Using NCEP/NCAR reanalysis data, the China rainfall and surface temperature data of the China Meteorological Administration, and the Arctic Oscillation (AO) indices of NOAA, the author investigates the relationships between the AO and the precipitation and temperature over China. There exists a good relationship between the AO index in December and the succeeding January precipitation over South China, indicating that when the December AO index is positive (negative), the January precipitation over South China increases (decreases). A remarkable negative correlation between the December AO index and the January surface temperature also exists over South China, indicating that when the December AO index is positive (negative), the January temperature over South China drops (rises). The occurrence of this anomalous climate is related to the anomalies of the atmospheric circulation systems. The December AO greatly influences circulation anomalies in January. A positive phase of the AO is found to lead to a stronger subtropical jet over the south side from the Iran Plateau to the Tibetan Plateau. Consequently, it results in a deepening pressure trough around the Bay of Bengal, which transports the warm and wet air to South China continuously. The Siberian High in January is stronger and extends farther southeastward. It results in continual cold air at 1000 hPa pouring into South China, inducing low temperature. Cooperating with the trough of the Bay of Bengal, anomalous precipitation occurs over South China. For the negative phase of the December AO, the opposite situation is observed.