

Impact Analysis of Global Climate Change on Water Balance over the Past 95 Years

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The impact of climate change in water balance components was important, since the hydrologic cycle plays a key role in the heat balance of the Earth's surface-atmosphere system [1]. Several global climate change analyses were done based on spatial and time scales to determine whether any trends are evident of the past 95 years period [3]. The main purpose of this study is to analyze the impact of the global historical climate change on water balance components (i.e. potential evapotranspiration, *Eo*) during the 95 years period (1901-1995). The global climate data used here were derived from CRU05 0.5 degree 1901-1995 monthly climate time series CD ROM, which produced by Climatic Research Unit, University of East Anglia [2]. To explore the trend and variations of climate change, the time series of monthly air temperature and precipitation data were aggregated into annual arithmetic means for two extremely periods (1901-1920 and 1990-1995). Due to the limitation of available spatial image datasets, the *Eo* in this study was calculated by using Thornthwaite method. By comparing the *Eo* value of 1901-1920 and 1990-1995, the *Eo* change due to climate change can be considered. If *Eo* change has been consequence of increasing contribution from air temperature, the *Eo* change would be expected to be increasing over all continents. However, its change record was examined in different pattern with air temperature. In fact, the greatest air temperature change was covered over high latitude of northern Asia (45°-70°N), while the highest *Eo* change was happened in low latitude (10°S-10°N). The *Eo* change was predominantly of two types, i.e. decreasing and increasing of *Eo* value. The highest decreasing change is occurred particularly in tropical region of Asia up to 200 mm/year or in 2 mm per year, while the greatest increasing of value is occurred in South America (20°S-5°N) by 100 mm/95 years. For mean global, Africa, Australia, Europe, and North America, the fluctuations are small only around -25 till 50 mm/year.

Key words: Climate change, water balance, potential evapotranspiration.

References

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