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On the role of atmospheric teleconnections in climate

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ABSTRACT. In a recent application of networks to 500 hPa data, it was found that super nodes in the network correspond to major teleconnection. More specifically in the northern hemisphere a set of super nodes coincides with the North Atlantic oscillation (NAO) and another set is located in the area where the Pacific North American (PNA) and the Tropical Northern Hemisphere (TNH) patterns are found. It was subsequently suggested that the presence of atmospheric teleconnections make climate more stable and more efficient in transferring information. Here we test this hypothesis by examining the topology of the complete network as well as of the networks without teleconnections. We find that indeed without teleconnections the network becomes less stable and less efficient in transferring information. We also find that the pattern chiefly responsible for this mechanism in the extratropics is the NAO. The other patterns are simply a linear response of the activity in the tropics and their role in this mechanism is inconsequential.