Geophysical Research Abstracts
Vol. 18, EGU2016-10614, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Super El Nino - a synchrony of Indian Ocean Dipole and ENSO dynamics?

Saji Hameed (1), Jin Dachao (2,1), Vishnu Thilakan (1), and KyongHee An (3)

(1) The Univesity of Aizu, Aizuwakamatsu, Japan (saji@u-aizu.ac.jp), (2) Nanjing University of Information Science and Technology, Nanjing, China , (3) Yeouidaebang-Ro 22 Dongjak-Gu, Seoul, Republic of Korea

El Ninos significantly affect societies, economies and ecosystems on a global scale. The strongest of these events, hereafter super El Ninos, have disproportionately larger impacts. It is unclear whether a particular combination of climate states, either internal or external to the equatorial Pacific, is associated with the unique spatial and temporal characteristics of these events. This became clear in the case of the much anticipated 2014 super El Nino - although several hypothesized precursor climate states were present, the Pacific warming of 2014 did not develop into a super El Nino. Past studies using statistical analysis and coupled model experiments have pointed to the possible role of the Indian Ocean Dipole (IOD) in affecting El Nino. However, no direct observational evidence for the role of IOD has yet been found. Here we present for the first time strong and direct observational evidence for the distinct role of IOD dynamics in modulating El Nino evolution during co-occurring events. Further, we identify the key process in this interaction as an atmospheric Kelvin wave dominated downstream circulation forced by equatorial Indian Ocean convection. We propose that the synchrony of this IOD forced process with the inherent coupled dynamics in the Pacific associated with El Nino explains the strong intensity as well as the rapid evolution and termination of super El Ninos, along with their disproportionate global impacts. We discuss the implication of our findings for the ongoing El Nino event which has been projected to rival the 1997 super El Nino in strength and impacts.