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Remotely Sensed Quantitative Drought Risk Assessment in Vulnerable Agroecosystems

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Hazard may be defined as a potential threat to humans and their welfare and risk (or consequence) as the probability of a hazard occurring and creating loss. Drought is considered as one of the major natural hazards with significant impact to agriculture, environment, economy and society. This paper deals with drought risk assessment, which the first step designed to find out what the problems are and comprises three distinct steps, namely risk identification, risk management which is not covered in this paper, there should be a fourth step to address the need for feedback and to take post-audits of all risk assessment exercises. In particular, quantitative drought risk assessment is attempted by using statistical methods. For the qualification of drought, the Reconnaissance Drought Index (RDI) is employed, which is a new index based on hydrometeorological parameters, such as precipitation and potential evapotranspiration. The remotely sensed estimation of RDI is based on NOA-AVHRR satellite data for a period of 20 years (1981-2001). The study area is Thessaly, central Greece, which is a drought-prone agricultural region characterized by vulnerable agriculture. Specifically, the undertaken drought risk assessment processes are specified as follows:
1. Risk identification: This step involves drought quantification and monitoring based on remotely sensed RDI and extraction of several features such as severity, duration, areal extent, onset and end time. Moreover, it involves a drought early warning system based on the above parameters.
2. Risk estimation: This step includes an analysis of drought severity, frequency and their relationships.
3. Risk evaluation: This step covers drought evaluation based on analysis of RDI images before and after each drought episode, which usually lasts one hydrological year (12month).

The results of these three-step drought assessment processes are considered quite satisfactory in a drought-prone region such as Thessaly in central Greece. Moreover, remote sensing has proven very effective in delineating spatial variability and features in drought monitoring and assessment.