SECULAR VARIATION EXPRESSIONS OF THE MAGNETIC INCLINATION.

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These expressions for the secular variation of the magnetic inclination at various important maritime stations have been deduced with a view of providing for the computation of the rate of change at a station at any time within the period of observation, and of bringing forward, from one epoch to another, values of the inclination observed in the regions where the stations are situated.

They have been used in this manner in connection with the preparation of the chart of the world, lately published by the Hydrographic Office, showing the isoclinic lines for the epoch 1897.

Taken in connection with the secular variation expressions of the magnetic declination, communicated by me to the Editor, and published in Vol. I, No. 2, the expressions for the inclination now presented furnish the means for investigating the secular change in the direction of a freely suspended magnetic needle at each of the twenty-two stations, in addition to those of Callao, Valparaiso, Hongkong, and Sydney, for which I have already furnished results.

SECULAR VARIATION EXPRESSIONS OF THE MAGNETIC INCLINATION.¹

Station.	Lat.	Long. from Gr.	Empirical Expression I=	Kepoch	Prob. error of a single obs'n	Period assumed
Arica	18° 28' S	70° 20.5' W	-21.67 + 9.84 sin (1.06τ + 44.5)	1768	-1893.2 ± 12	350
Ascension Island	7° 55.5' S	14° 24' W	-12.32 + 23.58 sin (0.6τ + 154.3)	1754	-1890.2 ± 44	600
Bahia	13° 00' S	38° 32' E	-7.85 + 13.17 sin (1.0τ + 95.3)	1822	-1895.8 ± 11	360
Batavia	6° 08' S	106° 48' E	-36.19 + 9.71 sin (1.2τ + 81.7)	1768	-1894.5 ± 29	300
Bombay	18° 05.6' N	72° 54' E	+30.47 + 12.12 sin (0.6τ + 277.9)	1845	-1894.5 ± 8	600
Callao	12° 04' S	77° 08' W	-6.46 + 0.0495 (τ) - 0.00076(τ) ²	1790	-1893.3 ± 12	450
Cape of Good Hope	33° 56' S	18° 29' E	-49.11 + 8.75 sin (0.8τ + 214.3)	1751	-1890.1 ± 60	450
City of Mexico	19° 26' N	99° 05' W	+42.32 + 2.92 sin (1.2τ + 359.2)	1778	-1895.2 ± 3	300
Concepcion	36° 42' S	73° 07' W	-46.42 + 11.12 sin (0.9τ + 25.5)	1710	-1893.2 ± 38	400
Cochimbo	29° 57' S	71° 22' W	-38.53 + 9.08 sin (1.1τ + 52.6)	1710	-1883.3 ± 3	327
Fajal, Azores	38° 32' N	28° 33' W	+67.80 + 4.87 sin (0.75τ + 202.1)	1775	-1889.8 ± 47	450
Habana	23° 09' N	82° 22' W	+51.76 + 0.0058 (τ) + 0.00055(τ) ²	1801	-1887.3 ± 14	400
Hongkong	22° 16' N	114° 10' E	+27.82 + 4.60 sin (0.9τ + 42.7)	1791	-1894.5 ± 17	400
Honolulu ²	21° 18' N	157° 52' W	+40.31 + 0.0093 (τ) + 0.00089(τ) ²	1830	-1892.5 ± 14	360
Magdalena Bay ³	24° 38' N	120° 58' E	+12.49 + 4.94 sin (1.0τ + 56.3)	1837	-1895.2 ± 5	360
Manila	14° 36' N	120° 58' E	+48.26 + 0.0135 (τ) + 0.00135(τ) ²	1766	-1892.5 ± 12	360
Montevideo	34° 54' S	56° 12' W	-32.78 + 0.125 (τ) - 0.00054(τ) ²	1790	-1895.9 ± 6	—
Panama	8° 57' N	79° 32' W	+32.09 + 0.0071 (τ) - 0.00061(τ) ²	1790	-1891.4 ± 14	—
Payta	5° 05' S	81° 05.5' W	+4.75 + 0.023 (τ) + 0.000119(τ) ²	1823	-1893.9 ± 25	360
Pernambuco	8° 03' S	34° 52' W	+5.27 + 8.29 sin (1.0τ + 116.5)	1768	-1896.0 ± 10	400
Petropaulowski	53° 01' S	58° 43' E	+63.54 + 0.99 sin (1.0τ + 48.3)	1779	-1890.0 ± 59	400
Punta Arenas	53° 10' S	70° 54' W	-56.23 + 10.64 sin (0.9τ + 351.0)	1760	-1893.3 ± 14	600
Rio de Janeiro ¹	22° 54' S	43° 10' W	-11.81 + 0.0009 (τ) - 0.00126(τ) ²	1817	-1896.1 ± 53	—
St. Helena	15° 55' S	5° 44' W	-32.95 + 22.88 sin (0.6τ + 152.9)	1754	-1890.1 ± 2.4	—
Shanghai ²	31° 15' N	121° 29' E	+46.13 + 0.0251 (τ) - 0.00112(τ) ²	1843	-1894.5 ± 9	—
Singapore	1° 18' N	103° 51' E	-12.78 + 0.0111 (τ) - 0.000587(τ) ²	1837	-1890.5 ± 11	—
Sydney	33° 52' S	151° 12' E	-62.97 + 0.0165 (τ) + 0.00056(τ) ²	1793	-1896.7 ± 20	—
Tahiti	17° 31' S	149° 34' W	-29.70 + 0.00017(τ) sin (0.9τ + 22.3)	1769	-1890.7 ± 28	400
Valparaiso	33° 02' S	71° 39' W	-39.99 + 9.09 sin (0.9τ + 22.3)	1790	-1893.7 ± 28	400

¹ Inclination of *north end below* the horizon is *positive*, *above* the horizon is *negative*; τ expresses the interval of time reckoned from 1890; plus when forward, and minus when backward.

² N. B.—In this case, τ is reckoned from 1870 instead of 1850.

³ N. B.—In this case, τ is reckoned from 1875 instead of 1850.