Tropical Meteorological Factors with Special Reference to Typhoons

By

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A *Atmospheric Pressure.*

1. *Basic Facts:* In tropics presure gradients in general small. Diurnal and semi-diurnal pressure variations correspondingly large. In typhoons, however, pressure gradients great.

2. *Consequences:* Difficult in tropics to separate local diurnal effects from widespread gradient changes, since both changes are only a few millibars. Isallobar analysis difficult, since 3 to 4 hour pressure tendencies mainly illusory. Due to weakening of Coriolis force and pressure gradient, winds may not be controlled by isobars.

3. *Forecasting Procedure:*

(a) *Daily Oscillation:* Semi-diurnal wave very regular throughout years; probably due to solar heating of *whole* atmosphere. Amplitude about 2mm. at equator, with two maxima about 10 a. and 10 p., and two minima about 4 a. and 4 p. Diurnal wave function of locality and temperature is quite irregular. On the whole, semi-diurnal wave could be allowed for, but not diurnal. Hence illusory to get correct pressure tendencies by allowing for *mean* daily oscillation. An attempt was made, by deducting semi-diural wave from actual barometric trace, to follow *local* changes in diurnal wave and widespread barometric changes. As to *local* changes in diurnal wave, little forecasting value since changes seemed *simultaneous* with local rain or temperature changes. However, deducting semi-diurnal wave made clearer broad barometric changes, i. e. first barometric fall with oncoming depression or typhoon.

(b) In SW monsoon season maximum pressure usually in evening, at other seasons in morning, probably owing to diurnal wave changes in such season.

(c) In tropics, 3 to 4 hour pressure tendencies should be used with extreme caution. Best to use 24 hour pressure changes and isallobars, especially for those hours at which semi-diurnal wave is between maximum and minimum, i. e. 1a., 7a., 1p., 7p.

(d) A 24-hour pressure drop of 2–3 mb. should alert forecaster if it is rather local, for it usually sign of coming typhoon. If general for large region, it is not immediate precursory sign of coming typhoon. Temperate zone meteorologists would neglect 2–3 mb. drop, but in tropics this is dangerous.