

DAILY PRESSURE VARIATION.

①
(Using hourly means
BEST days)

Main purpose of investigation is to find the pattern of annual changes in amplitude & phase of the Fourier component so that these may later be compared with the changes in the cosmic ray variation. This preliminary analysis of pressure data will be done ~~with~~ without reference to the cosmic ray data (i.e. all days will be considered, irrespective of whether or not C.R. data is available for those days).

1/ All data. Determine mean daily variation in monthly lots. (Take only as far as plotting observed means).

2/ In order to be able to get a better picture of the diurnal variation component of pressure changes, we have to be able to correct for secular changes (or the average effect of same), and we can ~~only~~ correct satisfactorily only for an assumed linear average secular change. (Any other form would be part of the average daily variation). Hence it is desirable to exclude those days when obvious non-linear secular change is superimposed on the regular daily wave. (Note that any selection of data to a certain extent presupposes the daily variation to be of a certain form). From \perp it is seen that the 24-hour component is small and that the daily wave crosses the straight line joining hour 1 to hour 25 at least once and as in the majority of cases three times between these two end points. Hence it seems reasonable to reject from the original data to be considered any days of marked non-linear secular change. As a definite criterion we shall reject all days in which the plotted pressure curve lies wholly above or wholly below a straight line as described above, together with any other days which, although passing this test, exhibit marked irregularities which do not conform approximately with the general regularity of the curves obtained in \perp . We can then with confidence use a linear correction for average secular change. As considerable reduction in data used will result from the selection process, we shall group the data in 2-monthly groups, — Jan. Feb.; Mar.-April; etc. — (this will be the grouping used later in analyzing the C.R. data)

[N.B. Ref "Oscillations of the Earth's Atmosphere" — Wilkes
first chapter. ref. to Chapman's selection criteria
in looking for lunar tide]

DAILY PRESSURE VARIATION

(2)

Days selected for further analysis (see criterion for rejection on page ①).

'54 { Jan 2, 5, 7, 10, 11, 12, 13, ~~14~~, 17, 18, ~~19~~, 21, 22, 23, 24, 25, 26, 29, 30, 31
Feb 3, 8, 10, 13, 15, 16, 17, 19, 20, 21, 22, ~~27~~,

'54 { Mar. 1, 3, 7, 12, 14, 16, 28, 30.
Apr. 4, 5, 6, 9, 11, 18, 19, 27, 28,

'54 { ~~June~~ May 3, 4, 10, 11, 12, 13, 14, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30
~~July~~ June 4, 5, 13, 16, 17, 22, 23, 27,

'54 { July 4, 5, 9, 10, 11, 13, 14, 17, 18, 19, 20, 21, 23, 25.
Aug. 1, 4, 5, 6, 7, 13, 26, 27, 28, 31.

'53 { Sept 2, 14, 15, 16, 17, 18, 26, 27, 28, 29.
Oct 6, 7, 12, 13, 14, 23, 24, 25, 26, 27, 28,

'53 { Nov 3, 8, 12, 19, 25,
Dec 2, 10, 11, 22, 26, 31.

ANALYSIS PROCEDURE We have 13 bihourly means $u_0 \dots \dots u_{12}$ ⁽⁰⁰⁻⁰²⁾ ⁽²⁴⁻²⁶⁾

a) Correction for secular change. $\frac{u_0 - u_{12}}{12} = x$ represents the secular change ^{per two hours}
Calculate $(u_0 + 0), (u_1 + x), (u_2 + 2x), \dots \dots (u_{11} + 11x)$. ^(assumed linear)

b) Calculate the mean of these corrected values.

c) Calculate departures of corrected values from their mean.

d) Carry out harmonic analysis on these departures (try to 4 components)

e) Plot departures + the fitted curve (+ harmonic dial plots.)

f) Tabulate amplitudes & phases and correct for the effect of using bihourly means instead of spot readings. Plot corrected harmonic dial
(See Chapman & Bartlett)

DAILY PRESSURE VARIATION.

