



Influence of the Mt. Pinatubo eruptions on the dynamics of the quasi-biennial oscillation

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When Mt. Pinatubo erupted in June 1991, the quasi-biennial oscillation (QBO) had nearly terminated a westerly wind phase. Observations showed that the westerly phase remained in the lower tropical stratosphere, and was slightly lifted upward in the months after the eruption, until the westerly wind was terminated in spring 1992. This study tests the hypothesis that the radiative forcing resulting from the observed stratospheric aerosol layer, which developed after the Pinatubo eruption, is the cause of the observed temporal extension and lifting of the westerly wind in the lower tropical stratosphere. For this purpose the MAECHAM5 GCM, which simulates the QBO from resolved and parameterized wave mean-flow interaction, is employed in two ensemble simulations. The control ensemble simulates the QBO without any external perturbation. The aerosol ensemble includes an externally prescribed distribution of sulfate aerosols, following observations after the Mt. Pinatubo eruption. This presentation compares the ensemble mean evolution of the QBO in both cases, and analyzes the differences in the QBO forcing terms that can cause the observed temporal extension of the westerly wind phase of the QBO.