Global climate changes are often connected with increasing amount of greenhouse gasses in the atmosphere. Analyses of 22 temperature and precipitation characteristics from the period 1961-2000 showed, that some climate characteristics of the Czech Republic have been changing (mean diurnal temperature range and the number of days in heat waves have increased, length of frost season has decreased). Some characteristics have remained unchanged (maximum seasonal temperature range, length of wet and dry season). Trends of values in autumn proved to be different from other seasons. Comparison of outputs of regional climate model RegCM3 with data from stations in the Czech Republic showed, that model described temporal changes of characteristics, sufficiently, but the mean model values were lower. The coincidence of RegCM3 precipitation characteristics with real data was worse, than the correspondence of temperature characteristics. The mean values of some precipitation characteristics were very different from real ones and they also didn't describe temporal development of characteristics.