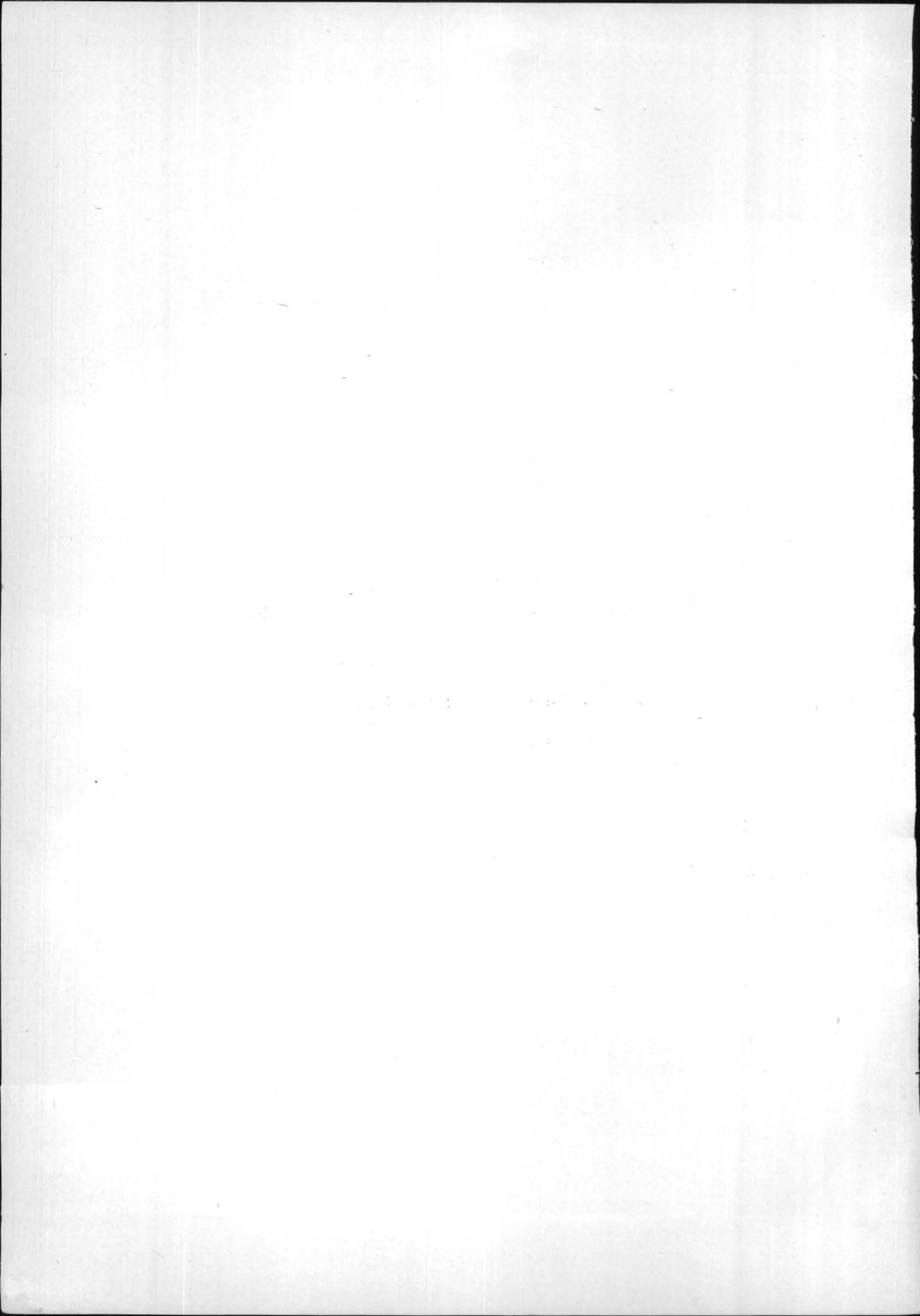


SESSION III

DIAGNOSTIC STUDIES—DYNAMIC

CHAIRMAN : DR. C. RAMASWAMY

Care The Observatory, NEW DELHI



*On the vorticity budget and vertical velocity distribution
associated with a life cycle of a monsoon depression**

S. M. DAGGUPATY

Department of Physics, University of Toronto, Toronto, Canada

and

D. R. SIKKA

Indian Institute of Tropical Meteorology, Poona, India

ABSTRACT

This paper discusses the results obtained from a diagnostic study of a monsoon depression which formed in the northern part of the Bay of Bengal. The depression, while intensifying, progressed westwards across India with a speed of about 5° longitude per day. The computed vertical velocity is in good agreement with the observed asymmetric distribution of rainfall around the depression. The presence of a low level of nondivergence, *i.e.*, around 850 mb, is found to have a significant role in the dynamics of the monsoon depression.

The important result of the computed vorticity budget over the period of the intensification of the depression is the detection of a middle and upper tropospheric cyclonic vorticity depletion with time due to large scale dynamics in the western sector of the depression. This result is rather unexpected because of the fact that the depression's observed cyclonic vorticity increases, not only in the lower troposphere but also in the middle and upper troposphere while progressing westwards. It has been shown that the presence of deep convective cloud activity in the western sector provides the necessary process to compensate the negative vorticity tendency in the middle and upper troposphere. Through a simple parameterization, it has been shown quantitatively that the transport of subgrid scale vorticity by deep convective clouds in the western sector is significant.

This mechanism of vertical transport of extremely rich boundary layer cyclonic vorticity by deep convective clouds is found to be very essential for the intensification and, as well, for the westward movement of the monsoon depression.

DISCUSSION

(Paper presented by D. R. Sikka)

P. R. PISHAROTY : Is the convective parameterization acting something like twisting term?

AUTHOR : The way in which parameterization is done does not make it clear that it acts like twisting terms. However, we observe that the sign of corrections incorporated by such parameterization is in the right direction though the magnitudes may not be agreeing always.

*Paper published in *J. Atmos. Sci.*, 34, 5, pp. 773-792