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The Sunspot Observations Made In 2004

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In the photospheric observations made at the Istanbul University Observatory, observable sunspots and faculae are drawn on a projected disk of the Sun and the heliographic coordinates of the sunspots are determined from these drawings.

This paper gives the heliographic coordinates for the sunspot groups observed in 2004 and some other results.

The photosphere of the Sun is observed on every clear day at the Istanbul University Obsevatory. A refracting telescope is used for this purpose; the aperture of the objective and focal length are 13 cm, and 200 cm respectively. The Sunspots and faculae are drawn on a projection disk of a diameter of 25 cm. The heliographic coordinates of the sunspots are determined by using the Astronomical Almanac for which the Position Angle of the Sun's axis P_0, Heliographic Latitude B_0, Longitude L_0 are calculated for the time that observation was made. Each sunspot group is observed for a single rotation of the Sun and the results obtained during the period are given in Tables and in Figures.

In this paper, cloumns in Table I give the followings: (I): Current numbers of the groups; (2) and (3): The mean latitude of each group respectively; (4) and (5): First and last observations of the groups respectively; (6): Evolution of the groups which are classified according to McIntosh Sunspot Group Classification (Solar Geophysical Data, 1987). First letter in coloumn gives "Modified Zürich Class", the second letter gives the penumbra of the largest spot, and the third letter gives the number of umbrae in each group. The question mark "?" denotes a group which was observed at the edge of the disk and could not be identified in the McIntosh Classification. "----" is used to express that no observation was done on that day because of bad weather conditions or other reasons.

In 2004, 222 groups were observed 4 of them have a latitude of 0^0, 73 of them have an average latitude of $+10^0$ in the North Hemisphere and remained 145 groups have an average latitude of -11^0 in the South Hemisphere. The distribution of the groups according to their latitudes is shown in Table II and Figure 1.

In Table III, number of groups and umbrae are given by decimal numbers for each day; the integer part of these numbers denote the numbers of the groups and the fractional part numbers of umbrae. Letters across these numbers are the abbrevations of the observers' names; the complete names are given at the end of the Table III.

Table IV and Table V give the relative Wolf Numbers for the İstanbul University Observatory and the distribution of the groups in types, respectively. The data in Table V is summarized in Figure 2.

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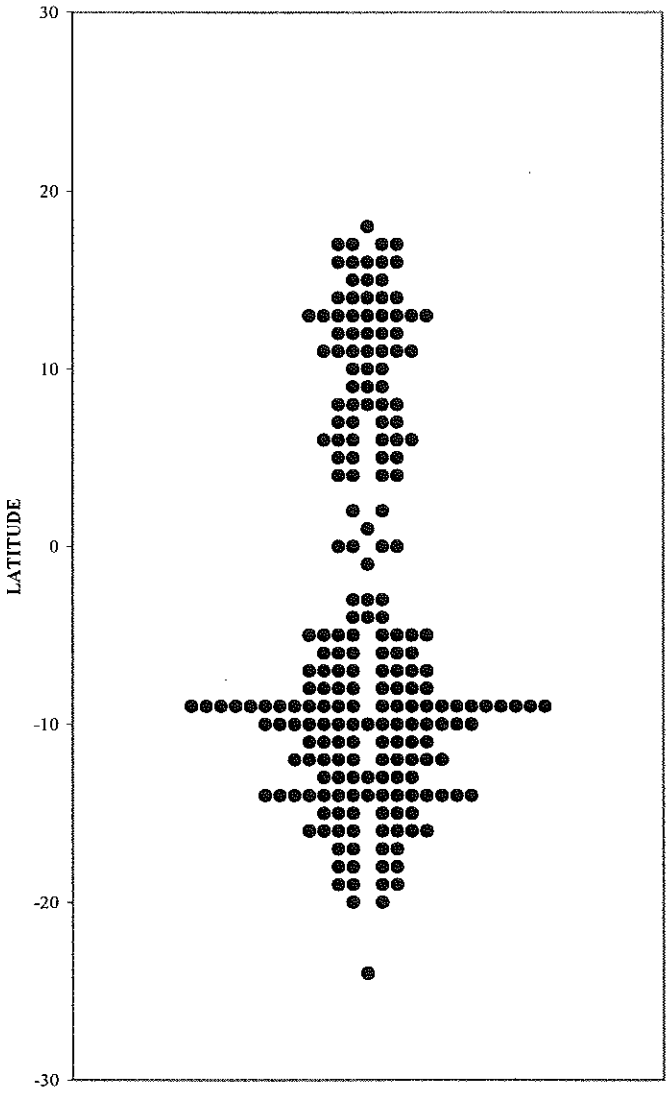

Fig. 1 : Distribution of the groups according to their latitudes.

Table II

	Latitude Intervals	North Hemisphere	South Hemisphere
	00	4	0
From	01 to 05	13	15
From	06 to 10	21	61
From	11 to 15	29	46
From	16 to 20	10	22

From	21 to 25	0	1
From	26 to 30	0	0
From	31 to 35	0	0
From	36 to 40	0	0
From	41 to 45	0	0
	TOTAL	77	145

