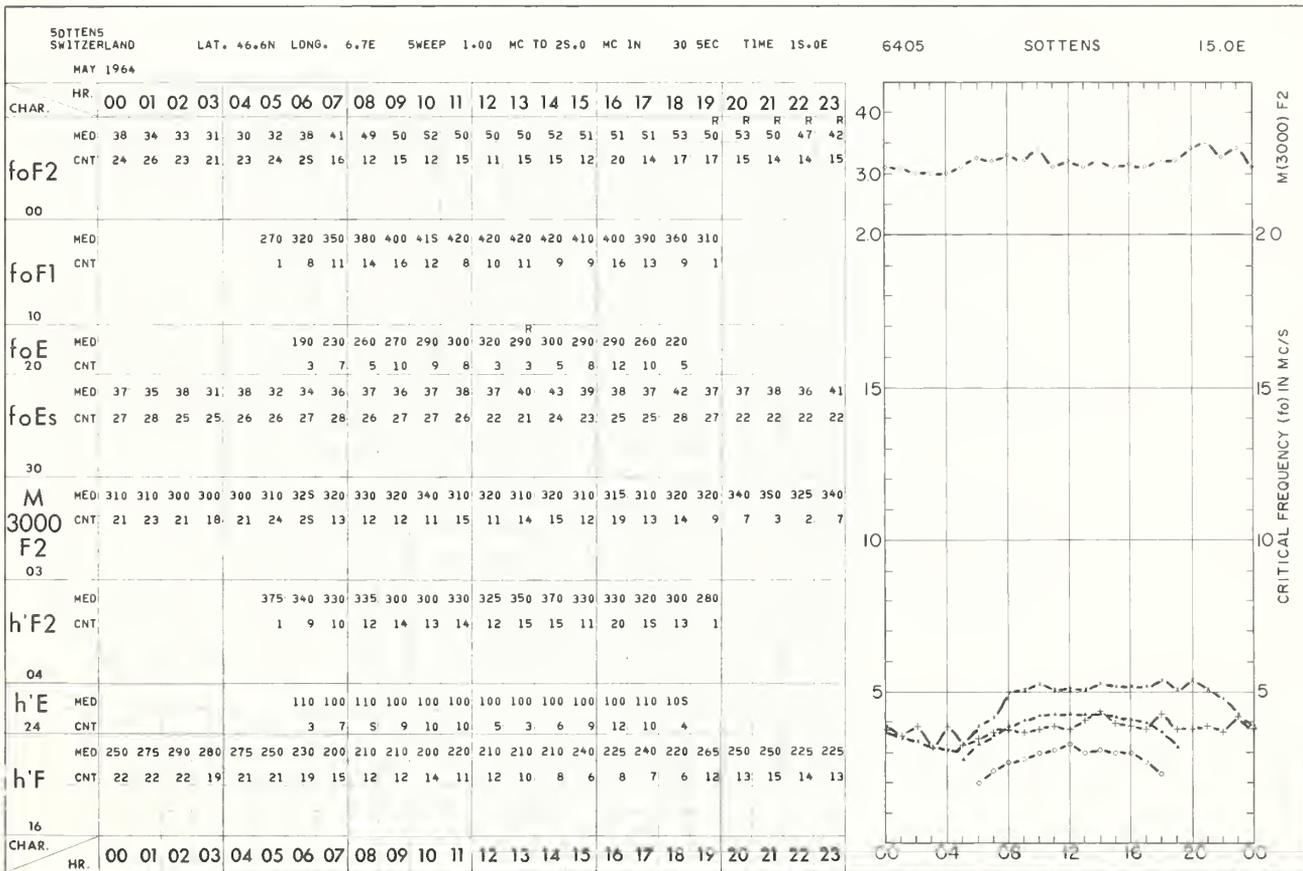
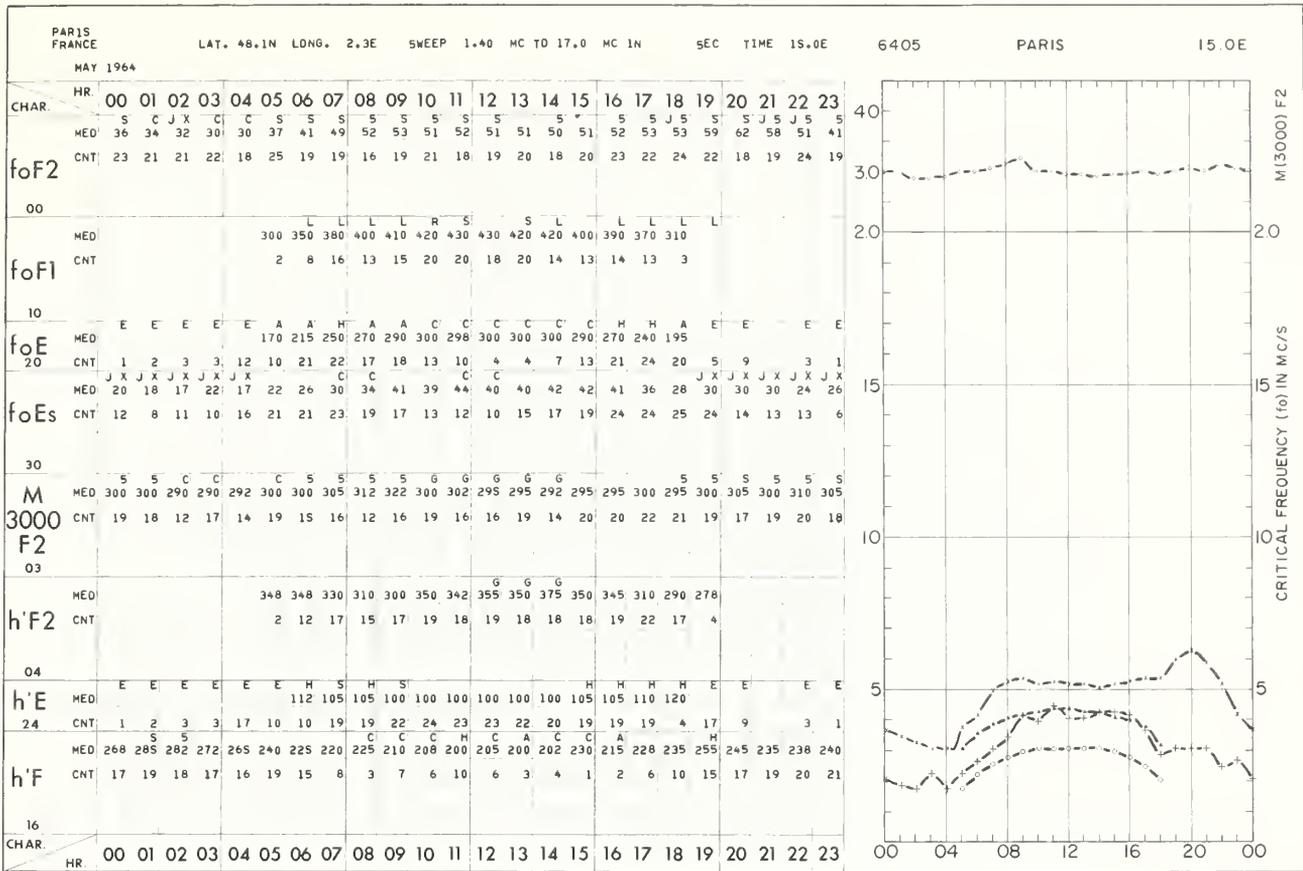


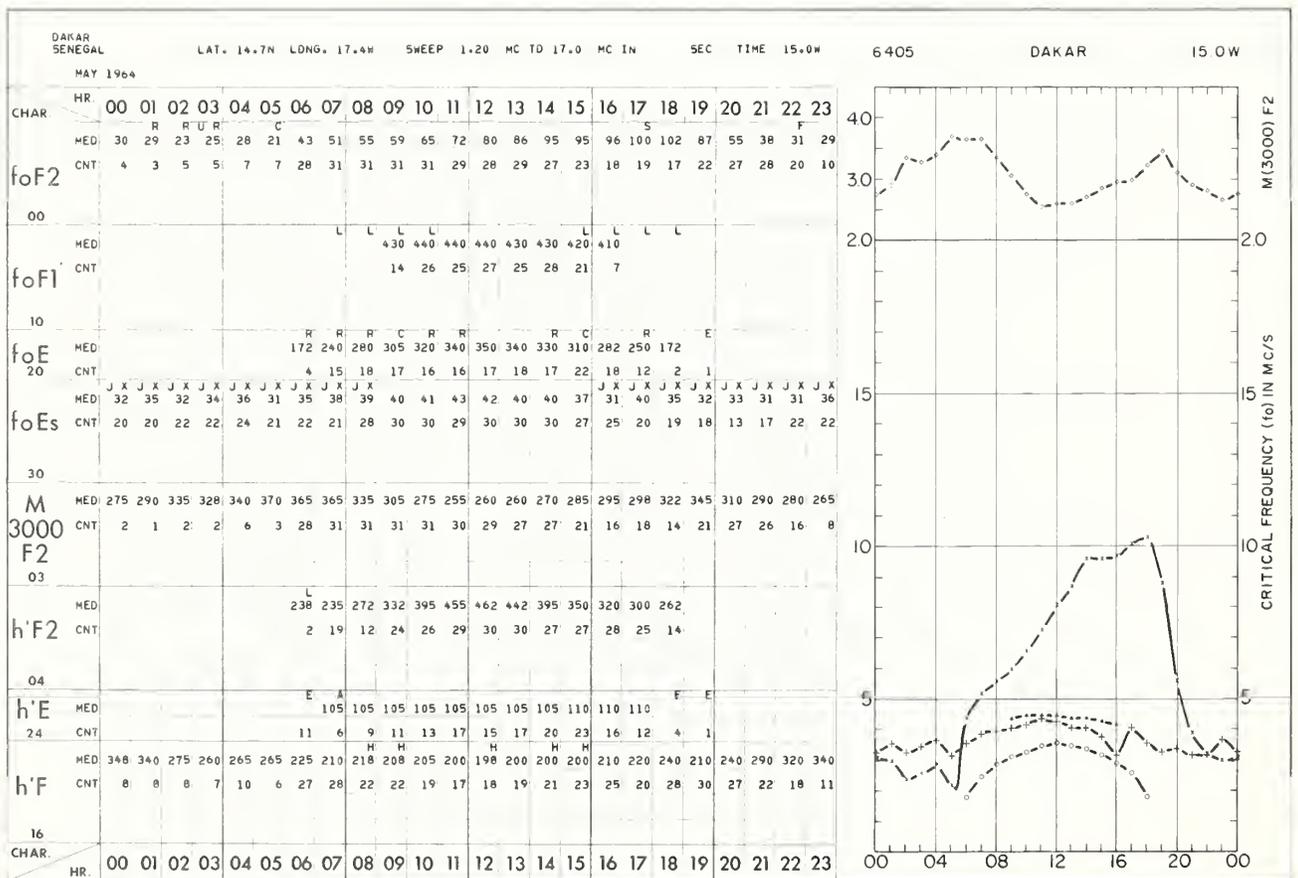
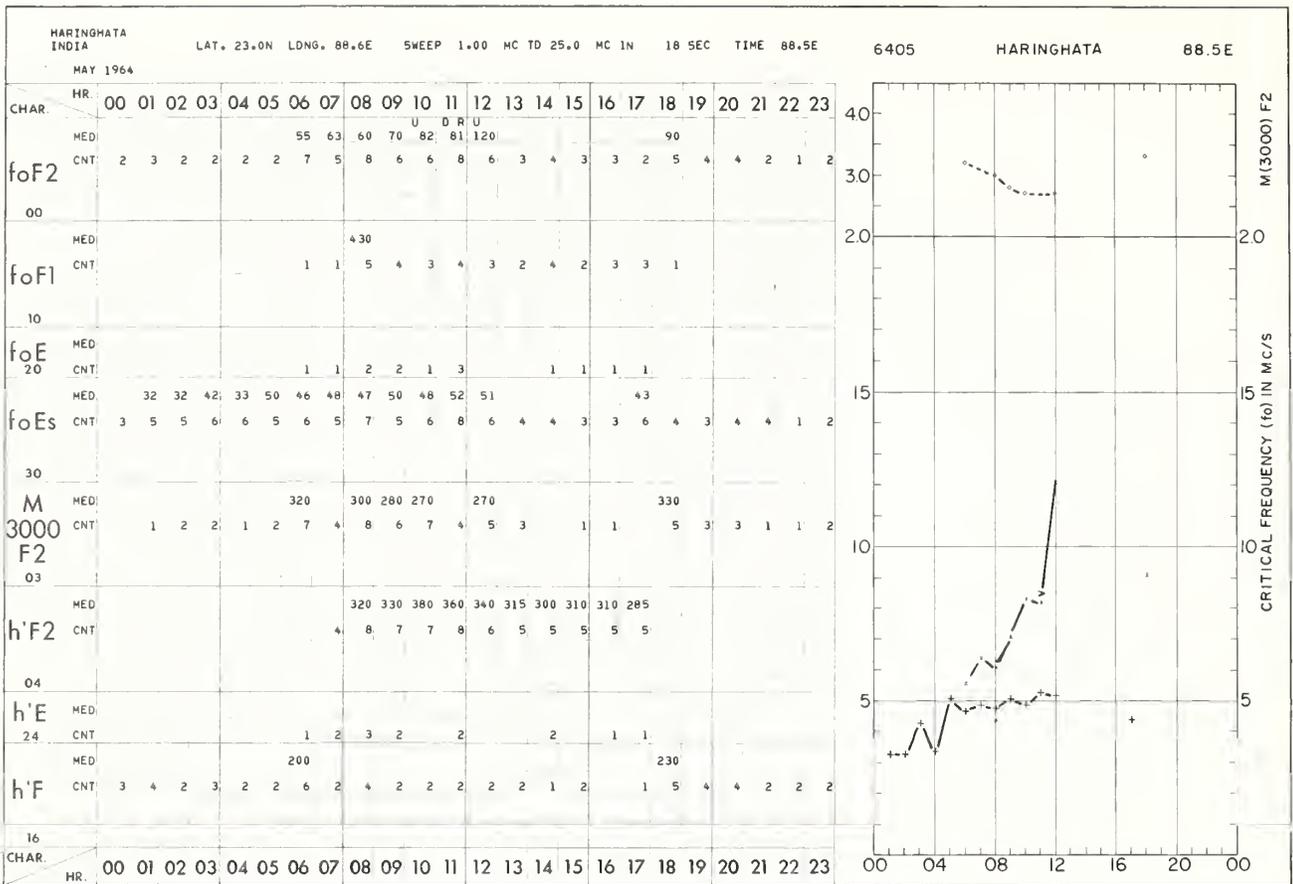


