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MERIDIONAL CIRCULATION IN SUMMER MONSOON OF SOUTHEAST ASIA

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Earlier, relying on theoretical considerations and on some observational evidence, the author (1967) had postulated subsidence near the equator and the corresponding existence of an equatorial cell separating the two Hadley cells of the two hemispheres, in the General Circulation model of the atmosphere. Subsequently, Bunker (1971) made some detailed analysis of observations taken in Line Islands Experiment over Equatorial Central Pacific Ocean during April 1967 and concluded that "the observed circulation appears most nearly similar to Asnani's model with two Hadley cells and a single equatorial cell".

Working on the same line of theoretical argument and also keeping in view the observational evidence which has gradually been coming to light, we believe that along with the global average picture of General Circulation as given above, one can now make a fairly reliable picture of meridional circulation prevailing over southeast Asia in general and India in particular, during the peak months (July and August) of the summer monsoon. This idealised picture is shown in figure 1. We believe that in course of time, when the current difficulties in measuring vertical velocity in the tropical atmosphere are overcome, the picture may get only slightly altered in finer details.

According to this picture, the equatorial cell separating the two Hadley cells of the two hemispheres gets considerably elongated to the north in the region of southeast Asia during the summer monsoon season and splits up into two sub-cells (I and II in the figure), one positioned over the equator and the other centred between 10° and 15° N.

This picture of regional meridional circulation during the summer monsoon is consistent with the following observations :

i) persistent cloudiness a few degrees south of the equator;

ii) relative clearance of the skies over the equator;

iii) cloud bands and possibly weak secondary trough north of the equator (Raman, 1968);

iv) subsidence over south peninsula, perhaps first postulated by Koteswaram (1958) and subsequently verified by computations of vertical velocity (Keshavamurty, personal communication);

v) persistent rains over central and north India; and

vi) southerly components in winds of lower troposphere and northerly components in winds aloft over the monsoon region.

References

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Raman, C.R.V.	1968	I.I.O.E. Met. Mon., 8, East-West Center Press, Honolulu.

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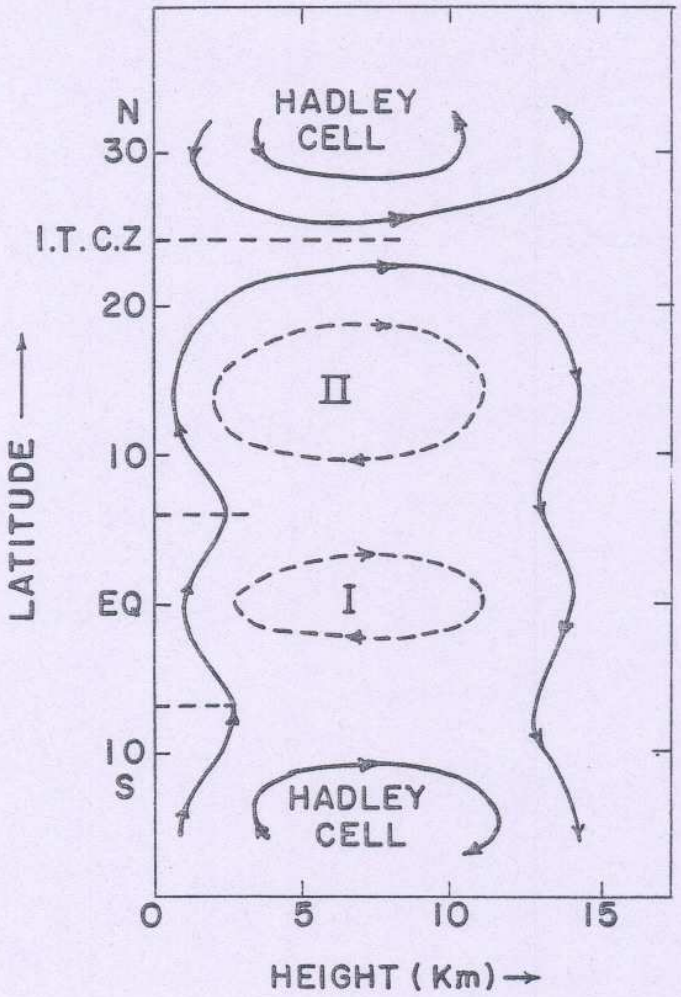

FIG.1 MERIDIONAL CIRCULATION IN SUMMER MONSOON OVER SOUTHEAST ASIA.