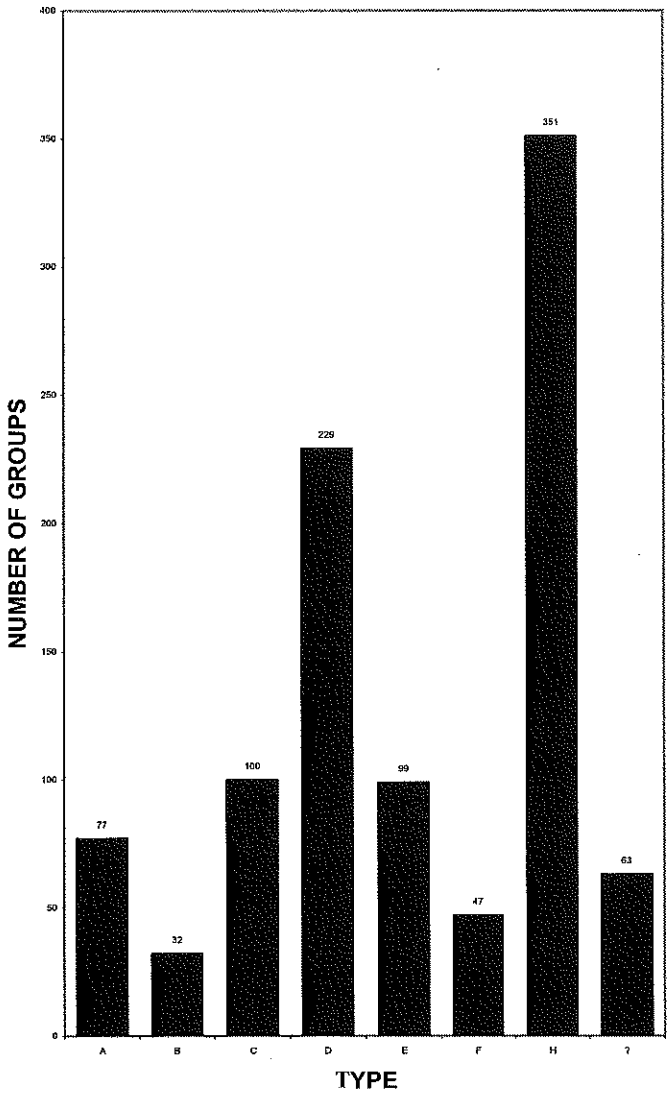

Fig. 2 : Distribution of the groups in types

Table IV

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	59	79	64	34	65	-	33	-	-	34	117	41
2	44	-	45	52	56	42	32	47	-	24	-	44
3	-	-	-	60	48	56	46	47	-	46	98	42
4	-	-	-	69	63	68	43	43	33	39	78	36
5	-	-	55	82	50	46	15	29	78	37	87	58
6	41	76	-	44	29	40	35	44	53	24	103	23
7	35	55	46	69	25	51	-	76	61	-	86	-
8	-	81	44	27	32	36	39	47	82	-	80	22
9	56	46	-	29	26	68	49	81	75	0	79	11
10	43	41	32	25	58	36	50	82	69	0	-	15
11	-	59	-	23	50	36	100	113	68	0	60	-
12	-	-	51	36	68	27	79	127	60	-	53	28
13	-	-	43	-	71	49	155	151	76	-	-	20
14	40	40	47	58	-	50	121	116	53	-	-	-
15	-	68	39	-	101	52	121	-	61	29	-	11
16	-	62	35	37	119	102	128	-	58	30	-	11
17	69	22	47	-	113	79	125	58	75	81	54	-
18	51	22	43	-	94	-	183	62	69	75	46	37
19	65	22	72	-	87	-	137	58	59	86	61	-
20	56	-	84	67	90	135	139	92	37	97	-	-
21	-	-	64	-	72	89	135	94	47	103	36	-
22	-	40	74	53	74	135	121	108	45	-	47	-
23	-	-	82	49	112	-	151	-	17	157	26	-
24	-	-	93	53	87	94	134	60	16	146	-	31
25	22	60	159	34	70	61	100	44	22	141	63	18
26	-	71	104	41	64	67	103	30	22	143	50	16
27	0	69	124	-	57	-	80	33	22	-	60	11
28	-	59	76	-	65	46	53	-	11	160	-	26
29	-	93	63	35	-	37	30	26	47	156	53	-
30	-	-	79	43	56	29	31	-	36	132	-	17
31	-	-	74	-	-	-	30	-	-	140	-	-
Mean	45	56	67	46	68	61	87	70	50	78	67	26

Table V

Evolution Type	**A**	**B**	**C**	**D**	**E**	**F**	**H**	**?**	**Total**
Number of Groups	77	32	100	229	99	47	351	63	998
Percentage of Number	7,72	3,21	10,02	22,95	9,92	4,71	35,17	6,31	100