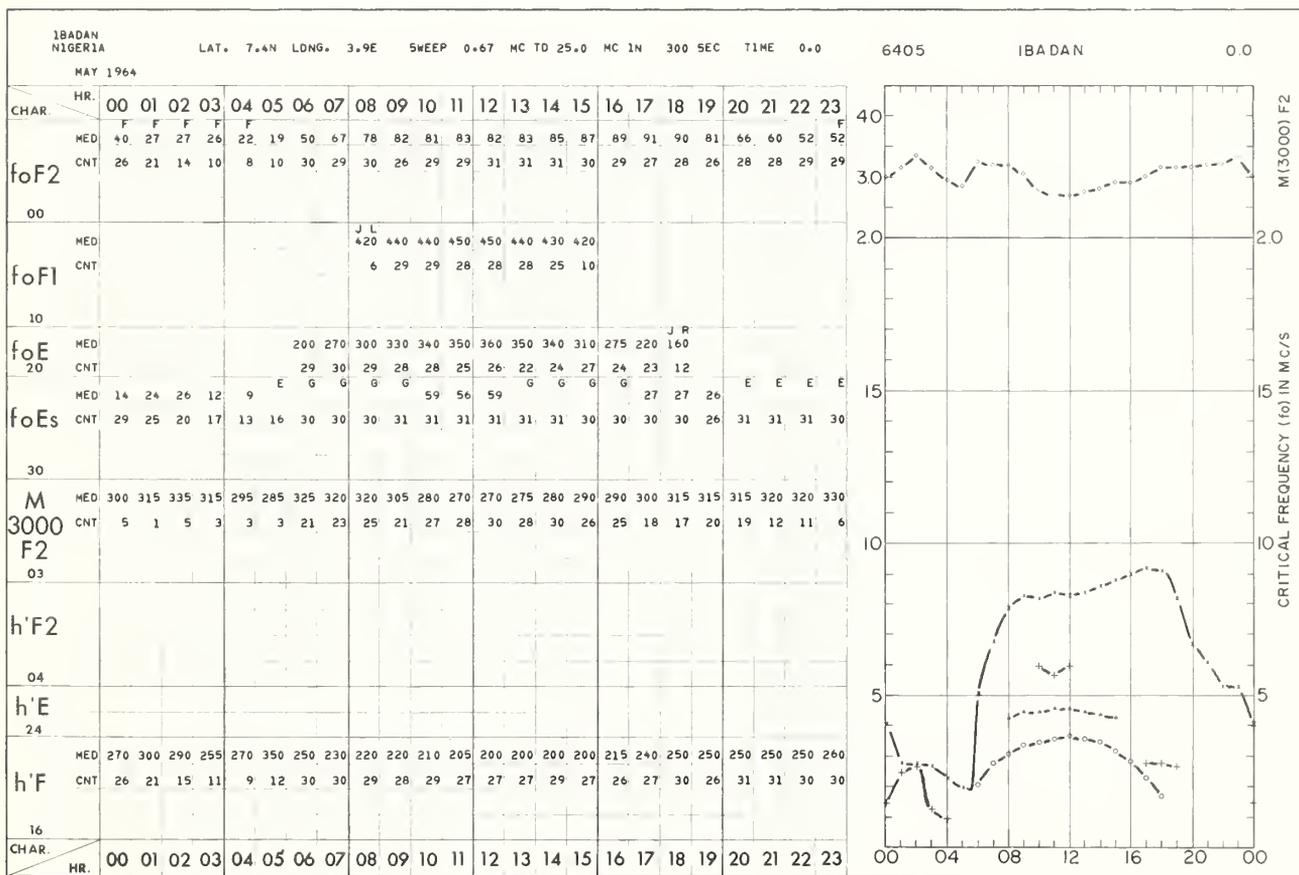
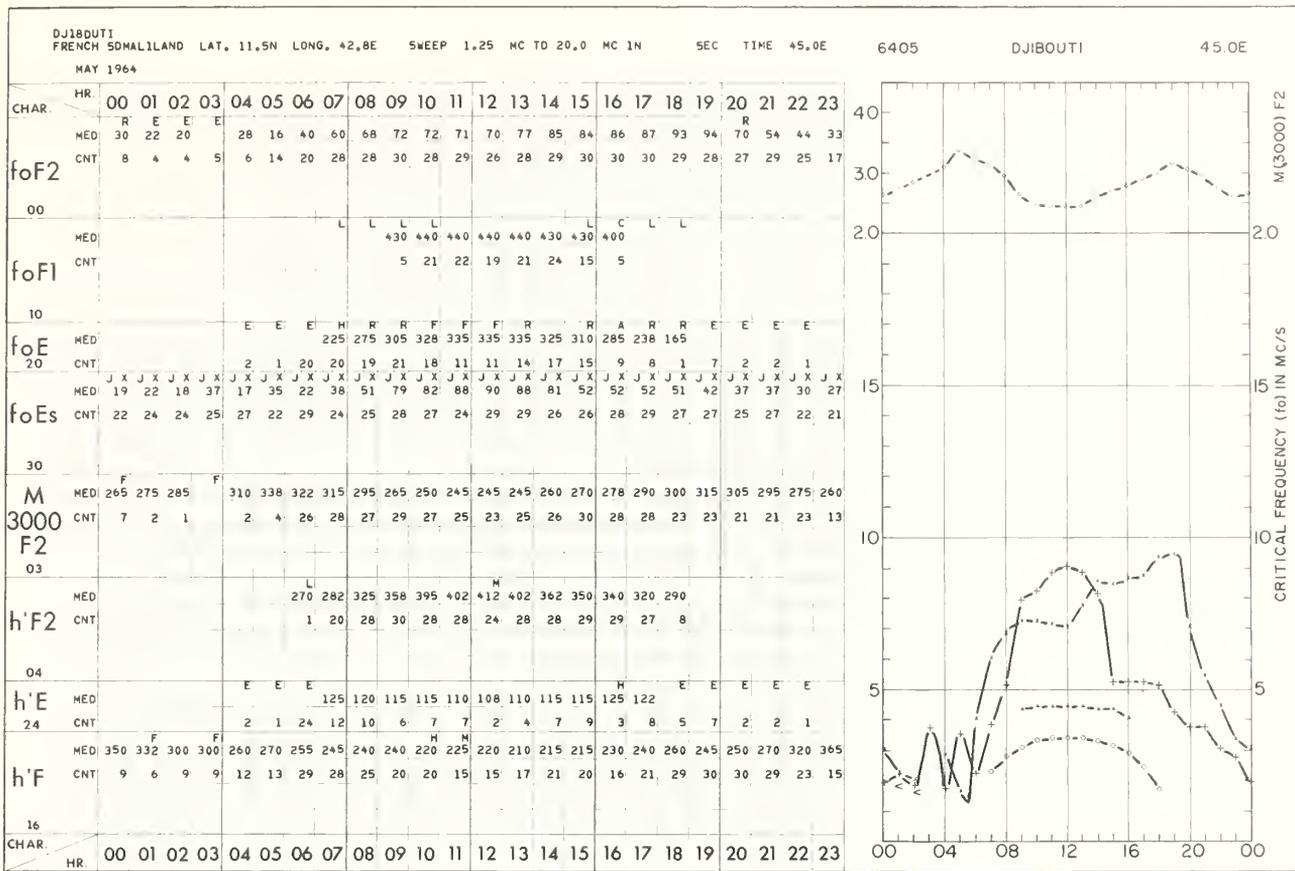


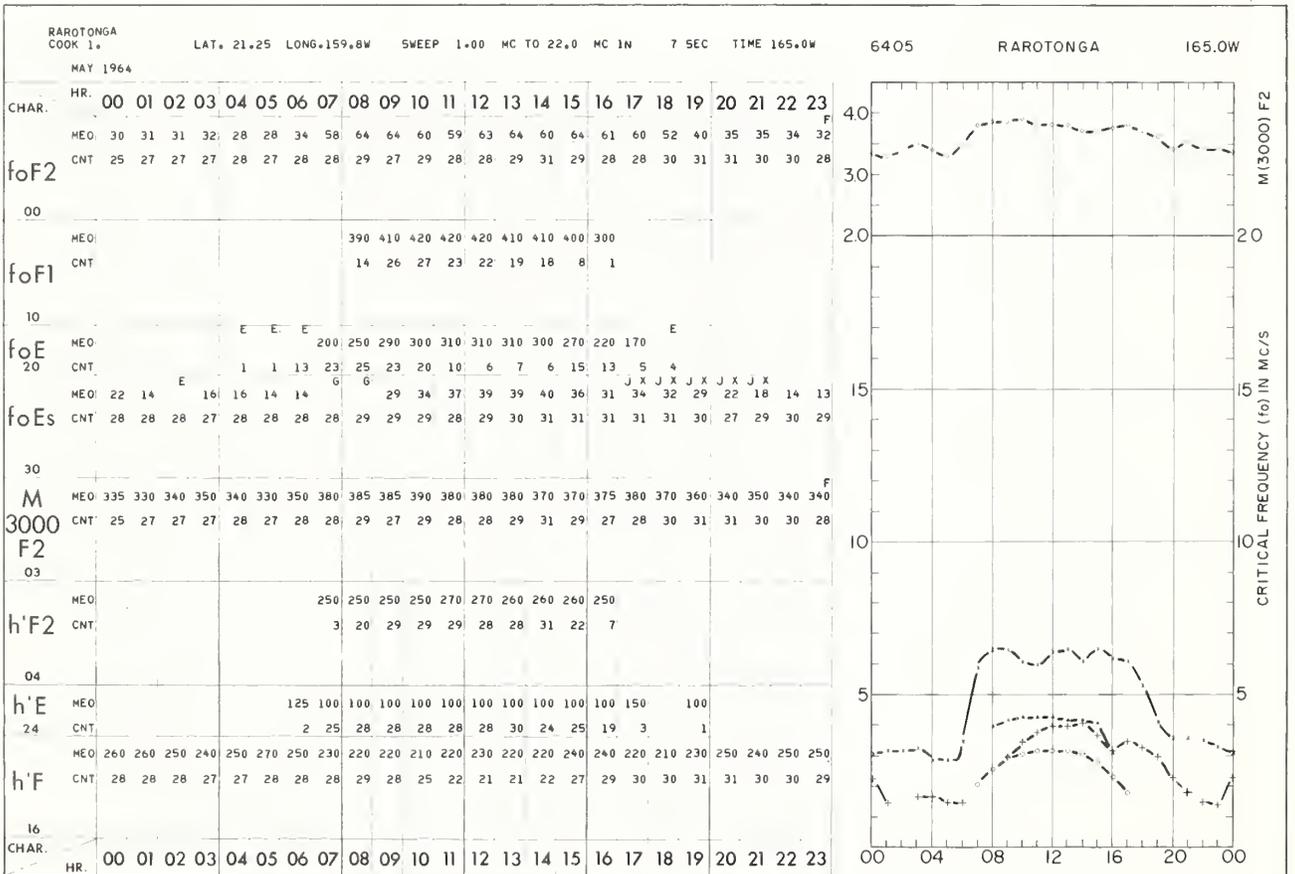
