Geophysical Research Abstracts
Vol. 14, EGU2012-7035-1, 2012
EGU General Assembly 2012
© Author(s) 2012

Phase-dependent Impact of Strong Tropical Volcanic Eruption on predicting ENSO

M. Ohba (1), H. Shiogama (2), T. Yokohata (2), and M. Watanabe (3)

(1) Central Research Institute of Electric Power Industry, Abiko, Japan (oba-m@criepi.denken.or.jp), (2) National Institute for Environmental Studies, Tsukuba, Japan, (3) Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwa, Japan

Impact of tropical strong volcanic eruption (SVE) on the El Niño-Southern Oscillation (ENSO) and its phase-dependency is investigated by using a coupled general circulation model. Since warm and cold phases of ENSO exhibit a significant asymmetry in their transition/duration, we separately investigate the response of warm and cold ENSO to the idealized SVE forcing of similar magnitude to 1992 Pinatubo event, producing a peak top-of-atmosphere radiative perturbation larger than -3.5 Wm-2. The radiative forcing due to the volcanic aerosols injected into the stratosphere induces tropical cooling around the time the volcanic forcing peaks. Identical-twin forecast experiments with/without the SVE forcing are conducted to investigate the phase-dependency of the SVE on predicting ENSO. The experiments show that a without SVE condition extends the skillful prediction of the ENSO warm phase by about one year, which was about half year under the SVE forcing, in which a significant drop of the prediction skill is found after the peak of forcing. The SVE significantly counteract the evolution of the warm phase of ENSO, and then the following transition from warm to cold ENSO is interfered. However, the effect of the SVE forcing on the predictability of the tropical Pacific SST is much weaker in La Niña. The SVE forcing during the cold phase of ENSO rather facilitate the La Niña duration. This result implies that the impact of SVE on ENSO could be significantly dependent on the phase of ENSO, and then various experiments (e.g., a change in magnitude of SVE and ENSO phase) in advance will contribute to instantly speculate the impact of future SVEs in ENSO forecast.