

The effect on water resources produced by global environmental changes

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In the present paper, the effect on water resources produced by global environmental changes is investigated by clarifying the secular changes in the components of hydroclimatological characteristics including precipitation, evapotranspiration, and runoff over the last 100 years. The smooth trend curve indicates that annual evapotranspiration has increased over the long term, especially since the 1980s. On the other hand, annual precipitation has been inclined to decrease since the first half of the 1970s. Smoothed long-term changes in the difference between annual values of precipitation and potential evapotranspiration are analogous to those of annual precipitation. The average annual runoff ratio for each ten-year has also shown a tendency to decrease during the last few decades. It is pointed out that the notable characteristics on current frequency-magnitude distributions in annual precipitation are both a reduction of intervals of hydrological extremes and an increase of range in each year. Under conditions of extreme meteorological events that increased air temperature in the summer of 1994, river water quality showed a remarkable change as compared with its average value in a normal year. The most striking feature due to high temperature was a very low value of the concentration of dissolved oxygen through July into August. The facts identified in the present study provide a meaningful perspective of the possible consequences of global warming for hydrological element, and are useful as basic data to evaluate the effects of future climate change on water resources. Japan's scientific contribution to a clue solving the global environmental changes is also discussed by showing the specific case studies.