



South Atlantic hurricane Catarina and recent advancements on the understanding of transition mechanisms

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Sea Surface Temperatures (SSTs) warmer than 26.5°C and Environmental Vertical Wind Shear (EVWS) lower than 8 m/s offer ideal conditions for Tropical Cyclone (TC) development. Thus it has been accepted that hurricanes could not form over the South Atlantic Ocean due to the very intense climatological EVWS and not sufficiently warm SSTs over the basin. This concept is now under review after Catarina hit southern Brazil in March 2004 after undergoing Tropical Transition (TT) over relatively cool waters. This was the first documented time when a system reaching a category I hurricane strength (Saffire-Simpson scale) made landfall anywhere in the South Atlantic basin (Pezza and Simmonds 2005). This is not to say that a phenomenon like Catarina had not existed in the past, but there is evidence that at least during the satellite era this is unprecedented.

Catarina generated much discussion and controversy in the community as to how it should be named (which also depends on cultural backgrounds) and as to what its hybrid structure really was. This hurricane represents a mark in Southern Hemisphere meteorology prompting the weather services to improve their forecasting and alert system in a time of climate change. It also draws the attention of the global meteorological community for the increasing need to develop a more modern system of classification of cyclones.

Pezza and Simmonds (2005) proposed a large scale blocking mechanism leading to persistent low EVWS to explain how this extremely rare event was formed, and such

ideas have recently received further support in the literature (McTaggart-Cowan et al 2006). A possible hemispheric link with the positive phase of the Southern Annular Mode (SAM) has been found, pointing out to the possibility of more frequent storms if the SAM continues to increase under global warming conditions. We are currently working on further evidence for this association and the new results will be communicated in the peer-reviewed literature. Advances in modeling and the local observing network are expected to throw further light into a possible hurricane (and extreme weather and climate events in general) climate prediction scheme for the region in the future.

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