Geophysical Research Abstracts, Vol. 7, 01658, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01658

A Network Approach in Studying Atmospheric Dynamics

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In this paper we present a new way to study atmospheric dynamics. According to this approach each point is considered as a node in a network and the fluctuations at each point are considered to be the result of a dynamical system whose state varies in some complex way. Under this arrangement the goal is to study the collective behavior of the complete network. Preliminary results using 500 hPa and streamfunction data indicate that this network exhibits some unique properties: 1) the network possesses super nodes that are identified with major teleconnection patterns, 2) teleconnections are not static phenomena and they have been affected by the recent warming of the planet, 3) the overall dynamics of the network emerge from the interaction between two interweaved subnetworks, one operating in the tropics and the other in the midlatitudes.