

عنوان مقاله:

A GLOBAL STUDY OF CHANGE IN ARIDITY CLASSES

محل انتشار:

دومین کنفرانس بین المللی مخاطرات محیطی (سال: 1392)

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خلاصه مقاله:

Global climate change is anticipated to have enormous impacts on the availability of (and demand for) future water resources around the world. Therefore, due consideration of the role of climate change on water resources availability is critical for proper water resources assessment, planning, and management. Aridity indices serve as an important means for water resources assessment. In this study, the UNESCO aridity index (AI), which is based on the ratio of annual precipitation and potential evapotranspiration, is used to assess the potential available water globally. Estimation of such potential evapotranspiration data is based on the FAO reference evapotranspiration equation, which is a variant of the Penman-Monteith method. The calculated global UNESCO aridity index is classified into five states, from the minimum amount of water available (i.e. Hyper-arid class) to the maximum amount (i.e. Humid class). The present study examines the changes in these aridity classes during the past century, towards a more reliable evaluation of their possible trends in the future under climate change conditions. Global precipitation and potential evapotranspiration data observed over the period 1900–2009 are analyzed to produce the aridity maps. Since moving a variable between a series of states or classes in time can be easily and effectively analyzed and described by Markov models, the global aridity class time series are considered as a Markovian process to describe the change from one class of aridity to another. A global transition probability map is produced for each transition. The results generally show that the probability of some transitions, such as from arid or hyper-arid zones to humid zone, is zero or close to zero throughout the world. However, the results for some more probable hazardous transitions, such as from sub-humid to semi-arid, are different. The aridity maps also suggest that some parts of the world, especially marginal regions of each climatic zone, are at significant risk to become more arid in the future.

کلمات کلیدی:

aridity, climate change, Markov chains, potential evapotranspiration, transition probability

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