Table 1

Current Number	Heliographic Latitude	Heliographic Longitude	Observation First	Observation Last	Evolution of the Groups										
1	-20	189	01.01.04	02.01.04	Hr-3,	Dai-5									
2	-10	146	01.01.04	01.01.04	Ax-2										
3	-7	126	01.01.04	06.01.04	Dri-13,	Dao-7,	----,	----,	----,	Hr-3					
4	-12	74	01.01.04	10.01.04	?-1,	Eko-2,	----,	----,	----,	Dkc-18,	Dkc-11,	----,	Dkc-25,	Ekc-14	
5	3	7	07.01.04	10.01.04	Dao-4,	----,	Dai-11,	Dai-9							
6	4	11	14.01.04	18.01.04	Ha-4,	----,	----,	Dai-8,	?-2						
7	-9	331	14.01.04	19.01.04	Ha-2,	----,	----,	Ha-4,	Hs-3,	Ax-1					
8	-14	285	14.01.04	20.01.04	Dao-4,	----,	----,	Esi-15,	Ekc-16,	Eso-14,	Eso-8				
9	11	257	17.01.04	17.01.04	Ha-2										
10	-17	269	19.01.04	25.01.04	Ha-2,	Dao-4,	----,	----,	----,	----,	Hs-1				
11	8	258	19.01.04	25.01.04	Fao-8,	Fac-14									
12	9	269	25.01.04	25.01.04	Hs-1										
13	-9	118	01.02.04	06.02.04	Dri-16,	Dai-10,	----,	----,	----,	Ax-1					
14	-9	104	01.02.04	02.02.04	Hr-1,	Hr-3									
15	14	84	01.02.04	01.02.04	Bxo-4										
16	-11	74	01.02.04	02.02.04	Cro-3,	Dao-5									
17	13	47	01.02.04	02.02.04	Eao-5,	Eac-12,	----,	----,	----,	Eri-13,	Eac-17,	Dao-10,	Cso-6		
18	-8	25	02.02.04	11.02.04	Hr-1,	----,	----,	----,	Eai-18,	Dko-18,	Ekc-36,	Dko-6,	Dao-7,	Dso-6	
19	-6	49	06.02.04	06.02.04	Cro-4										
20	-9	308	08.02.04	19.02.04	?-5,	Dac-4,	Dac-3,	Dsc-8,	----,	----,	Dso-5,	Dso-4,	Hs-3,	Hs-1,	Hs-1,	Hs-1
21	-14	287	10.02.04	11.02.04	Ax-1,	Hr-1									
22	17	308	11.02.04	11.02.04	Dro-4										
23	7	335	14.02.04	16.02.04	Hr-4,	Cao-6,	Hr-2								
24	-17	272	14.02.04	15.02.04	Hr-1,	Hs-1									
25	-18	249	15.02.04	16.02.04	Cao-6,	Hr-1									
26	1	215	15.02.04	19.02.04	?-1,	Hs-2,	Hs-1,	Hs-1,	Hs-1						
27	16	321	16.02.04	16.02.04	Ax-4										
28	13	162	22.02.04	01.03.04	Dao-8,	----,	----,	Dki-20,	Dkc-21,	Dkc-7,	Ekc-8,	Ekc-11,	Eao-13		
29	-12	160	22.02.04	22.02.04	Hs-1										
30	-24	149	22.02.04	27.02.04	Hs-1,	----,	----,	Hs-1,	Ha-1,	Hs-1					
31	-5	144	25.02.04	02.03.04	Dao-9,	Dac-8,	Dao-6,	Dao-3,	Hk-6,	Dao-2,	Ha-2				
32	-14	70	26.02.04	08.03.04	?-1,	Ha-1,	Dao-6,	Cai-18,	Cai-19,	Eai-23,	----,	----,	Eai-15,	----,	Eso-6,	Cao-2
33	-18	127	27.02.04	28.02.04	Ha-4,	Hs-2									
34	-14	152	29.02.04	29.02.04	Hr-1										

Table I (Cont.)

35	-11	111	29.02.04	29.02.04	Ax-2																	
36	-13	15	05.03.04	10.03.04	Dro-9,	----,	Dao-4,	Ha-2,	----,	Hs-1												
37	-14	307	05.03.04	17.03.04	?-1,	----,	Fko-6,	Fko-10,	----,	Fko-11,	----,	Fko-15,	Fso-5,	Dso-7,	Dso-4,	Dao-2,	Dso-2					
38	18	302	12.03.04	17.03.04	Cai-5,	Dao-6,	Dao-8,	Dao-3,	Hs-1,	Ax-1												
39	-13	225	12.03.04	17.03.04	?-1,	Ha-2,	Ha-2,	Ha-2,	Ha-2,	Hr-2												
40	-4	178	17.03.04	27.03.04	Dro-2,	Dao-8,	Eao-12,	Eao-26,	Cai-22,	Eai-14,	Eai-23,	Eai-26,	Eai-16,	Hs-1,	?-1							
41	-18	268	18.03.04	20.03.04	Hs-4,	Dao-5,	Cao-2															
42	-1	152	18.03.04	28.03.04	Hs-1,	Hs-1,	Hs-1,	Cao-3,	Hs-1,	Csi-6,	Csi-6,	Csi-6,	Hs-1,	Hs-1,	Hs-1							
43	-12	224	19.03.04	19.03.04	Hs-1																	
44	15	144	19.03.04	28.03.04	Dao-3,	Eao-15,	Eao-11,	Eao-16,	Eai-16,	Eai-20,	Eai-22,	Eai-22,	Eao-10,	Ha-1								
45	-14	118	22.03.04	23.03.04	Hr-1,	Hr-2																
46	-5	61	24.03.04	05.04.04	?-1,	Hs-1,	Ha-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1					
47	7	166	25.03.04	27.03.04	Bxo-4,	Dao-2,	Dro-2															
48	-6	145	25.03.04	25.03.04	Ax-2																	
49	-8	131	25.03.04	25.03.04	Ax-1																	
50	-14	117	25.03.04	25.03.04	Ax-1																	
51	-14	79	25.03.04	28.03.04	Hr-2,	Ha-2,	Dro-9,	Ax-1														
52	13	56	25.03.04	05.04.04	?-2,	Dko-5,	Dko-8,	Dko-9,	Dko-12,	Dki-16,	Dai-20,	Hs-1,	Hs-3,	Hs-1,	Hs-1,	Ha-1						
53	-16	47	26.03.04	31.03.04	Hs-1,	Dao-8,	Ha-3,	Cro-5,	Ax-3,	Ax-3												
54	-19	179	27.03.04	27.03.04	Cro-3																	
55	-14	12	29.03.04	07.04.04	Hk-5,	Dao-8,	Dao-10,	Ha-2,	Eko-7,	Hk-5,	Cao-10,	Cao-11,	Ha-5,	Cro-3								
56	-16	108	30.03.04	30.03.04	Ax-1																	
57	-14	313	02.04.04	14.04.04	?-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Cso-3,	Hs-1,	Hs-1,	----,	?-1					
58	-17	315	03.04.04	12.04.04	Ha-2,	Ha-6,	Dac-6,	Dao-8,	Dri-11,	Dai-6,	Dao-6,	Dao-4,	Cao-2,	Bxo-3								
59	10	287	05.04.04	05.04.04	Hr-2																	
60	-10	24	07.04.04	07.04.04	Bxo-3																	
61	-20	308	07.04.04	07.04.04	Ax-1																	
62	-16	247	12.04.04	16.04.04	Hr-2,	----,	Dai-13,	----,	Dso-4													
63	-12	175	14.04.04	16.04.04	Hr-3,	----,	Hr-1															
64	14	154	14.04.04	16.04.04	?-1,	----,	Cao-2															
65	-6	200	20.04.04	20.04.04	Hr-2																	
66	-19	179	20.04.04	22.04.04	Dro-4,	----,	Bxo-4															
67	-6	130	20.04.04	23.04.04	Cso-10,	----,	Ha-2,	Ax-1														
68	-9	113	20.04.04	29.04.04	Eao-11,	----,	Eai-17,	Eki-11,	Eko-4,	Hk-4,	Hk-2,	----,	----,	?-1								
69	-8	127	23.04.04	24.04.04	Cro-7,	Ax-3																
70	-15	114	24.04.04	24.04.04	Ha-1																	
71	15	49	24.04.04	02.05.04	Dso-5,	Dao-10,	Dao-7,	----,	----,	Ha-3,	Ha-4,	Hr-2,	Ax-1									
72	17	69	26.04.04	26.04.04	Hr-2																	
73	-13	63	29.04.04	01.05.04	Hr-1,	Dro-8,	Cai-5															

