International Journal of Innovative
Computing, Information and Control
Volume **7**, Number **2**, February **2011**

ICIC International ©2011 ISSN 1349-4198
pp. **657–668**

USING GIS-BASED SPATIAL GEOCOMPUTATION FROM REMOTELY SENSED DATA FOR DROUGHT RISK-SENSITIVE ASSESSMENT

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Received September 2009; revised February 2010

Abstract. *This paper proposes a novel method for providing spatial filtering of drought risk-sensitive areas. Our method uses geographic information system (GIS) and remote sensing (RS) techniques to identify the exact spatial locations of drought risk-sensitive areas and then quantitatively evaluates the degree of drought risk based on this spatial information. Furthermore, the spatial occurrence of the local G statistic provides decision makers with useful decision support information. Drought risk-sensitive areas are identified based on the analysis of satellite imagery. The correlation of the vegetative and hydrological drought indices to drought conditions are considered as well. The empirical implementation of this novel method shows it to be suitable and useful for drought monitoring and assessment in different areas with little modification.*
Keywords: Drought, Drought indices, Remote sensing, Local getis statistic, Spatial filtering

1. **Introduction.** Drought has become a major environmental issue in recent years. The growing need for agricultural production and water resources has driven researchers to concentrate on drought risk assessment as a means to improve environmental management leading to effective monitoring [1-4]. The major problem is the lack of spatial information for assessment of drought risk. Spatial information is important to diagnose drought-related phenomena. For example, the absence of spatial information can lead to misregistration using mutual information in medical image registration [5]. [6] developed a Simple Spatial Disaggregation Approach (SSDA) within a geographical information system (GIS) environment, that utilizes cluster forecasting techniques to provide spatial information for criminal damage. The spatial autocorrelation concept is important in region-based science. Ecologists must study spatial patterns to enrich their understanding of the spatial processes occurring in the environment [7]. Spatial autocorrelation is an important part of analysis and georeferencing of vegetation and drought condition data. Thus, in this study we propose using a novel combination of drought indices derived from satellite images and spatial autocorrelation computations as a spatial filtering mechanism to provide exact spatial information about drought risk-sensitive areas.

Risk assessment includes both risk estimation (identifying hazards and estimating their outcomes and probabilities) and risk evaluation (determining the significance or value of risks to those concerned with or affected by the decision) [8]. Much effort has been