relevant sheets marked thus →

Days ~~to be~~ used for further analysis. (Selected days)
Group into 5 monthly lots

- { Jan '54 2, 5, 7, 10, 11, 12, 13, 17, 18, 21, 22, 23, 24, 25, 26, 29, 30, 31. ^C
- { Feb '54 3, 8, 10, 13, 15, 16, 17, 19, 20, 21, 22. ¹¹

- { Mar '54 1, 3, 7, 12, 14, 16, 28, 30. ⁸
- { Apr. '54 4, 5, 6, 9, 11, 18, 19, 27, 28. ⁹

- { May '54 3, 4, 10, 11, 12, 13, 14, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30. ¹
- { June '54 4, 5, 13, 16, 17, 22, 23, 27. ⁸

- { July '54 4, 5, 9, 10, 11, 13, 14, 17, 18, 19, 20, 21, 23, 25. ¹¹
- { Aug '54 1, 4, 5, 6, 7, 13, 26, 27, 28, 31. ¹⁰

- { Sept. '53 2, 14, 15, 16, 17, 18, 26, 27, 28, 29. ¹⁰
- { Oct '53 6, 7, 12, 13, 14, 23, 24, 25, 26, 27, 28. ¹¹

- { Nov. '53 3, 8, 12, 19, 25. ⁵
- { Dec '53 2, 10, 11, 22, 26, 31. ⁶

PRESSURES

SEPTEMBER 1953

MONTH /	HR	01	02	03	04	05	06	07	08	09	10	11	12	13
SEPT. TOTAL		51.74	51.71	51.55	51.49	51.56	51.87	52.27	52.59	52.72	52.66	52.53	52.23	51.97
MEAN		1.7247	1.7237	1.7183	1.7163	1.7187	1.7290	1.7423	1.7530	1.7573	1.7553	1.7510	1.7410	1.7323
2hourly MEAN			1.7242		1.7173		1.7238		1.7477		1.7563		1.7460	

SEPT /	HR	14	15	16	17	18	19	20	21	22	23	24	25	26
MEAN		51.51	51.18	51.05	51.20	51.54	51.95	52.37	52.66	52.80	52.77	52.69	52.66	52.63
		1.7170	1.7060	1.7017	1.7067	1.7180	1.7317	1.7457	1.7553	1.7600	1.7590	1.7563	1.7553	1.7543
2hourly MEAN		1.7247		1.7038		1.7123		1.7387		1.7577		1.7577		1.7548

PRESSURES

OCTOBER 1953

MONTH / HA	01	02	03	04	05	06	07	08	09	10	11	12	13
OCTOBER TOTAL	53.40	53.05	52.88	52.80	52.92	53.26	53.68	53.89	53.90	53.55	53.55	53.24	52.85
MEAN	1.7226	1.7113	1.7058	1.7032	1.7071	1.7181	1.7316	1.7384	1.7387	1.7371	1.7274	1.7174	1.7048
2 hourly MEAN		1.7169		1.7045		1.7126		1.7350		1.7379		1.7224	

OCTOBER / HA	14	15	16	17	18	19	20	21	22	23	24	25	26
MEAN	52.48	52.16	52.04	52.10	52.32	52.67	53.22	53.62	53.75	53.55	53.37	53.18	52.82
	1.6929	1.6826	1.6787	1.6806	1.6877	1.6990	1.7168	1.7297	1.7339	1.7274	1.7216	1.7155	1.7039
2 hourly MEAN	1.6989		1.6806		1.6842		1.7079		1.7318		1.7245		1.7097

PRESSURES

NOVEMBER 1953

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
NOV. TOTAL	46.01	45.76	45.63	45.47	45.49	45.70	45.85	45.89	45.75	45.63	45.55	45.42	45.29
MEAN	1.5337	1.5253	1.5210	1.5157	1.5163	1.5233	1.5283	1.5297	1.5250	1.5210	1.5183	1.5140	1.5097
2hourly MEAN		1.5295		1.5183		1.5198		1.5290		1.5230		1.5162	