Table I (Cont.)

74	14	44	30.04.04	30.04.04	Ax-1																		
75	-10	31	01.05.04	05.05.04	Dai-15,	Dai-15,	Eai-11,	Dao-11,	Dao-2														
76	-16	34	01.05.04	03.05.04	Cao-3,	Dro-10,	Dro-5																
77	-19	278	03.05.04	07.05.04	Hs-2,	Ha-2,	Ha-4,	Ha-2,	Hs-1														
78	2	333	04.05.04	04.05.04	Hr-1	Ha-2,																	
79	-12	321	04.05.04	10.05.04	Cri-9,	Dai-14,	Dao-7,	Ha-2,	Cao-11,	Dai-4,	Ha-1												
80	-9	198	08.05.04	19.05.04	?-1,	Hs-2.	Hs-2,	Ha-3,	Hh-3.	Hk-2,	----,	Ha-2,	Ha-2,	Cai-5,	Ha-2,	Hs-1							
81	-3	189	10.05.04	12.05.04	Ax-2,	Ax-3.	Cro-5																
82	-5	182	10.05.04	13.05.04	Ha-2,	Ha-2,	Hr-2,	Ax-5															
83	-3	176	10.05.04	21.05.04	Ax-1,	Ax-2,	Dri-6,	Dai-20,	----,	Dke-40,	Dko-24,	Dko-16,	Dao-11,	Dao-10,	Dao-6,	Cao-3							
84	-12	224	12.05.04	12.05.04	Ha-2																		
85	-8	192	13.05.04	13.05.04	Ax-4																		
86	10	191	15.05.04	20.05.04	Dai-18,	Dai-16,	Dai-14,	Cai-12,	Ha-3,	Ha-3													
87	-9	120	15.05.04	25.05.04	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Ha-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1								
88	-7	233	16.05.04	17.05.04	Cao-4,	?-3																	
89	17	93	16.05.04	28.05.04	Ha-1,	Hk-3,	Ha-2,	Ha-2,	Ha-4,	Hs-1,	Hs-2,	Hs-4,	Hs-1,	Hs-1,	Hs-1,	Ha-1,	?-1							
90	6	89	16.05.04	17.05.04	Hs-1,	Hr-1																	
91	-11	138	18.05.04	23.05.04	Dri-6,	Dri-10,	Dai-11,	Cro-4,	Cri-7,	Bxo-3													
92	-10	40	20.05.04	30.05.04	?-5,	Dai-13,	Fai-24,	Eai-33,	Eai-30.	Eai-24.	Fai-32,	Fac-36,	Fac-33.	----.	Fai-15								
93	-9	102	23.05.04	26.05.04	Ax-6,	Bxo-3.	Cri-4,	Hr-1															
94	-16	30	23.05.04	24.05.04	Cro-5,	Ax-2																	
95	-14	283	28.05.04	07.06.04	?-1,	----,	Dai-10,	----,	----,	Dai-21,	Dri-12,	Dac-21,	Dao-10,	Bxo-4,	Ax-2								
96	-11	258	30.05.04	30.05.04	?-1																		
97	-9	243	02.06.04	05.06.04	Ha-1,	Ha-2,	Ha-2.	Hs-2															
98	-12	336	03.06.04	04.06.04	Hr-1,	Dao-3																	
99	6	278	03.06.04	03.06.04	Ax-1																		
100	-9	223	04.06.04	09.06.04	Dao-2,	Ha-4,	Dro-4.	Dao-6,	Dao-3,	Dro-5													
101	5	259	06.06.04	06.06.04	Ha-2																		
102	-5	205	07.06.04	09.06.04	Ax-2,	Hr-1.	Cro-6																
103	12	172	07.06.04	07.06.04	Hr-1																		
104	-10	214	08.06.04	09.06.04	Bxo-2,	Hr-3																	
105	-10	261	09.06.04	11.06.04	Ax-2,	Hr-3,	?-1																
106	-10	158	09.06.04	13.06.04	Dro-2,	Dro-2,	Dao-4,	Cro-6,	Ha-1														
107	-11	121	10.06.04	22.06.04	Ha-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	Hs-1,	----,	----,	Hs-1,	Hs-1,	?-1						
108	-6	110	13.06.04	13.06.04	Bxo-3																		
109	12	76	13.06.04	25.06.04	?-4,	Eko-7,	Fki-12,	Fko-11,	Fke-18,	----,	----,	Eko-11,	Fko-8,	Hh-5.	----,	Hk-1,	?-1						
110	-5	78	14.06.04	14.06.04	Ax-1																		
111	-10	58	14.06.04	26.06.04	?-1,	Eki-9,	Eki-11,	Fki-18,	----,	----,	Fki-26,	Fke-20,	Fki-35,	----,	Fke-25,	Fac-12,	Fac-9						
112	-10	161	16.06.04	17.06.04	Cro-4,	Dso-2																	

