Implication of Entropy Flow for the Development of a Severe Tropical Storm

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The entropy flows of a severe tropical storm developed later into a typhoon are calculated using the entropy flow formula appropriate for atmospheric dynamical systems based on the National Centre for Environmental Prediction/National Centre for Atmospheric Research reanalysis data. The results show that the intensification of net negative (positive) entropy flow entering into the storm preceded the strengthening (weakening) of its intensity and the asymmetries of the entropy flow pattern around the storm's centre contained some significant information on storm track prediction. These results imply that classical thermodynamic entropy may serve as an order parameter for an atmospheric system and that entropy flow analysis is able to provide a new insight into the mechanism responsible for the life cycle of the system.

Keywords: entropy flow; typhoon; self-organization

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