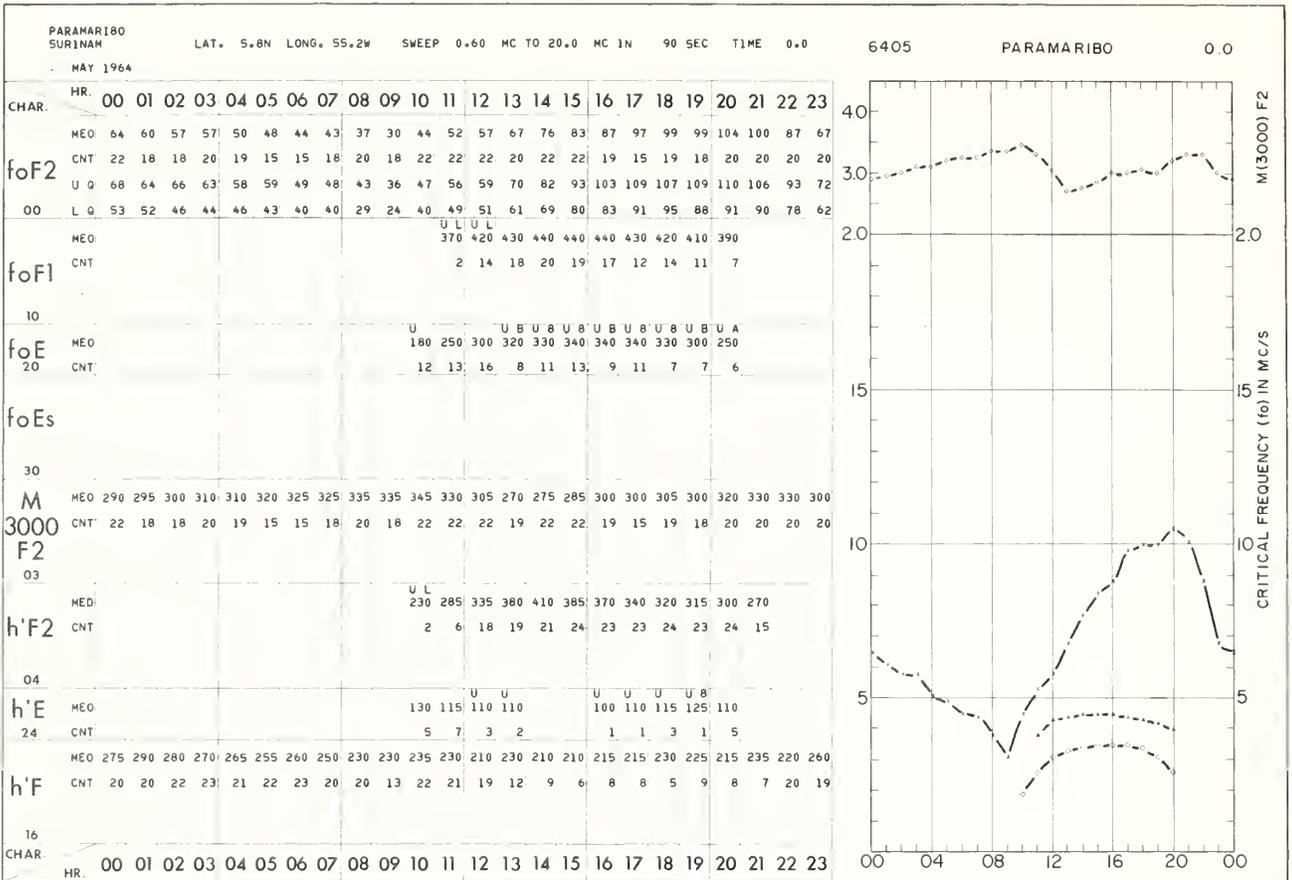


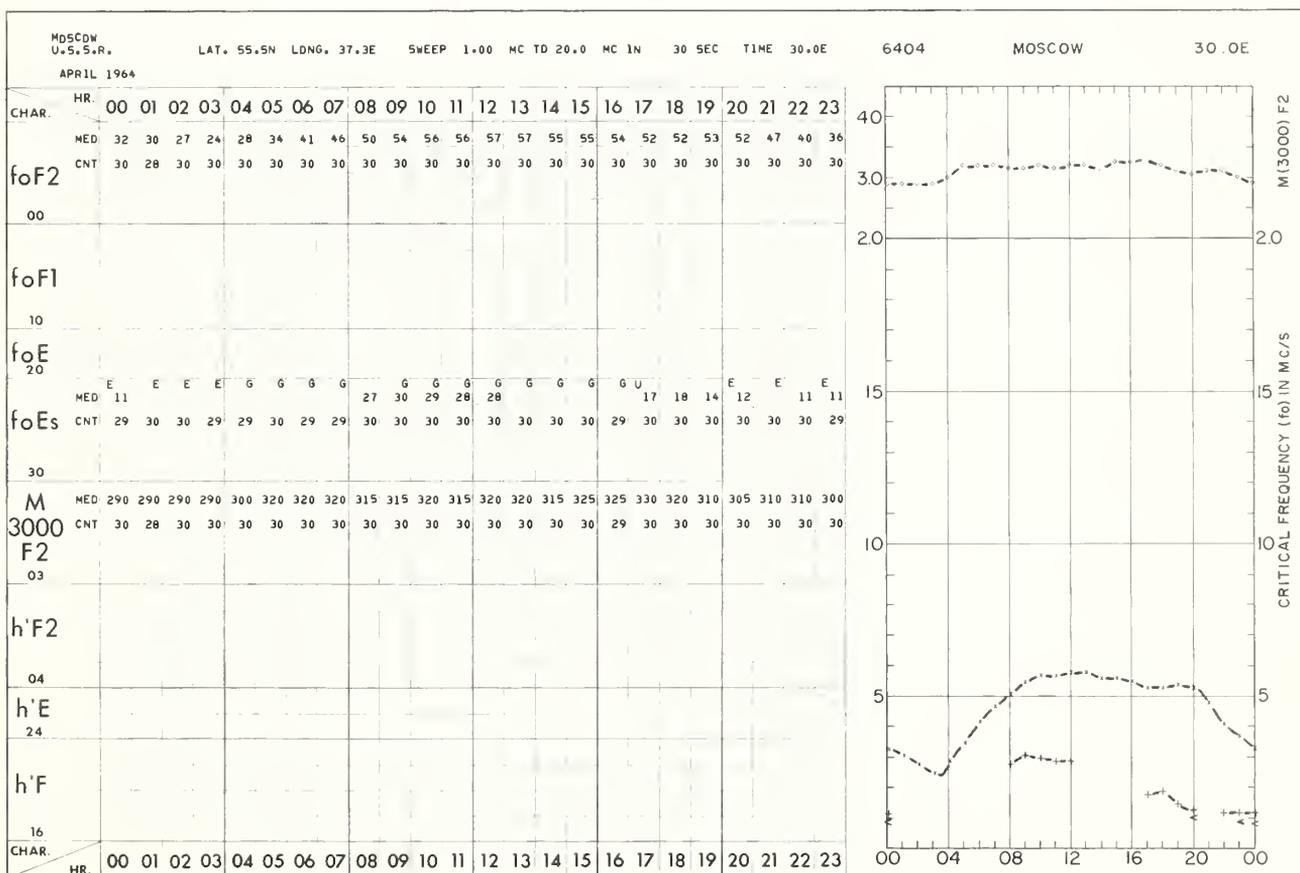
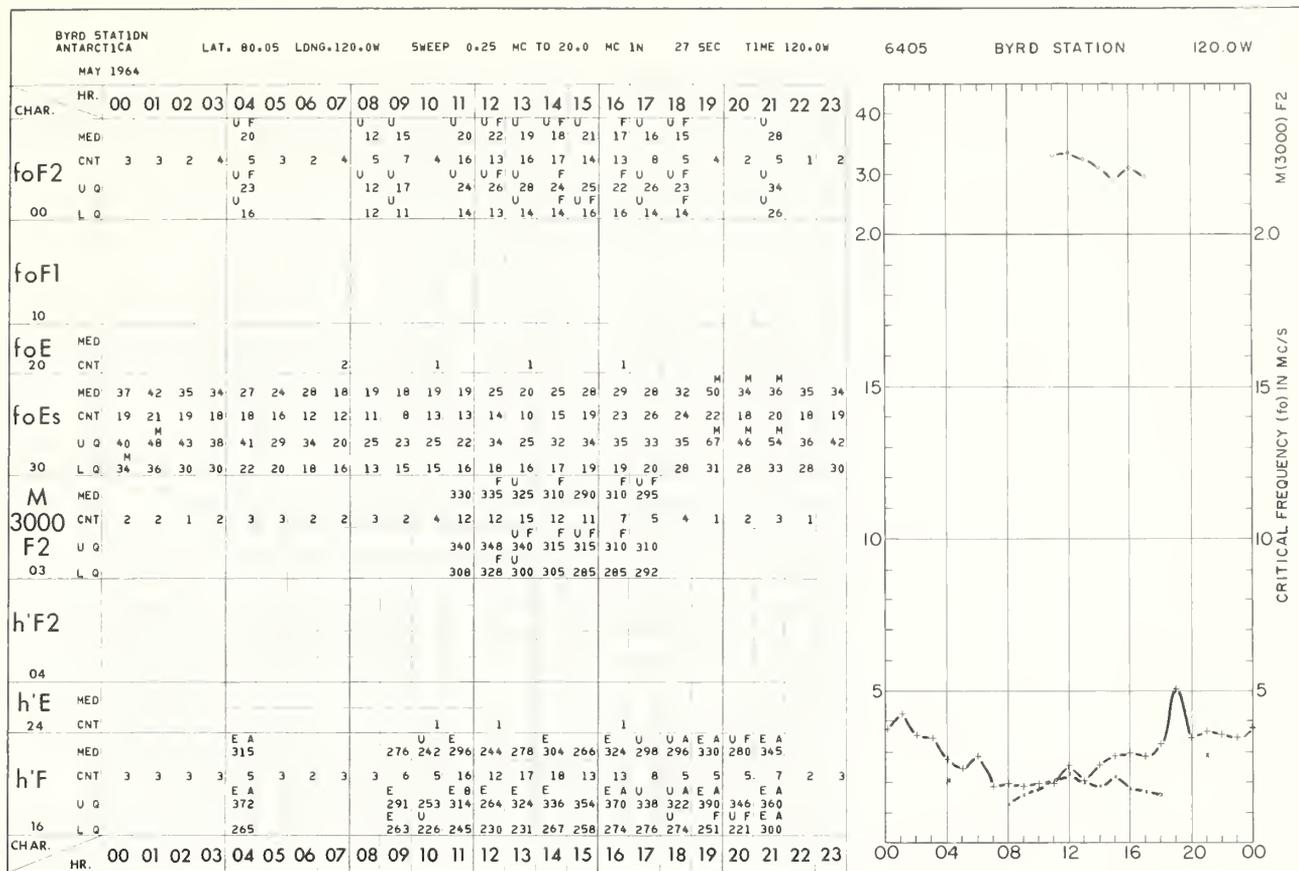


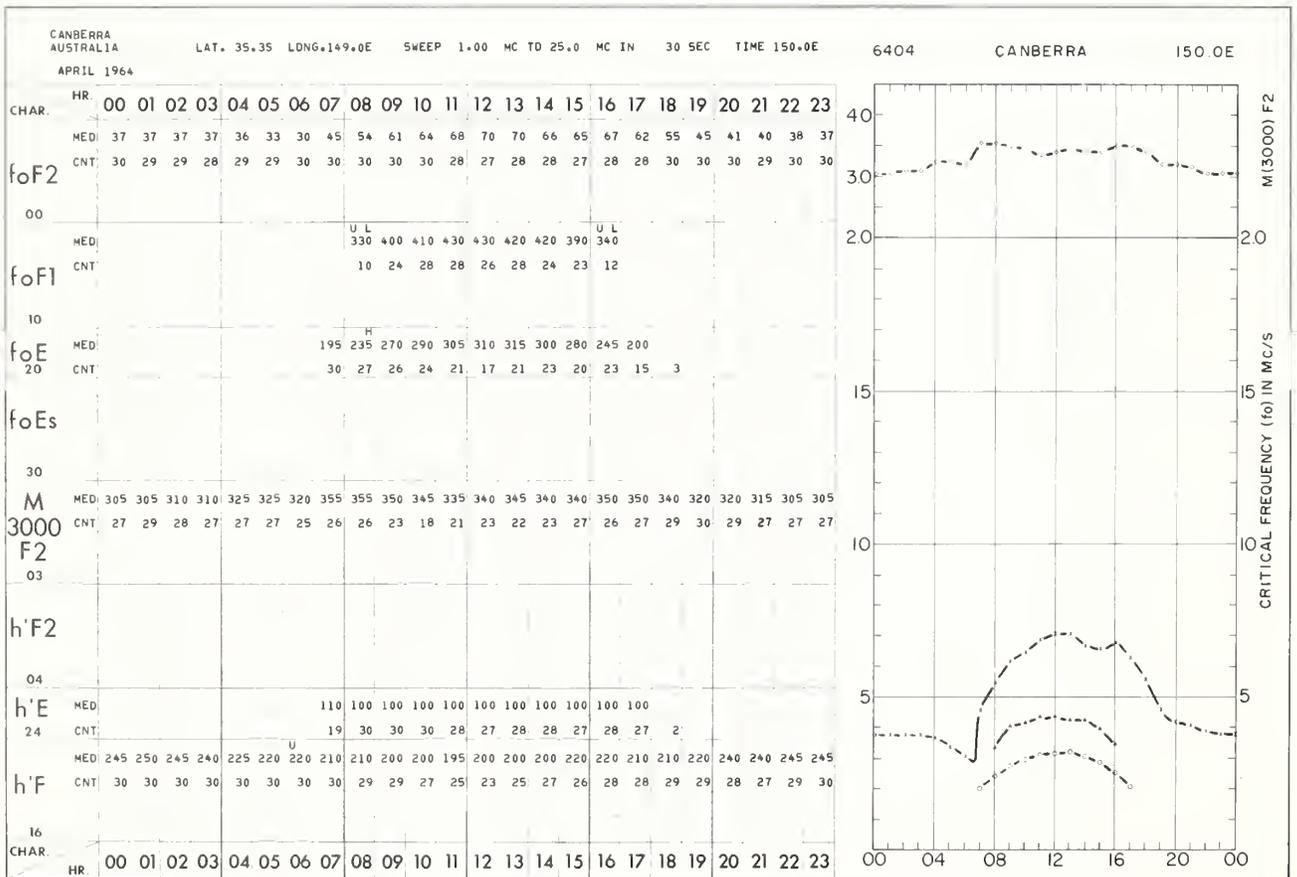