Table I (Cont.)

113	-7	111	16.06.04	16.06.04	Ax-1																				
114	-15	49	16.06.04	16.06.04	Bxo-2																				
115	-9	44	16.06.04	16.06.04	Ax-2																				
116	-16	49	20.06.04	26.06.04	Cri-25,	Bxi-7,	Bxi-15,	----,	Dac-9,	Cro-5,	Ax-2														
117	-11	37	20.06.04	20.06.04	Hr-4																				
118	-10	25	20.06.04	24.06.04	Cri-8,	Cao-3,	Bxo-4,	----,	Ha-2																
119	-14	76	22.06.04	22.06.04	Hr-4																				
120	8	339	22.06.04	29.06.04	Ax-1,	----,	Dac-7,	Cro-3,	Cri-12,	----,	Cri-10,	Ax-1													
121	6	313	26.06.04	26.06.04	Ax-4																				
122	-9	254	28.06.04	04.07.04	Bxo-3,	Dro-3,	Cro-3,	Cro-2,	Cso-4,	Cao-8,	Bxi-5														
123	9	250	28.06.04	06.07.04	Hs-3,	Dao-3,	Cso-6,	Cao-11,	Cao-8,	Cao-7,	Cao-7,	Cro-5,	Cro-3												
124	-6	248	03.07.04	03.07.04	Ax-1																				
125	-9	179	04.07.04	04.07.04	Hr-1																				
126	-8	259	06.07.04	06.07.04	Ax-1																				
127	-7	126	06.07.04	18.07.04	?-1,	----,	Dro-6,	Dai-12.	Csi-13,	Cai-15,	Cai-16,	Dai-17,	Dai-12,	Dao-6,	Cai-10,	Hs-1,	Hs-4								
128	3	255	08.07.04	08.07.04	Ax-2																				
129	0	191	08.07.04	08.07.04	Ax-1																				
130	-9	172	09.07.04	11.07.04	Dao-5,	Cri-6,	Hr-2																		
131	11	166	09.07.04	09.07.04	Hr-2																				
132	11	79	10.07.04	22.07.04	Hs-1,	Hs-1,	Hs-3,	Hs-12,	Hs-6,	Hs-7,	Hs-4,	Hs-5.	Hs-9,	Ha-6,	Hs-2,	Hs-1,	?-1								
133	13	170	11.07.04	15.07.04	Bxi-6,	Cai-7,	Dac-19,	Dao-8,	?-7																
134	11	155	11.07.04	12.07.04	Cro-4,	Ax-2																			
135	-15	75	11.07.04	11.07.04	Ax-1																				
136	-8	65	11.07.04	16.07.04	Ax-1,	Hr-1,	Hr-1,	Hr-1,	Ax-2																
137	16	134	13.07.04	16.07.04	Cao-9.	Dao-4,	His-7,	Ax-1																	
138	-12	55	13.07.04	13.07.04	Hr-1																				
139	-16	52	13.07.04	18.07.04	Bxo-3,	Cro-2,	Ax-8,	Bxo-5,	Bxo-4,	Bxo-3															
140	-10	44	13.07.04	24.07.04	?-13,	Eko-18,	Fko-20,	Fki-34,	Eki-33,	Fki-69,	Fko-5,	Cki-32,	Cki-24,	Cai-17.	Dao-5,	Dso-2									
141	-11	57	16.07.04	18.07.04	Ax-2,	Ax-4,	Ax-1																		
142	8	346	17.07.04	29.07.04	?-6,	Fko-18,	Fko-34,	Fko-43,	Fko-44,	Fko-50,	Fko-101,	Fko-88,	Fko-58,	Fko-59,	Fko-35,	Eko-11,	?-3								
143	-13	345	17.07.04	28.07.04	?-2,	Dac-9,	Dac-12,	Dko-11,	Cai-14,	Dao-13,	Dao-15,	Cai-14,	Cai-9,	Cso-4,	Cso-4,	His-1									
144	-17	53	20.07.04	21.07.04	Ax-1,	Bxo-2																			
145	8	261	25.07.04	04.08.04	Ax-3,	Dsi-10,	Dao-51,	Dso-11,	Dso-7,	Dso-10,	Dai-8,	----,	Csi-9,	Eai-5,	?-2										
146	-9	178	30.07.04	10.08.04	Ha-1,	Hk-2,	----,	Eki-18,	Eai-22.	Eai-21,	Eac-19,	Eac-22,	Eac-26.	Eac-9,	Dao-9,	?-3									
147	-13	83	06.08.04	18.08.04	?-2,	Eao-6,	Dao-7,	Eko-30,	Eko-36,	Eko-66,	Fko-80,	Fko-93.	Fko-71,	----,	----,	Fko-22.	?-9								
148	-5	89	07.08.04	07.08.04	Ha-3																				
149	11	75	07.08.04	14.08.04	Ha-1,	Ha-1,	His-1,	Hr-1,	Hs-1,	His-7,	Ha-2,	Ha-2													
150	16	41	09.08.04	13.08.04	?-1,	His-2,	Ha-2,	Ha-3,	Ha-3																
151	-8	27	11.08.04	14.08.04	Dao-3,	Dao-3,	Dao-2,	Ha-1																	

