Effects of ice microphysics and its interaction with radiation on tropical equilibrium states are investigated based on three two-dimensional cloud-resolving simulations imposed by zero vertical velocity. The model is integrated for 40 days with the initial vertical profiles of temperature and vapor observed during TOGA COARE; the simulations reach equilibrium states in all experiments. One experiment without ice microphysics and another experiment without ice cloud-radiation interaction are compared with the control experiment, which includes both ice microphysics and ice cloud-radiation interaction. The simulation without ice cloud-radiation interaction produces a colder and drier equilibrium state by thermal instability-induced condensation enhancement than does the simulation with ice cloud-radiation interaction. The simulation with ice microphysics generates a warmer equilibrium state as well as a moister equilibrium state through radiative interaction with water vapor and water clouds and thermal stability-induced condensation suppression, respectively, than does the simulation without ice cloud-radiation interaction. The comparison between the simulations with and without ice microphysics in this study is similar to Gao et al. (2006) with imposed large-scale forcing except that the exclusion of ice microphysics produces a cold bias through condensation processes in this study whereas it generate a warm bias through convergence of vertical heat flux in Gao et al. (2006).