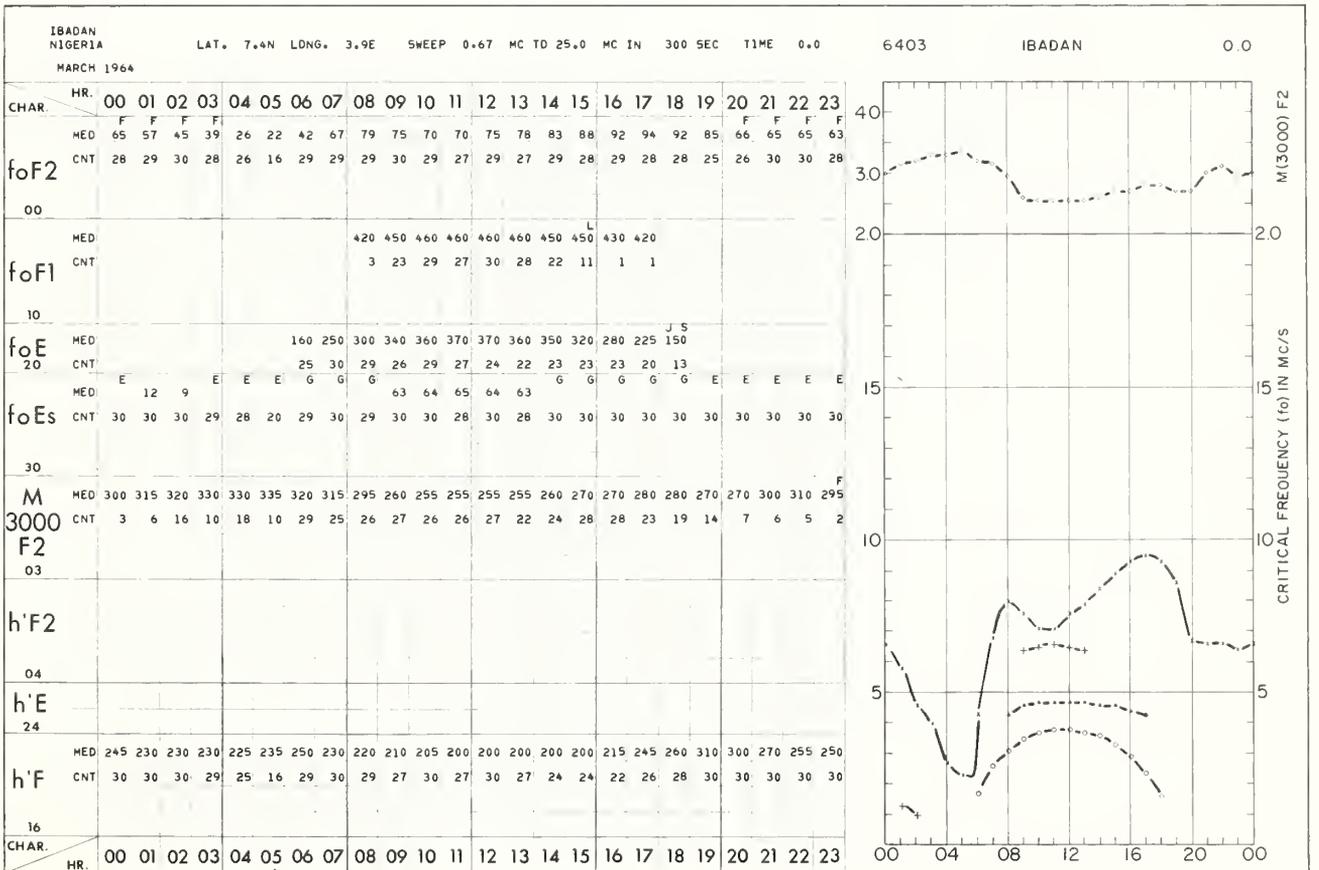
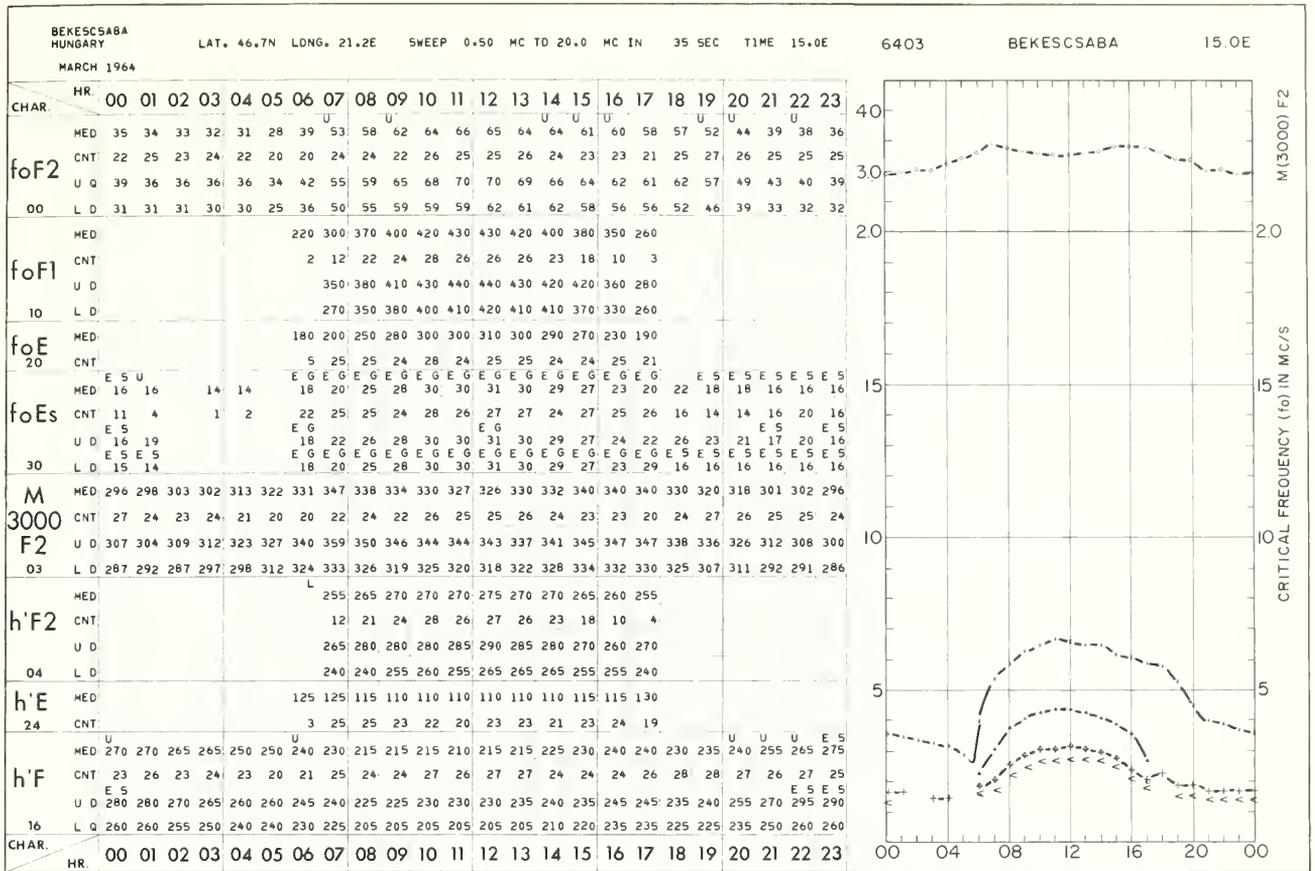


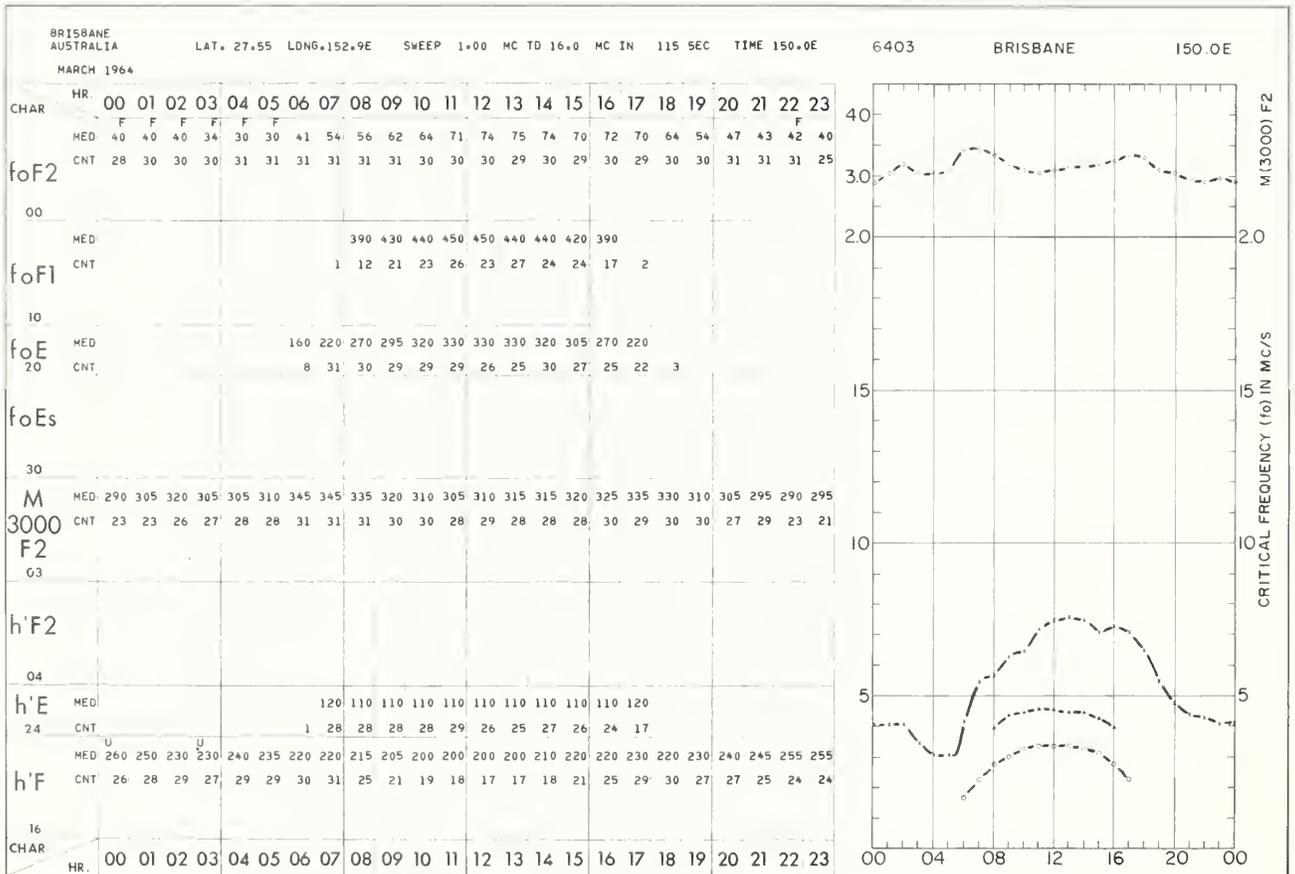
