Fourth Day: Thu. Nov. 10

Morning Session Typhoon and Hurricane I

Prediction of Hurricane Formation

L. BERKOFSKY

Recently a numerical model for prediction of hurricane formation was integrated for a few time steps. In this model, the latent heat of condensation was the only heat source. Solutions were obtained both with and without heating, and the calculations showed the importance of heating for the development process.

This model has been revised, on the basis of experience gained with the initial computations, so that the entire problem is streamlined. The problem is being re-programmed for solution on the IBM 704 computer.

A Numerical Experiment on the Development of a Tropical Cyclone

A. KASAHARA

A model of a tropical cyclone is constructed based upon conservation of momentum, mass, heat, and water vapor in the hydrostatic system. The horizontal and vertical eddy-diffusion processes are included in the equations in order to incorporate the planetary frictional (Ekman) layer into the model. The effects of the surface boundary (Prandtl) layer are simulated by the boundary conditions for the equations, which permit the evaluation of surface stress, the sensible heat transport and the evaporation of water vapor from the earth's surface. The energy sources of the model are the latent heat of condensation released during the ascent of moist air and the sensible heat transported from the ocean surface. A balance of total energy is attained with the sinks of energy due to frictional dissipation and atmospheric radiation processes.

The finite-difference equations for the axially-symmetric case are presented, together with an examination of the computational stability. By means of a high-speed computer, numerical solutions are obtained from given initial wind and temperature fields. The evolution of the warm-core circulation and the development of the tangential motion are discussed together with the physical processes leading to cyclogenesis. Particular emphasis is given to the importance of latent heat of condensation and dual effects of eddy-exchange processes upon the development of a tropical cyclone.

Model Research of Formation of Tropical Cyclone

S. SYŌNO