NOVEMBER/HR	14	15	16	17	18	19	20	21	22	23	24	25	26
MEAN	45.22	45.13	45.12	45.29	45.58	46.00	46.37	46.67	46.78	46.68	46.53	46.24	45.97
2hourly MEAN	1.5085		1.5042		1.5145		1.5395		1.5575		1.5535		1.5368

PRESSURES

DECEMBER 1953

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
DEC. TOTAL ²	47.69	47.29	46.94	46.80	46.91	47.15	47.30	47.44	47.39	47.14	46.93	46.63	46.33
MEAN	1.5384	1.5255	1.5142	1.5097	1.5132	1.5210	1.5258	1.5303	1.5287	1.5206	1.5139	1.5042	1.4945
2hourly MEAN		1.5319		1.5119		1.5171		1.5281		1.5247		1.5090	

DECEMBER / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
MEAN	46.11	46.07	46.13	46.33	46.69	47.16	47.72	48.07	48.21	48.13	47.90	47.56	47.18
2hourly MEAN	1.4874	1.4861	1.4884	1.4945	1.5061	1.5213	1.5394	1.5506	1.5552	1.5526	1.5452	1.5342	1.5219
MEAN	1.4910		1.4871		1.5003		1.5303		1.5529		1.5489		1.5281

PRESSURES

JANUARY 1954

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
24hr TOTAL	58.24	57.94	57.66	57.55	57.65	57.85	58.09	58.28	58.24	58.02	57.73	57.38	57.09
MEAN	1.8787	1.8690	1.8600	1.8565	1.8597	1.8661	1.8739	1.8800	1.8787	1.8716	1.8623	1.8510	1.8416
2 hourly MEAN		1.8739		1.8582		1.8629		1.8769		1.8752		1.8566	

JANUARY / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	56.85	56.75	56.74	56.78	56.89	57.23	57.71	58.11	58.29	58.26	58.20	58.02	57.70
MEAN	1.8339	1.8306	1.8303	1.8316	1.8352	1.8461	1.8616	1.8745	1.8803	1.8794	1.8774	1.8716	1.8613
2 hourly MEAN	1.8377		1.8305		1.8334		1.8539		1.8774		1.8784		1.8665

PRESSURES

FEBRUARY 1954

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
FEBRUARY Total	49.09	48.83	48.58	48.41	48.48	48.69	48.99	49.19	49.40	49.46	49.39	49.21	49.00
MEAN	1.7532	1.7439	1.7350	1.7289	1.7304	1.7389	1.7489	1.7568	1.7643	1.7664	1.7639	1.7575	1.7500
2hourly MEAN		1.7486		1.7320		1.7346		1.7529		1.7654		1.7607	

FEBRUARY / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	48.77	48.58	48.43	48.48	48.64	48.90	49.30	49.71	49.90	49.84	49.70	49.53	49.31
MEAN	1.7418	1.7350	1.7296	1.7314	1.7371	1.7464	1.7607	1.7754	1.7821	1.7800	1.7750	1.7689	1.7611
2hourly MEAN	1.7459		1.7323		1.7343		1.7536		1.7787		1.7775		1.7650

PRESSURES

MARCH 1954

MONTH / HR	MARCH TOTAL	MEAN	Hourly MEAN
01	48.66	1.5697	1.5660
02	48.43	1.5623	1.5502
03	48.14	1.5529	1.5521
04	47.97	1.5474	1.5719
05	47.98	1.5477	1.5756
06	48.25	1.5565	1.5934
07	48.58	1.5671	1.5858
08	48.88	1.5768	1.5737
09	48.94	1.5787	
10	48.89	1.5771	
11	48.61	1.5681	
12	48.30	1.5581	
13	47.96	1.5471	
14	48.43	1.5623	
15	47.56	1.5342	
16	47.56	1.5342	
17	47.78	1.5413	
18	48.19	1.5545	
19	48.62	1.5684	
20	49.07	1.5829	
21	49.36	1.5923	
22	49.43	1.5945	
23	49.28	1.5897	
24	49.04	1.5819	
25	48.90	1.5774	
26	48.67	1.5700	
MEAN	47.71	1.5390	1.5431
TOTAL	1171	15342	15342
MEAN	47.71	1.5390	1.5431
Hourly MEAN	47.71	1.5390	1.5431

