SESSION IV

DIAGNOSTIC STUDIES—DYNAMIC

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Indian J. Met. Hydrol. Geophys. (1978), **29**, 1 & 2, 217-218

551·553·21 : 551·577 : 551·588·2 (210 : 540)

*The influence of the topography of the Indian Peninsula on the low-level circulation of the summer monsoon**

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ABSTRACT

The effect of the topographic complex formed by the Western Ghats along the west coast of south India and the adjoining Deccan plateau to their east, on the low-level circulation of the summer monsoon and its associated rainfall are investigated. Quasi-geostrophic models of flow of a homogeneous fluid in the presence of obstacles in a rotating system are applied to identify two features of the low-level circulation which are suggested to be manifestations of the influence of the topographic feature considered. These are the southward direction of the low-level isobars on the Peninsula and the prominent trough on the Bay of Bengal. The nature of variation of these features as a response to change in conditions upstream of the topography is described. The spatial variation of the rainfall over the Peninsula predicted by assuming it to be proportional to the vorticity compares favourably with the observed variation of the seasonal r ainfall.

DISCUSSION

(Paper presented by S. Gadgil)

K.S. YAJNIK : My compliments for an excellent presentation. Does the change in Rossby wavelength due to changes in zonal winds between May and June/July correspond with the changes in the location where the isobars curve in the Bay of Bengal ?

AUTHOR : Thank you. The changes in the magnitude of the northerlies on the Peninsula as well as in the magnitude and wavelength of the Rossby waves are consistent with the observed changes.

RUBY KRISHNAMURTI : Have you considered the north-south variation of the basic flow ? In this case the dispersion relation for Rossby waves is more complicated.

*Full paper published in Proc. Geophys. Fluid Dynamic Workshop on topic in Monsoon Met., Bangalore, Vol. 2, pp. 70-102.

AUTHOR : I would like to consider it after this. The dispersion relation becomes complicated even for the case of a finite obstacle in a uniform flow. I have almost completed that problem.

J. KUETTNER : How is the increase of rainfall near east coast caused ?

AUTHOR : As the current decends from the Deccan plateau, the cyclonic vorticity increases by vortex stretching and since CISK is valid, the associated large scale rainfall also increases to the east of plateau.

J. KUETTNER : Have you studied the influence of strong vertical shear on the Rossby waves ?

AUTHOR : No. I have not but I would like to do.

P.K. DAS : I do not think it is necessary to assume a rigid upper lid. You can still make the problem determinate by radiation boundary condition.

AUTHOR : I agree. But we wanted the simplest problem in which the gravity waves were removed by the rigid lid assumption.

P.K. DAS : How do your results compare with Sarker's analysis ? He found roughly 60% of rainfall over the Ghats could be attributed to orography.

AUTHOR : Sarker's analysis is for entirely different parameter, *viz.*, small-scale orographic features influencing a stratified fluid.