Table I (Cont.)

152	7	347	13.08.04	25.08.04	?-2,	Dho-2,	---,	---,	Dko-4,	Dko-6,	Dko-11,	Dko-8,	Dko-10,	Dko-6,	---,	Dko-4,	Dko-3			
153	13	339	17.08.04	22.08.04	Ha-2,	Hr-2,	Ax-3,	Ax-1,	Dai-12,	Dai-9										
154	13	328	18.08.04	20.08.04	Ha-5,	Cro-3,	Dai-12													
155	9	264	19.08.04	29.08.04	?-1,	?-4,	Eso-12,	Eao-12,	---,	Eso-9,	Eso-5,	Ha-3,	Eao-10,	---,	Eso-5					
156	4	316	20.08.04	20.08.04	Ax-2															
157	-10	293	20.08.04	29.08.04	Dro-5,	Dai-20,	Eai-26,	---,	Eao-17,	Eao-6,	Eai-7,	Ha-3,	---,	Ha-1						
158	0	118	22.08.04	22.08.04	Cri-5															
159	-9	179	04.09.04	06.09.04	Dri-10,	Dri-11,	Dro-2													
160	-11	95	04.09.04	13.09.04	Hk-3,	Hk-4,	Hk-3,	Hk-2,	Hk-2,	Hk-5,	Hk-4,	Hk-7,	Hk-3,	Ha-1						
161	0	163	05.09.04	05.09.04	Hr-2															
162	-14	84	05.09.04	06.09.04	Ax-4,	Ax-2														
163	-5	87	05.09.04	13.09.04	Hr-7,	Dai-6,	Cao-12,	Ax-18,	Dai-17,	Dac-13,	Dso-4,	Ha-1,	Ha-3							
164	-9	133	07.09.04	11.09.04	Cao-17,	Dai-17,	Dai-12,	Eao-6,	?-1											
165	-13	84	08.09.04	08.09.04	Ax-5															
166	5	349	09.09.04	21.09.04	?-1,	Dac-6,	Dki-16,	Dai-26,	Dac-42,	Dai-32,	Dai-29,	Eai-33,	Eac-37,	Dai-24,	Ha-3,	Dao-4,	Dao-4			
167	15	342	14.09.04	14.09.04	Ax-1															
168	16	335	15.09.04	15.09.04	Hr-1															
169	-13	272	15.09.04	27.09.04	?-1,	Cai-5,	Ekc-18,	Ekc-12,	Dao-21,	Dki-13,	Dko-12,	Eko-12,	Eko-7,	Dko-6,	Hh-1,	Hh-1,	Hh-1			
170	-10	304	18.09.04	18.09.04	Ax-3															
171	4	333	19.09.04	19.09.04	Bxo-5															
172	6	274	21.09.04	21.09.04	Ax-1															
173	-9	306	22.09.04	22.09.04	Ax-2															
174	5	274	22.09.04	22.09.04	Ax-1															
175	-9	139	25.09.04	06.10.04	?-1,	Hs-1,	Hs-1,	Hs-1,	Cao-3,	Hs-1,	Hs-1,	Ha-3,	Hs-1,	Hs-1,	Hs-2,	Hs-1				
176	2	139	29.09.04	30.09.04	Ax-1,	Cro-3														
177	13	133	29.09.04	29.09.04	Ax-2															
178	-12	96	29.09.04	06.10.04	?-1,	Hs-1,	Hs-2,	Ha-1,	Ha-11	Dro-5,	Cro-4,	Hr-3								
179	-8	166	01.10.04	01.10.04	Ax-1															
180	13	136	03.10.04	05.10.04	Ha-4,	Cro-3,	Hr-1													
181	-12	274	15.10.04	24.10.04	Hk-19,	Hk-20,	Hk-22,	Dao-7,	Dao-15,	Eac-19,	Eac-19,	---,	Eai-6,	Bxo-3						
182	-9	260	17.10.04	21.10.04	Cai-17,	Dai-13,	Cao-7,	---,	Bxi-6											
183	-19	226	17.10.04	18.10.04	Hs-1,	Hs-1														

Table I (Cont.)

