Drought Assessment Using Remote Sensing and Geographic Information Systems (GIS) Techniques (Case Study: Klaten District)

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Drought Assessment Using Remote Sensing and Geographic Information Systems (GIS) Techniques (Case Study: Klaten Regency, Indonesia)

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Abstract

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Keywords: Drought, Geographic Information System, Remote Sensing

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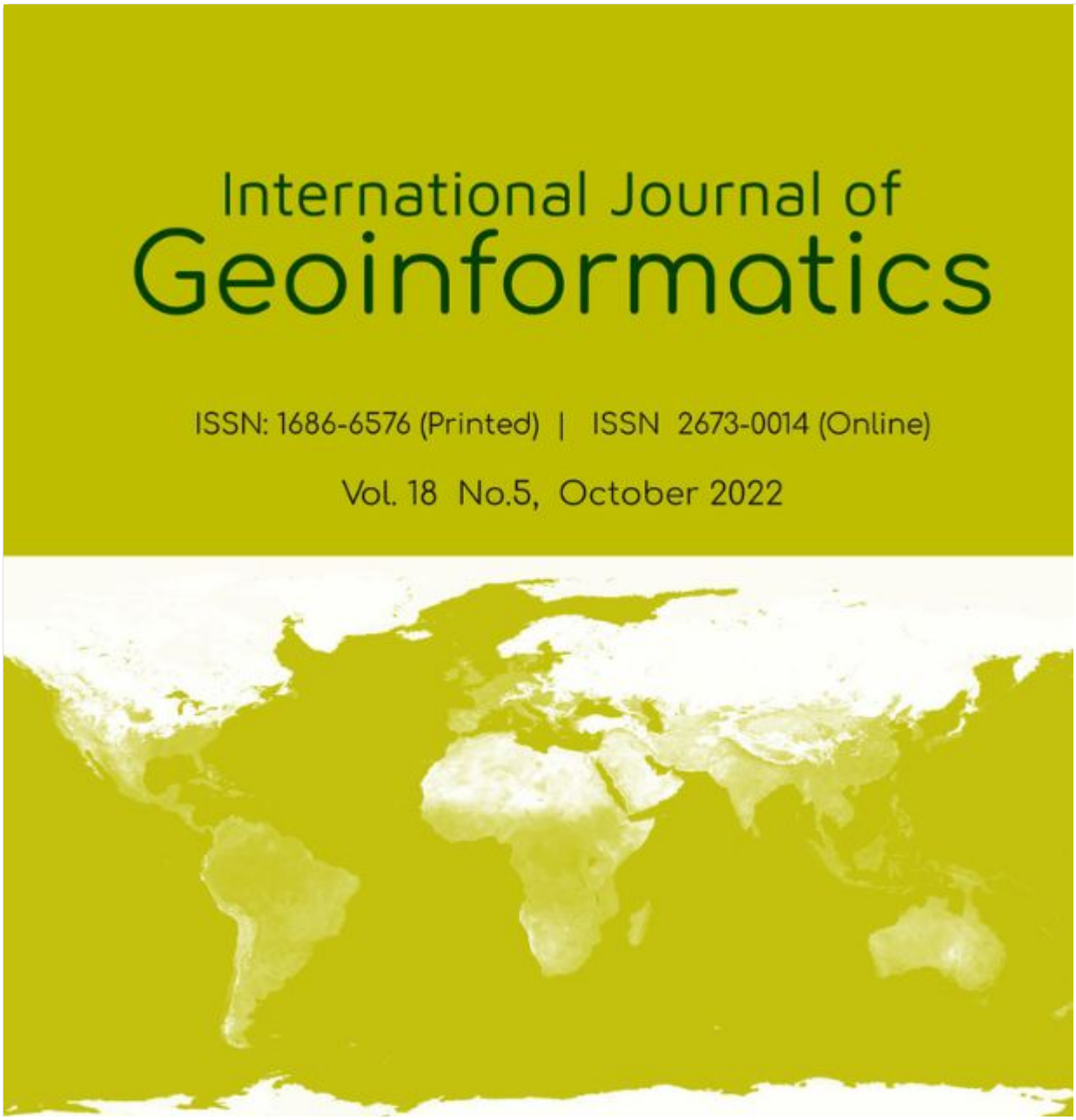

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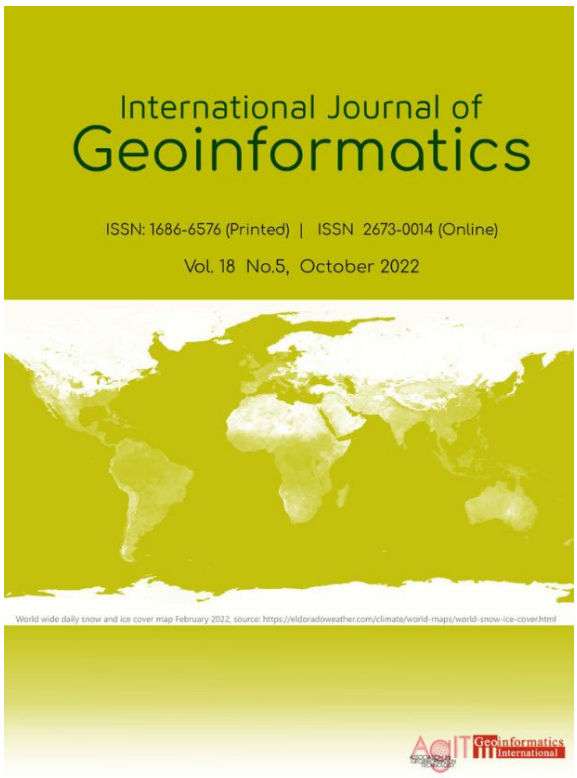

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Nitin Tripathi

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1. Introduction

Indonesia is located on the equator, so there is a rainy and dry season throughout the year. In the dry season, drought often occurs in several areas due to the duration of the dry season being too long. Drought is a natural disaster that is difficult to predict but can be detrimental to human life. Indonesia often experiences meteorological drought in several areas. Meteorological drought variables are based on rainfall and temperature whose application can be determined on a local or regional scale depending on the availability of data and the spatial distribution of the earth station network (Rhee et al., 2010). The availability of data makes it difficult to predict drought in large areas. Drought is caused by an uneven distribution of rainfall over a long period in an area (Lei and Duan, 2011 and Jamil et al., 2013). Drought can also be interpreted as a lack of water supply compared to the need for water for human purposes.

Drought affects various sectors in society such as agriculture, ecosystem services, human health, recreation, and water resources and is the most detrimental natural disaster. Therefore, drought has the most damaging impact on various sectors compared to other natural disasters because it causes water scarcity, agricultural drought, and famine (Smith and Katz, 2013). Each region has different characteristics so it is difficult to determine the approach to identifying accurate drought characteristics (Hao et al., 2017). Difficulties in identifying droughts encourage researchers to develop related indicators of drought including the applications used, regional conditions, and data availability in the area. In general, researchers focus their research on drought in certain geographic areas that have the potential for drought (Zhang et al., 2017a). Drought mapping has temporal and spatial complexity, making it difficult to accurately determine and identify the start and end of the drought and drought duration (Wu et al., 2013). The potential for drought requires accurate spatial data in describing information about an area so that it can plan for handling drought disasters if at any time the disaster occurs.