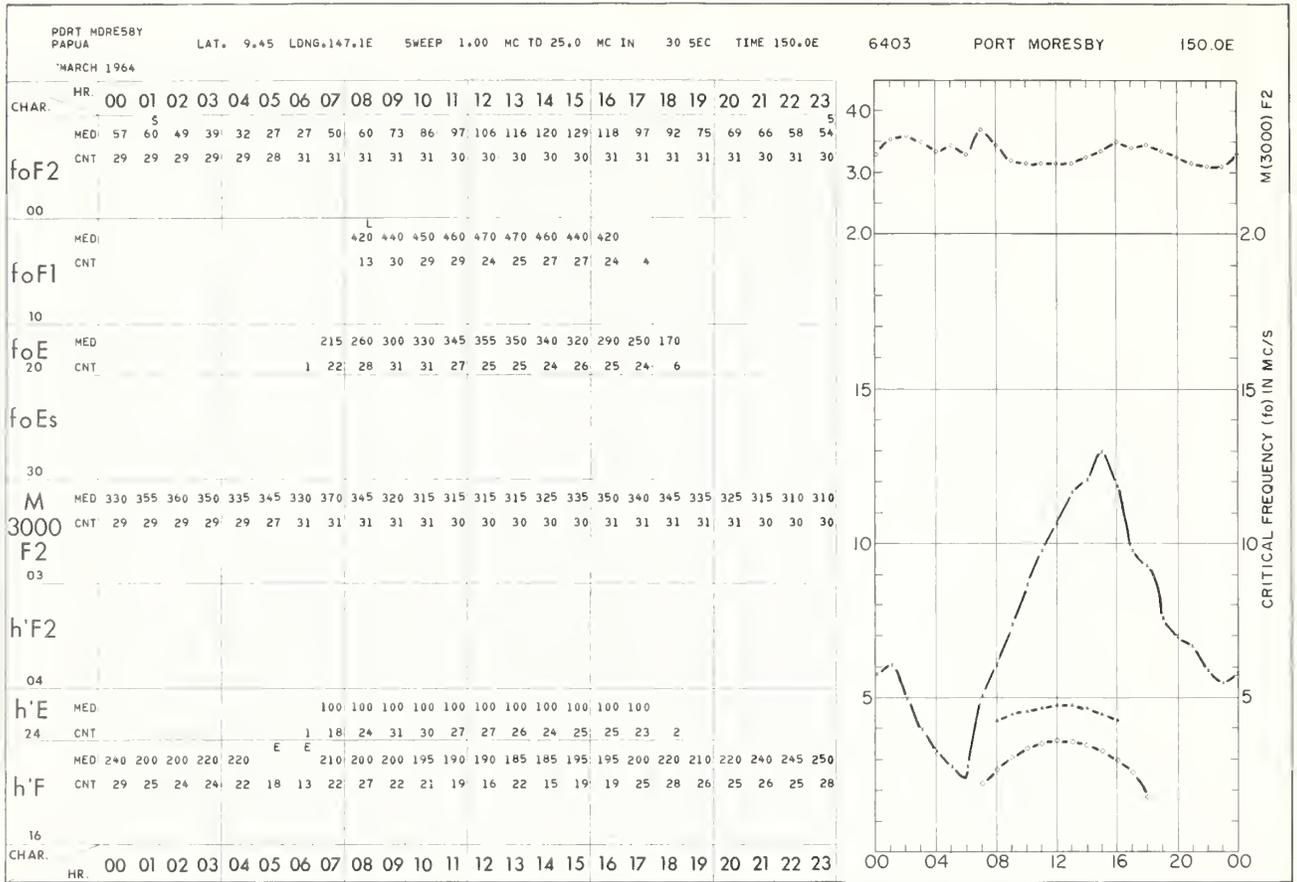


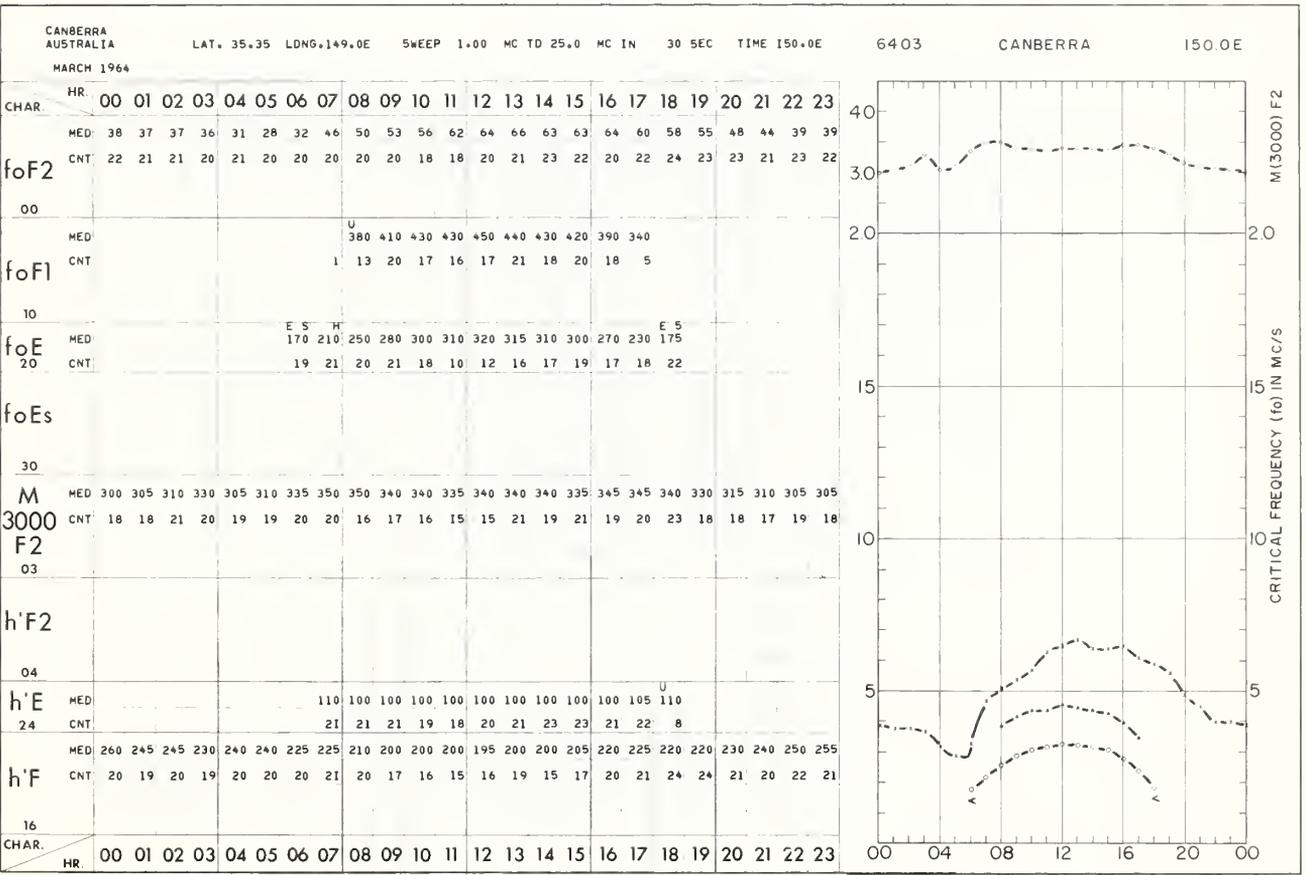
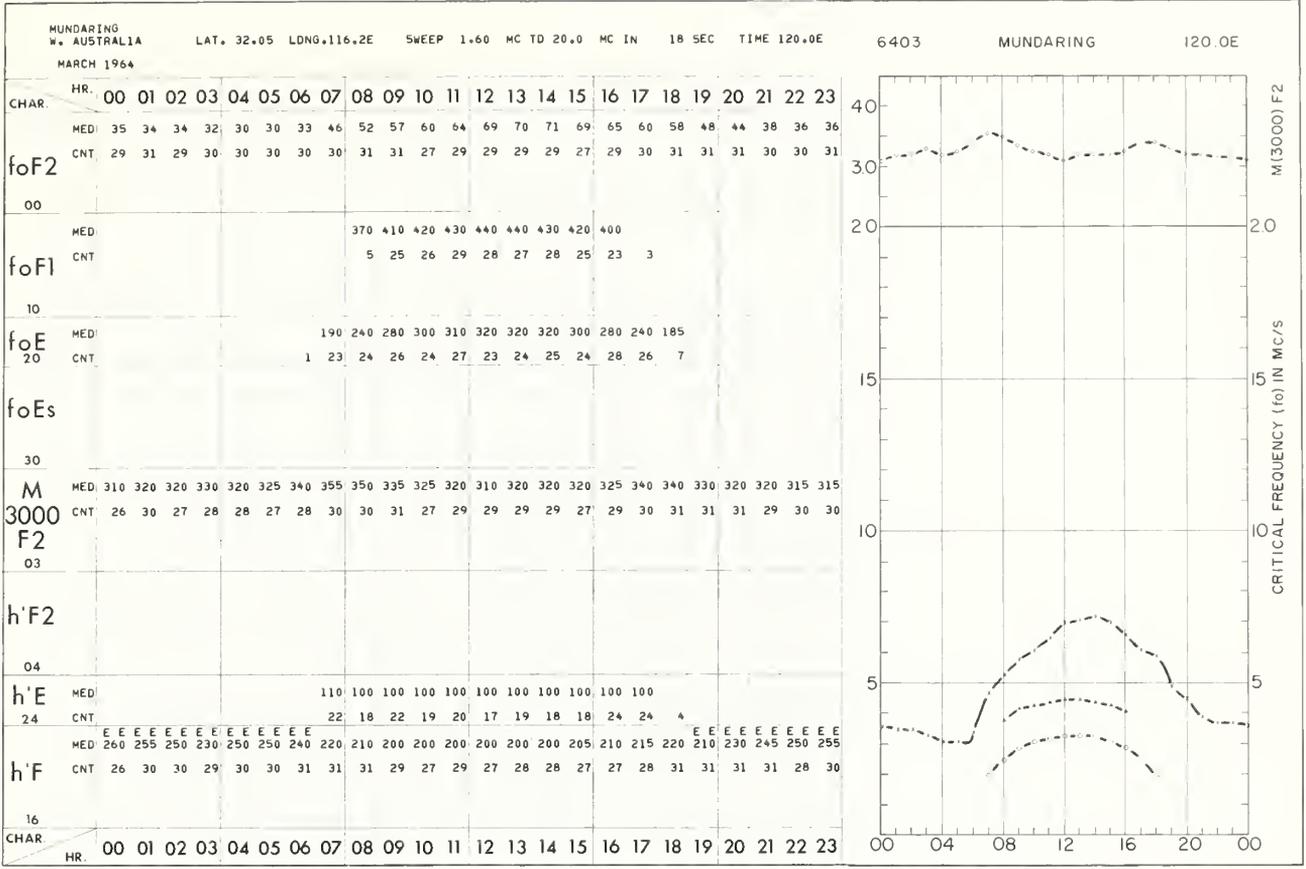


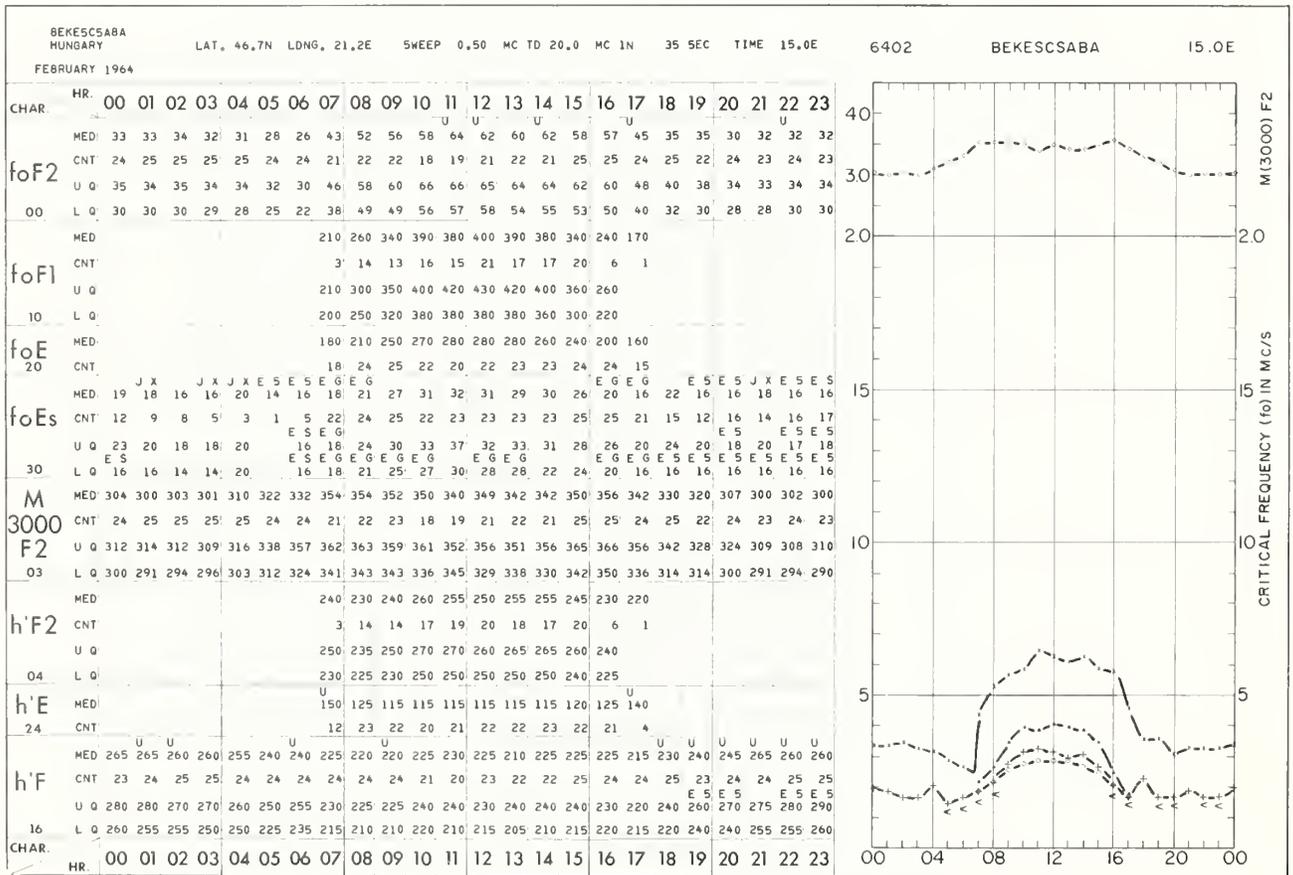