184	-4	217	17.10.04	28.10.04	Ha-1,	Ha-1,	Cao-2,	Ha-2,	Hr-1,	---,	Dai-22,	Dai-25,	Dao-12,	Ha-2,	---,	Hs-1						
185	-5	244	18.10.04	24.10.04	Cao-3,	Cao-11,	Dro-17,	Bxo-11,	---,	Cri-7,	Bxo-4											
186	11	175	19.10.04	31.10.04	?-1,	Ha-3,	Hk-4,	---,	Eac-24,	Eac-33,	Ekc-37,	Eko-49.	---,	Eao-35,	Dai-22,	Dao-8,	Ha-1					
187	-7	291	20.10.04	23.10.04	Bxo-6,	Dro-2,	---,	Hr-1														
188	-14	271	23.10.04	23.10.04	Ax-3																	
189	12	155	23.10.04	01.11.04	Hs-1,	Ha-2,	Hs-2,	Ha-1,	---,	Hs-1,	Ha-1,	Hs-1,	Hs-1,	Hs-1								
190	0	138	23.10.04	03.11.04	Ha-2,	Hs-2,	Hs-4,	Ha-3,	---,	Ha-5,	Ha-5,	Ha-2,	Ha-1,	Ha-8,	---,	Ha-1						
191	14	135	23.10.04	04.11.04	?-1,	?-7,	Eao-19,	Eao-12,	---,	Dao-9,	Dao-20,	Dko-15,	Dko-13,	Eko-16,	---,	Eao-5,	?-2					
192	-18	165	25.10.04	31.10.04	Dao-7,	Dao-5,	---,	Ha-2,	Ha-3,	Ha-2,	Ax-1											
193	-9	139	26.10.04	26.10.04	Ha-1																	
194	17	126	28.10.04	29.10.04	Ax-1,	Ax-1																
195	16	118	28.10.04	31.10.04	Dri-6,	Bxo-4,	Bro-3,	Ax-1														
196	-16	77	28.10.04	09.11.04	Eko-10,	Eki-20,	Ekc-19.	Eko-34,	Ekc-39,	---,	Fki-34.	Fko-24,	Fkc-26,	Fko-19,	Fko-9.	?-4,	?-1					
197	-15	43	30.10.04	07.11.04	?-2,	Dao-2,	Dao-3.	---,	Dao-2,	Hs-1,	Dao-7.	Cao-4,	Cro-3									
198	8	27	03.11.04	12.11.04	Hk-6,	Dkc-11,	Dki-24.	Eko-26,	Ekc-23,	Eko-35,	Eko-26.	---,	Ekc-12,	?-1								
199	6	71	06.11.04	06.11.04	Ha-3																	
200	-9	63	06.11.04	09.11.04	Ax-1,	Dai-11,	Dai-11,	?-11														
201	-14	271	09.11.04	19.11.04	?-1,	---,	Cro-3,	Dro-4,	---,	---,	---,	---,	Ha-2,	Bxo-3,	Ax-1							
202	5	315	11.11.04	17.11.04	Hr-4,	Dri-6,	---,	---,	---,	---,	Eao-4											
203	-15	242	11.11.04	22.11.04	?-1,	Dso-2,	---,	---,	---,	---,	Ha-1,	Hs-3,	Hs-1,	---,	Hs-1,	Ha-1						
204	-10	261	17.11.04	19.11.04	Dao-7,	Dro-10,	Dao-6															
205	13	174	19.11.04	19.11.04	Ax-2																	
206	14	146	19.11.04	27.11.04	Ha-1,	---,	Ha-1,	Ha-2,	Ha-3,	---,	Ha-3,	Ha-4,	Ha-3									
207	11	140	21.11.04	25.11.04	Dro-4,	Dao-3,	---,	---,	Hr-1													
208	-3	220	22.11.04	25.11.04	Ha-1,	Dro-3,	---,	?-2														
209	-15	74	25.11.04	05.12.04	Ha-2,	Hs-11,	Cso-11,	---,	Hk-10,	---,	Dao-9,	Dai-11,	Ha-1,	Hs-2,	Ha-2							
210	-7	71	25.11.04	06.12.04	Dac-5,	Cso-5,	Cso-4,	---,	Ha-1,	---,	Hs-1,	Hs-2,	Cao-7,	Hs-1	Ha-2.	?-1						
211	10	36	27.11.04	08.12.04	?-2,	---,	Ha-1.	---,	Hs-1,	Hs-1,	Cao-4.	Ha-3,	Hs-2,	Dso-2,	---.	Hs-1						
212	12	140	29.11.04	29.11.04	Hr-1																	
213	4	2	05.12.04	05.12.04	Ax-1																	
214	7	323	05.12.04	05.12.04	Hr-1																	
215	-7	271	08.12.04	09.12.04	Hr-1,	Hr-1																
216	12	313	10.12.04	15.12.04	Bxi-5,	---,	Dri-18.	Dao-10,	---,	?-1												
217	-7	275	16.12.04	18.12.04	Hr-1,	Dri-5,	?-1															
218	-9	265	17.12.04	17.12.04	Cro-6																	
219	-10	148	17.12.04	18.12.04	Dro-5,	Dro-5																
220	-9	129	17.12.04	28.12.04	?-2,	Ha-5,	---,	---,	---,	---,	---,	Dao-9.	Dao-8,	Ha-5,	Hs-1,	Dao-4						
221	-4	135	24.12.04	24.12.04	Dro-2																	
222	6	339	28.12.04	30.12.04	?-2,	---,	Dao-7															