PRESSURES

APRIL 1954

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
APRIL TOTAL	53.52	53.34	53.09	52.84	52.88	53.05	53.30	53.60	53.71	53.61	53.33	52.98	52.48
MEAN	1.7840	1.7780	1.7697	1.7613	1.7627	1.7683	1.7767	1.7867	1.7903	1.7870	1.7777	1.7660	1.7493
2hourly MEAN		1.7810		1.7655		1.7655		1.7817		1.7867		1.7718	

APRIL / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	51.94	51.65	51.59	51.71	51.99	52.39	52.72	52.94	53.16	53.13	52.97	52.89	52.70
MEAN	1.7313	1.7217	1.7197	1.7237	1.7330	1.7463	1.7573	1.7647	1.7720	1.7710	1.7657	1.7630	1.7567
2hourly MEAN	1.7403		1.7207		1.7283		1.7518		1.7683		1.7683		1.7598

PRESSURES

MAY 1954

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
MAY TOTAL	56.54	56.49	56.52	56.48	56.61	56.81	57.19	57.53	57.77	57.82	57.65	57.30	56.79
MEAN	1.8239	1.8223	1.8232	1.8219	1.8261	1.8326	1.8448	1.8558	1.8635	1.8652	1.8597	1.8454	1.8319
2 hourly MEAN		1.8231		1.8226		1.8294		1.8503		1.8644		1.8540	

MAY /HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	56.38	56.22	56.22	56.40	56.60	56.92	57.09	57.16	57.24	57.17	57.00	56.87	56.82
MEAN	1.8187	1.8135	1.8135	1.8194	1.8258	1.8361	1.8416	1.8439	1.8465	1.8442	1.8387	1.8345	1.8329
2 hourly MEAN	1.8253		1.8135		1.8226		1.8389		1.8452		1.8415		1.8337

PRESSURES

JUNE 1954

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
JUNE TOTAL	52.14	52.01	52.03	51.90	51.85	51.95	52.18	52.40	52.68	52.79	52.72	52.35	51.81
MEAN	1.7380	1.7337	1.7343	1.7300	1.7283	1.7317	1.7393	1.7467	1.7560	1.7597	1.7573	1.7450	1.7270
2 hourly MEAN		1.7358		1.7322		1.7300		1.7430		1.7578		1.7512	

JUNE / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	51.36	51.12	51.23	51.37	51.57	51.79	51.96	52.07	52.11	52.11	52.12	52.02	51.91
MEAN	1.7120	1.7040	1.7077	1.7123	1.7190	1.7263	1.7320	1.7357	1.7370	1.7370	1.7373	1.7340	1.7303
2 hourly MEAN	1.7195		1.7058		1.7157		1.7292		1.7363		1.7372		1.7322

PRESSURES

JULY 1954

HOBART

MONTH / HR	01	02	03	04	05	06	07	08	09	10	11	12	13
July TOTAL	58.63	58.56	58.55	58.44	58.49	58.65	58.91	59.11	59.34	59.41	59.37	59.03	58.51
MEAN	1.8913	1.8890	1.8887	1.8852	1.8868	1.8919	1.9003	1.9068	1.9142	1.9165	1.9152	1.9042	1.8874
Hourly MEAN		1.8902		1.8869		1.8894		1.9035		1.9153		1.9097	

JULY / HR	14	15	16	17	18	19	20	21	22	23	24	25	26
TOTAL	58.04	57.84	57.86	57.93	58.09	58.30	58.53	58.68	58.76	58.84	58.87	58.77	58.69
MEAN	1.8723	1.8658	1.8665	1.8687	1.8739	1.8806	1.8881	1.8929	1.8955	1.8981	1.8990	1.8958	1.8932
Hourly MEAN	1.8798		1.8661		1.8713		1.8844		1.8942		1.8985		1.8945

TIME HOUR (EST) HARBAROT