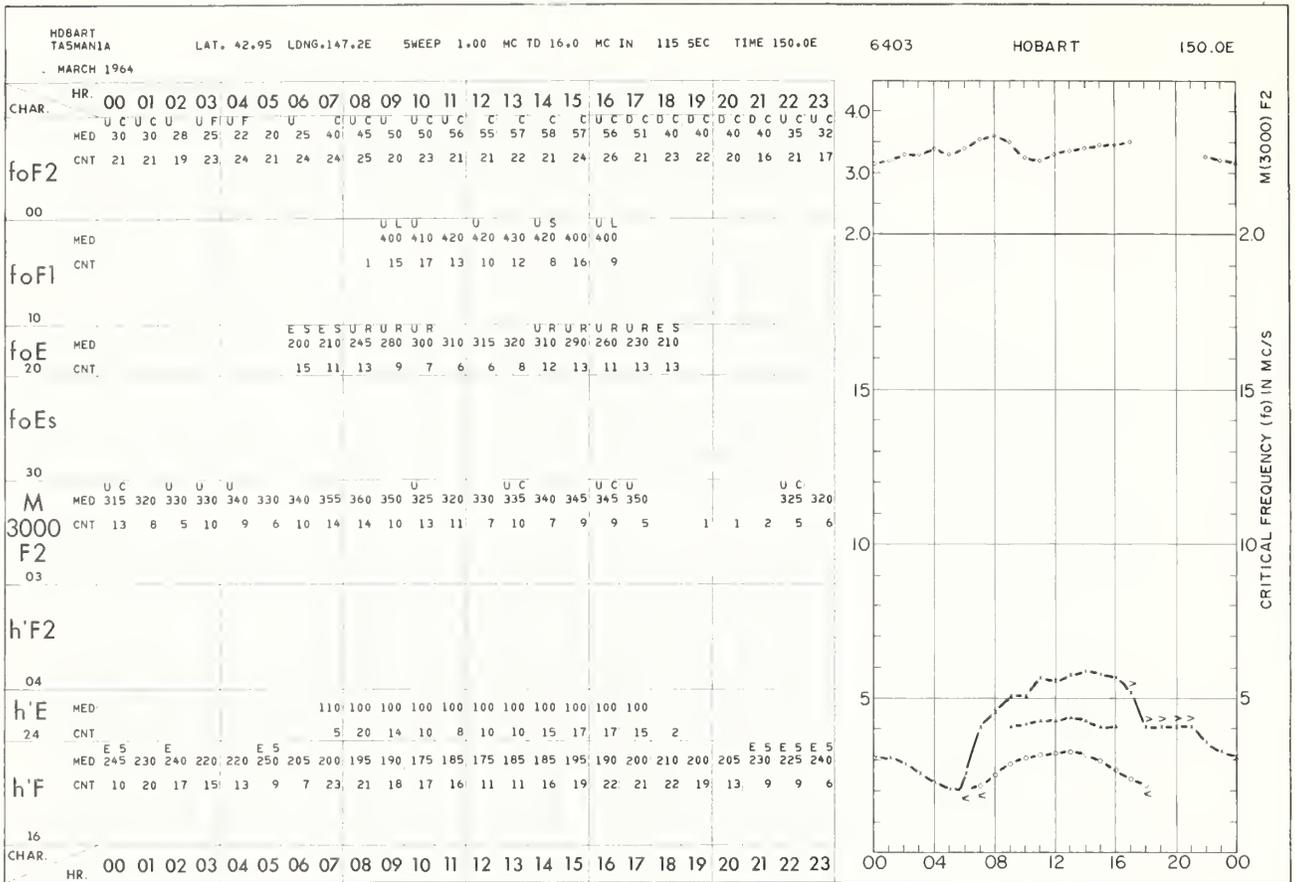


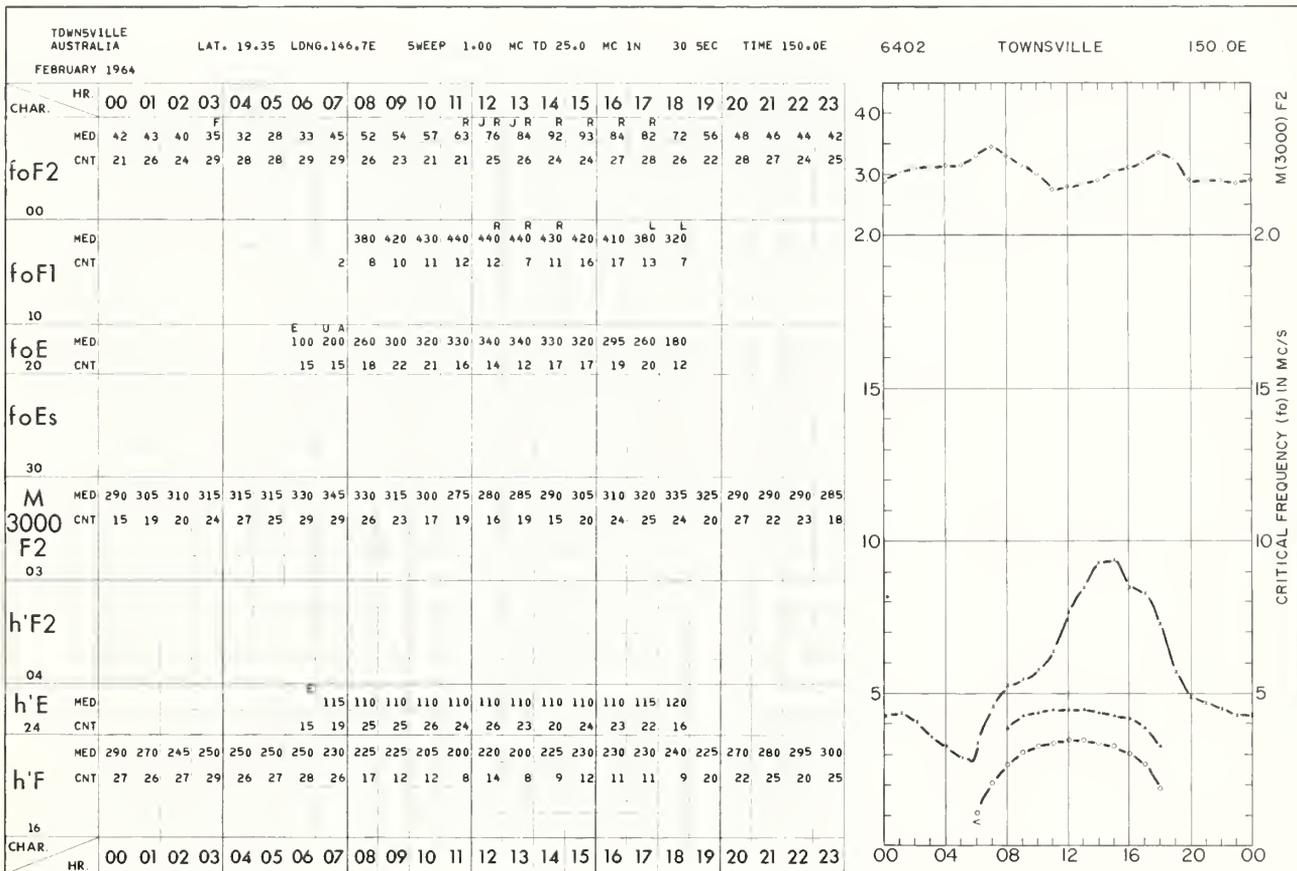
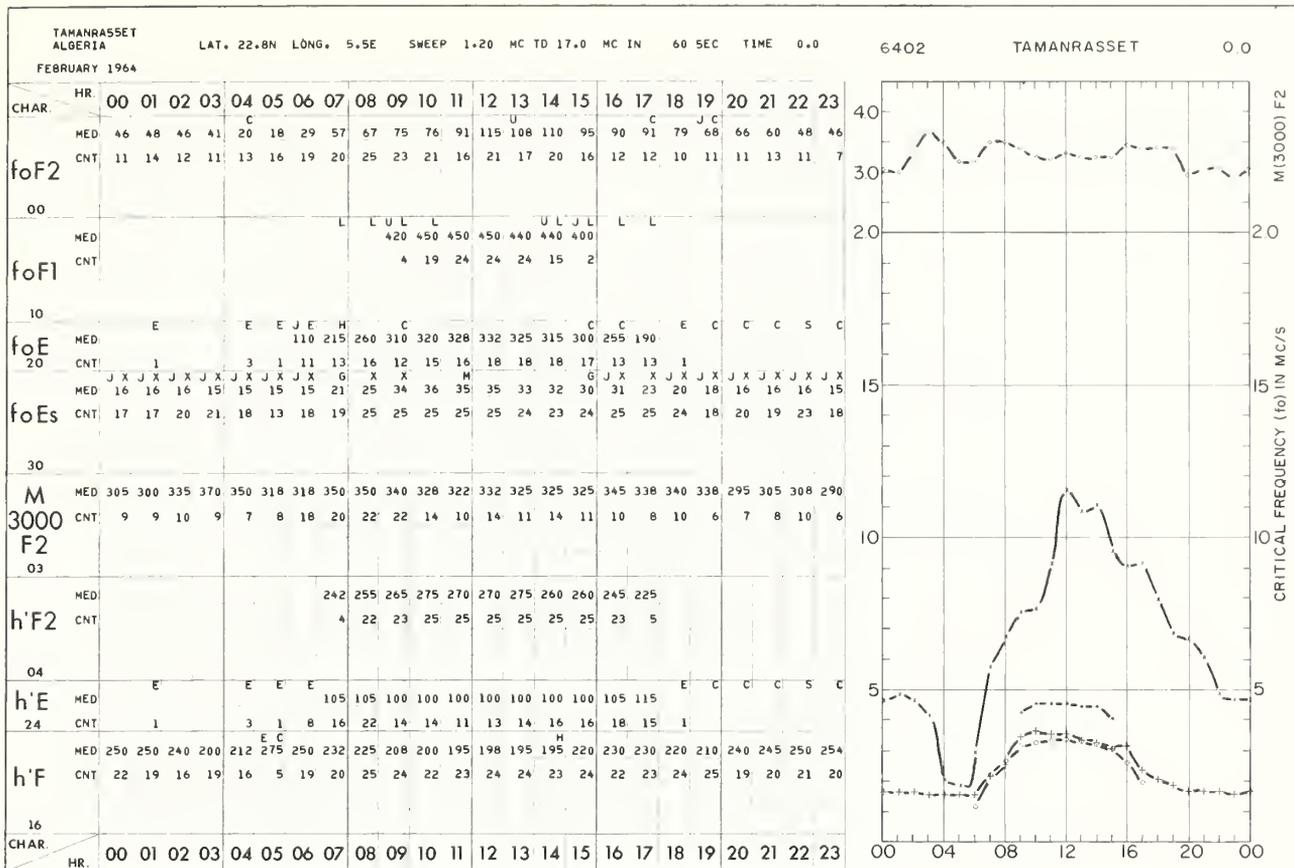