Table III

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	4.19 FB	5.29 MB	3.34 TG	3.4 HE	4.25 TÇ	-	2.13 TG	-	-	3.4 MB	5.67 SB	3.11 MS
2	3.14 HE	-	2.25 MS	4.12 SB	3.26 FB	2.22 TG	2.12 TÇ	2.27 MB	-	2.4 TÇ	-	3.14 MB
3	-	-	-	5.10 FB	3.18 MS	4.16 FB	3.16 İÇ	2.27 HE	-	3.16 MS	5.48 TG	3.12 TÇ
4	-	-	-	5.19 MS	4.23 FB	4.28 İÇ	3.13 HE	2.23 MB	2.13 FB	3.9 TG	4.38 MS	3.6 SB
5	-	-	3.25 MB	6.22 TG	3.20 MS	3.16 HE	1.5 FB	1.19 HE	5.28 FB	3.7 HE	3.57 TG	5.8 MB
6	2.21 MS	4.36 HE	-	3.14 MS	2.9 HE	3.10 MS	3.5 MS	2.24 MB	4.13 TG	2.4 MB	5.53 TÇ	2.3 İÇ
7	2.15 FB	2.35 SB	3.16 SB	5.19 FB	2.5 SB	4.11 MB	-	4.36 HE	3.31 TÇ	-	4.46 MB	-
8	-	3.51 TÇ	3.14 MS	2.7 İÇ	2.12 TÇ	3.6 MS	3.9 MB	3.17 HE	4.42 TG	-	3.50 MB	2.2 FB
9	2.36 TÇ	3.16 SB	-	2.9 MB	2.6 HE	5.18 FB	3.19 HE	4.41 İÇ	4.35 MB	0.0 MS	4.39 HE	1.1 MS
10	2.23 SB	3.11 TG	2.12 TG	2.5 HE	5.8 MS	3.6 HE	3.20 TG	4.42 TÇ	4.29 HE	0.0 TÇ	-	1.5 TG
11	-	4.19 MS	-	2.3 TÇ	4.10 FB	3.6 SB	7.30 MS	4.73 İÇ	4.28 TÇ	0.0 MB	4.20 MB	-
12	-	-	3.21 HE	3.6 MS	5.18 FB	2.7 FB	5.29 FB	4.87 TÇ	3.30 TG	-	4.13 HE	1.18 FB
13	-	-	3.13 HE	-	4.31 TÇ	4.9 TÇ	8.75 TG	5.101 İÇ	3.46 İÇ	-	-	1.10 SB
14	3.10 İÇ	3.10 HE	3.17 HE	4.18 TG	-	4.10 MS	7.51 MS	4.76 TÇ	2.33 SB	-	-	-
15	-	5.18 TÇ	3.9 FB	-	4.61 MS	3.22 FB	7.51 SB	-	3.31 MB	1.19 TÇ	-	1.1 TG
16	-	5.12 MB	3.5 TG	3.7 HE	7.49 SB	7.32 MS	7.58 MB	-	2.38 HE	1.20 MB	-	1.1 MS
17	4.29 HE	2 2 FB	4.7 MS	-	7.43 HE	4.39 SB	7.55 TG	3.28 MS	2.55 İÇ	4.41 SB	4.14 FB	-
18	3.21 TÇ	2.2 MS	3.13 SB	-	6.34 FB	-	7.113 SB	4.22 MS	3.39 TG	5.25 SB	3.16 TG	3.7 TG
19	4.25 HE	2.2 TG	5.22 İÇ	-	6.27 MS	-	4.97 İÇ	4.18 TG	3.29 TÇ	5.36 TÇ	5.11 FB	-
20	3.26 MS	-	4.44 TÇ	4.27 TG	6.30 İÇ	6.75 FB	5.89 TG	6.32 FB	2.17 SB	5.47 MS	-	-
21	-	-	3.34 TG	-	5.22 MS	5.39 TG	5.85 FB	4.54 FB	3.17 FB	6 43 TG	3.6 TG	-
22	-	3.10 FB	4.34 TG	3.23 MS	4.34 MB	7.65 FB	4.81 TÇ	5.58 TG	3.15 MS	-	4.7 İÇ	-
23	-	-	4.42 MS	3.19 TÇ	6.52 FB	-	3.121 İÇ	-	1.7 İÇ	9.67 FB	2.6 HE	-
24	-	-	4.53 FB	4.13 SB	5.37 TG	5.44 İÇ	3.104 SB	3.30 TA	1.6 TG	7.76 TG	-	2.11 MS
25	2.2 FB	3.30 MS	10.59 MB	2.14 MB	4.30 FB	4.21 HE	3.70 FB	3.14 MS	2.2 HE	6.81 MB	5.13 HE	1.8 MS
26	-	4.31 HE	8.24 İÇ	3.11 TG	3.34 TG	4.27 SB	3.73 SB	2.10 SA	2.2 MB	7.73 İÇ	3.20 FB	1.6 TÇ
27	0.0 MS	5.19 SB	9.34 MB	-	2.37 SB	-	3.50 HE	2.13 TS	2.2 TG	-	4.20 HE	1.1 SB
28	-	4.19 MS	6.16 MS	-	3.35 İÇ	3.16 TG	3.23 SB	-	1.1 HE	9.70 MS	-	2.6 TG
29	-	5.43 MB	4.23 MS	3.5 MB	-	3.7 MS	2.10 HE	2.6 FB	4.7 FB	8.76 FB	4.13 FB	-
30	-	-	5.29 FB	3.13 TÇ	3.26 TÇ	2.9 İÇ	2.11 SB	-	3.6 MS	8.52 HE	-	1.7 TG
31	-	-	4.34 TG	-	-	-	2.10 SB	-	-	8.60 MS	-	-

Observers: **FB: Funda Bostancı** **HE: Hasan Esenoğlu** **İÇ: İpek H. Çay** **MS: Melihat Sırma**
MB: Mevlana Başal **SB: Selçuk Bilir** **TÇ: M. Taşkın Çay** **TG: Tolga Güver**