

ASSESSMENT OF CLIMATIC AND HYDROLOGICAL DROUGHT USING RS AND GIS TECHNIQUE ON KOREAN PENINSULA

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The purpose of this study was to assess the climatic and hydrological drought of Korean peninsular using NOAA/AVHRR satellite images and national hydrological monitoring data. Climatic drought was evaluated by climatic water balance analysis. According to the climatic water balance analysis, water deficit and surplus distributed maps were created from spatial rainfall, soil moisture, and actual and potential ETs map. The results clearly showed that the temporal and spatial characteristics of dryness and wetness were detected and mapped based on the wetness index. Hydrological drought was evaluated by MSWSI (Modified Surface Water Supply Index) based on SWSI. The results were compared to PDSI and SPI, and checked the applicability of the suggested index in practical drought situation.

Many definitions of drought are adopted in various fields, with reference to the components of the hydrological cycle considered in the analysis and to the different impacts on water users and ecosystems (Yevjevich et al., 1983; Easterling, 1988; Rossi et al., 1992; Wilhite et al., 2000).

In particular from a meteorological/climatic point of view, drought can be defined as a temporary reduction in water or moisture availability significantly below the normal or expected amount for a specified period, with an emphasis on the transitory character of the water deficiency with reference to the particular climatic zone. From a hydrological point of view, drought is defined as a period of abnormally dry weather sufficiently prolonged for the lack of precipitation to cause serious water deficits in water bodies. From an agricultural point of view, drought is defined as depletion of soil moisture to a level that affect significantly crop and/or pasture yield (Rossi, 2000).

During the past four decades in Korea, extreme drought has happened with the interval of about five years. Especially, the case of 1994-1995 and 2001 drought of one hundred years frequency caused severe shortage of water supply and harvest damage due to little rainfall from March to June. The drought events have provoked attention to mitigate and prepare for the next drought.

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