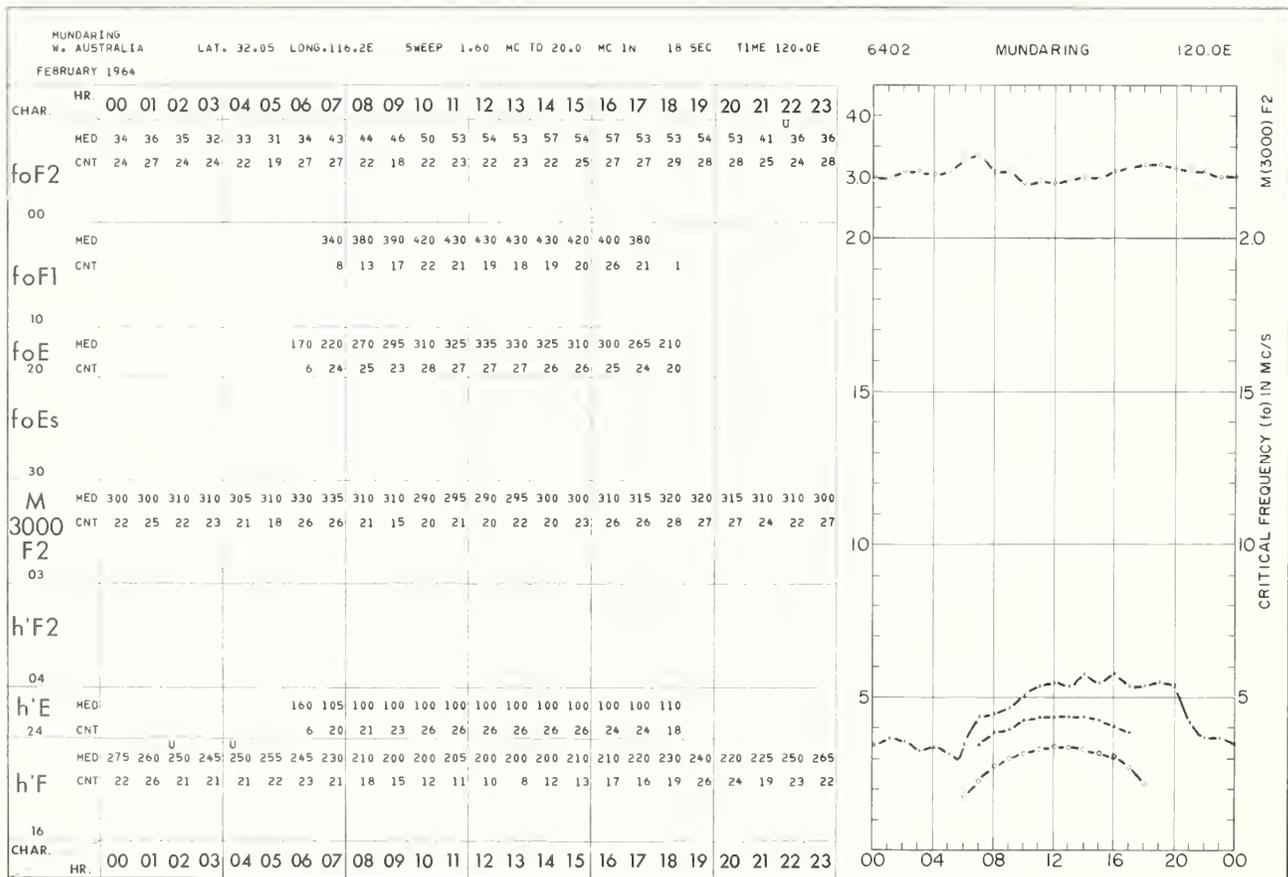
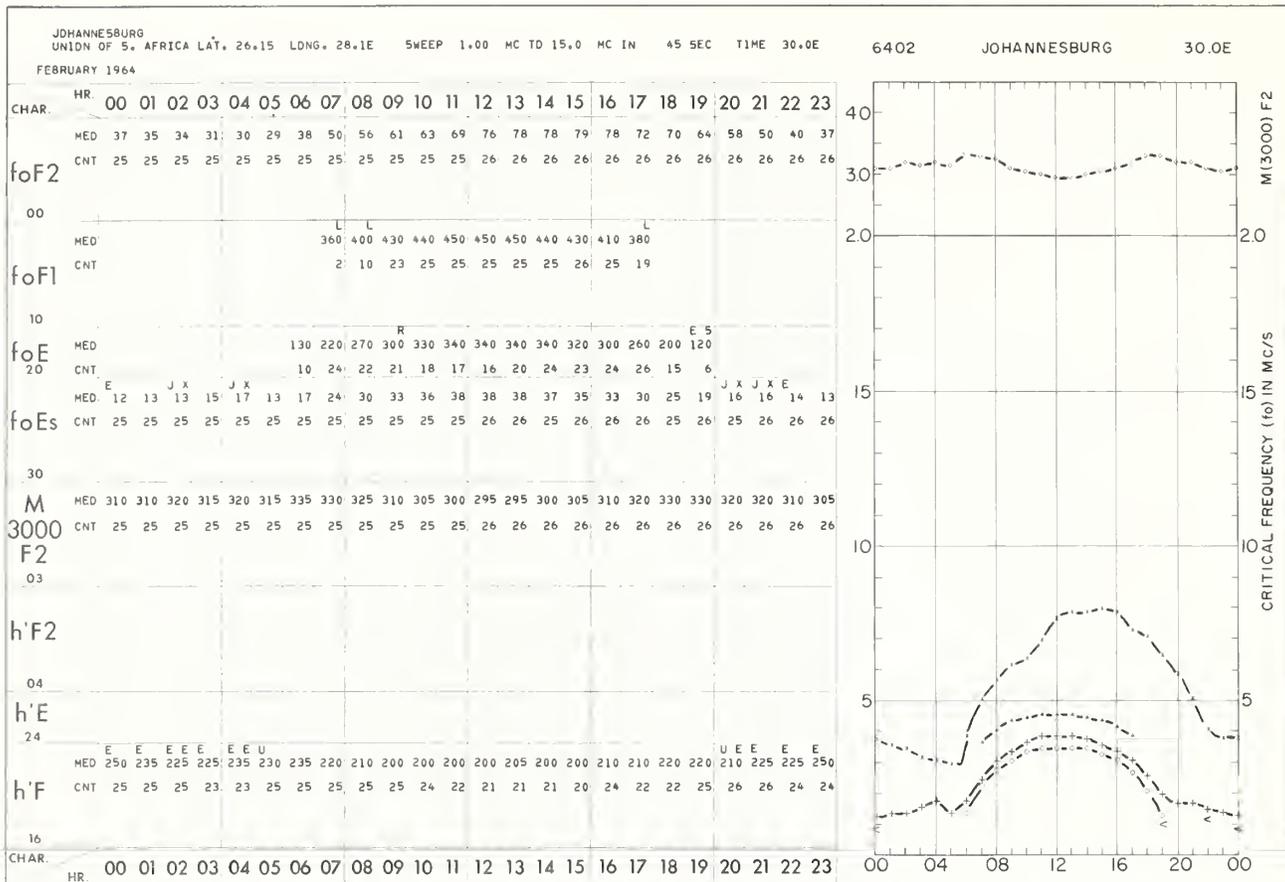


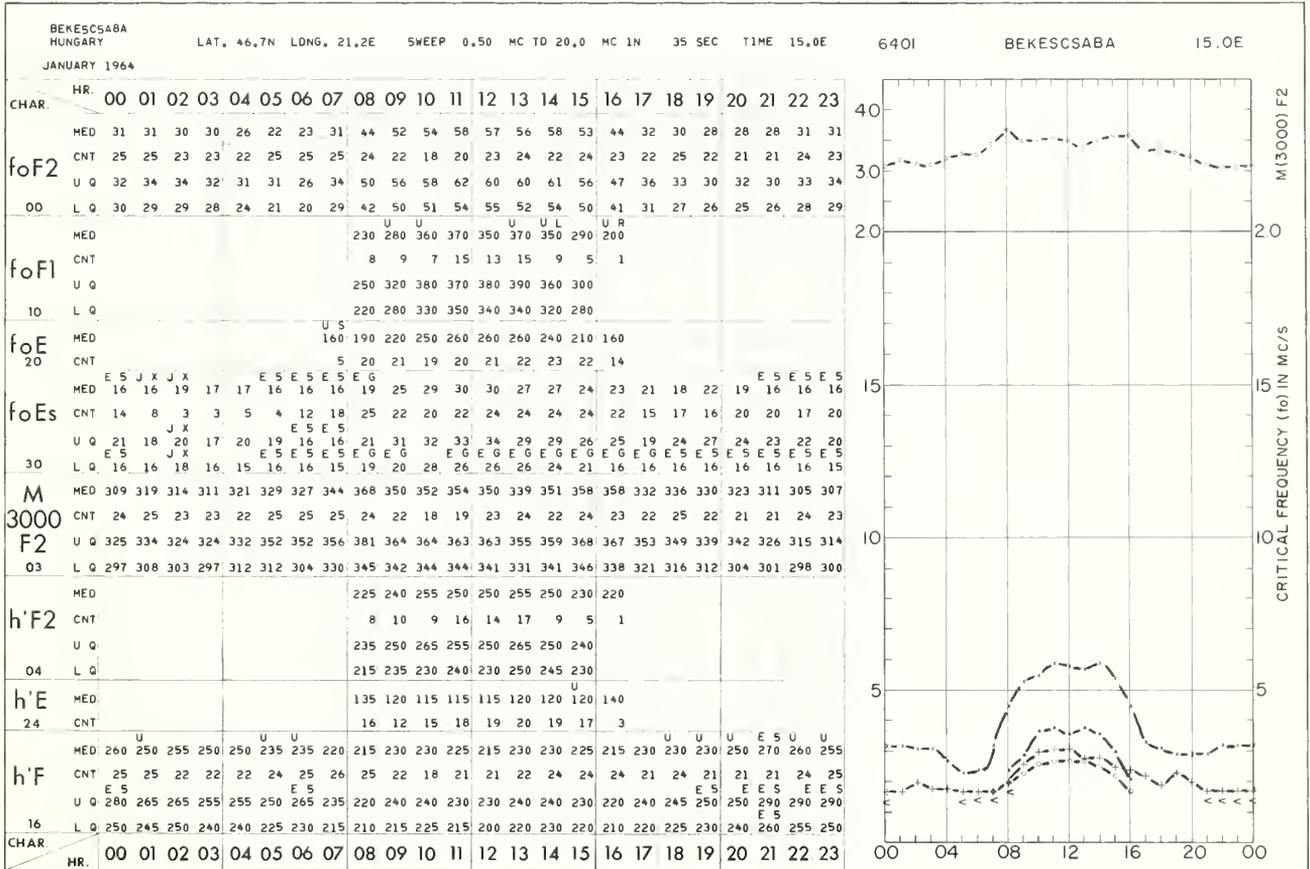
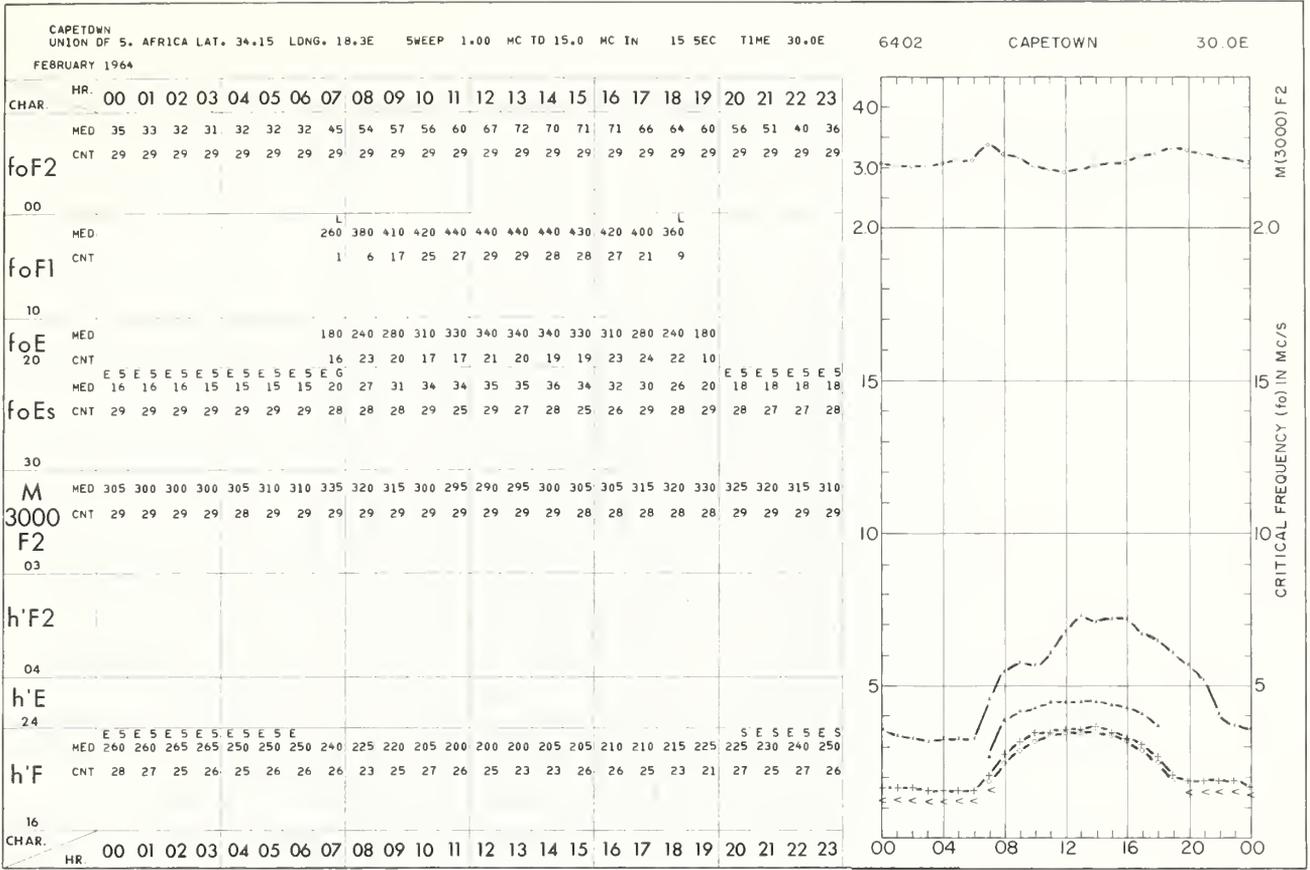


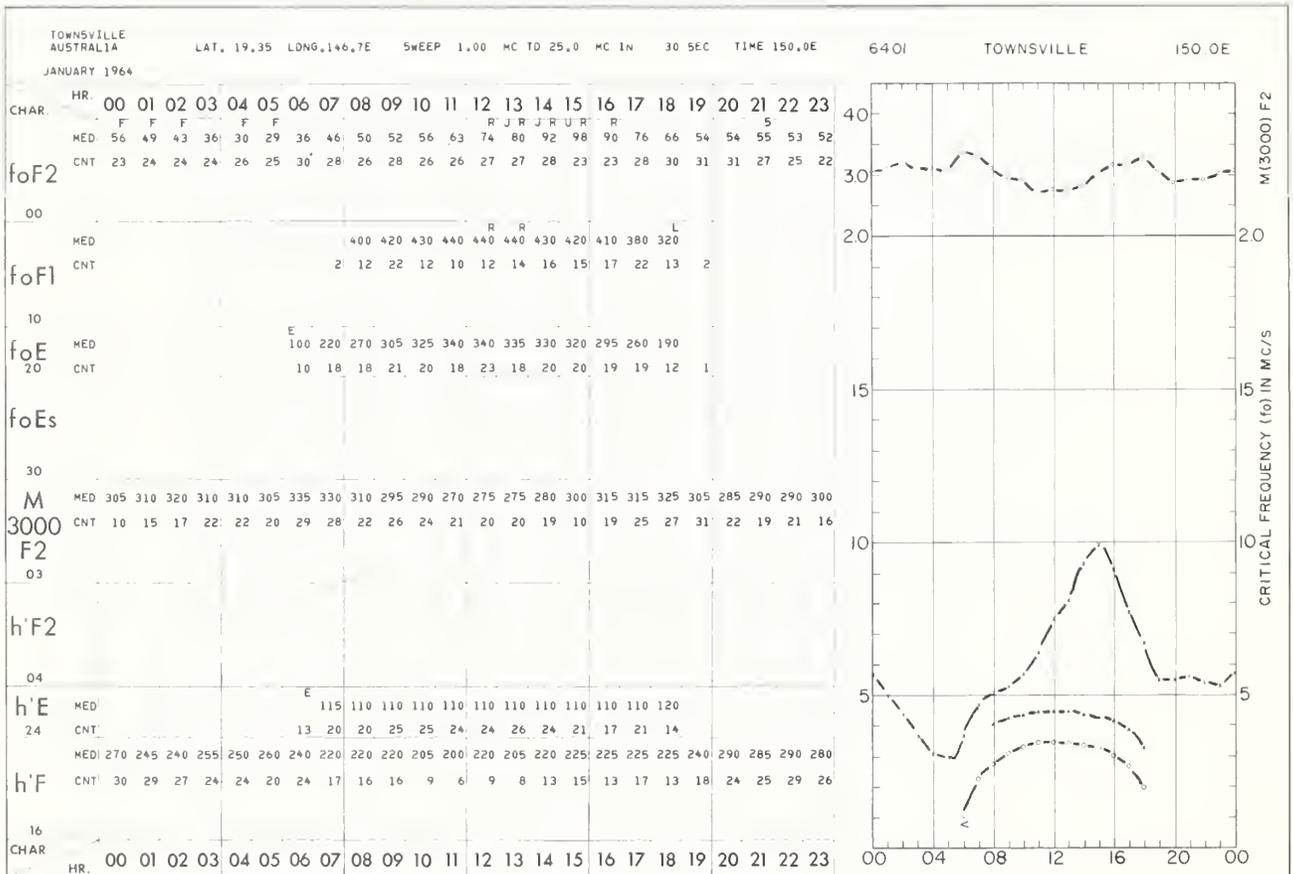
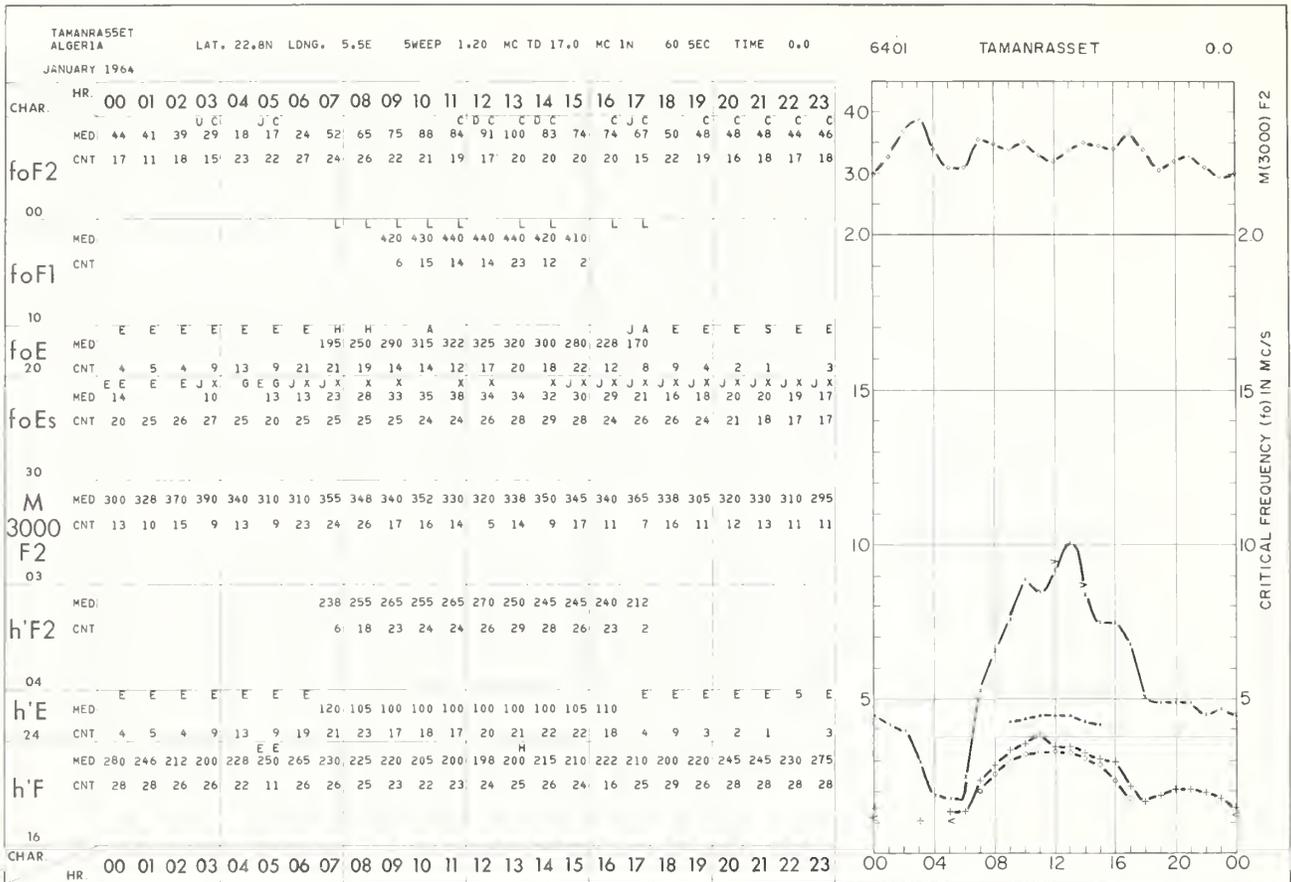












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