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Judul karya ilmiah (artikel) : Slum Upgrading Based on Level of Vulnerability to Climate Change in Coastal Area of Semarang City, Indonesia

Jumlah Penulis : 4 penulis

Status Pengusul : **Khristiana Dwi Astuti**, Pangi, Reny Yesiana, Intan Muning H

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NIP.196605061995121001
Departemen PWK FT UNDIP

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Departemen PWK FT. Undip

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Semarang, 31 Desember 2021

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NIP.196605061995121001
Departemen PWK FT UNDIP

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Maya Damayanti, S.T, MA, PhD
NIP. 197509222003122002
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# Slum Upgrading Spatial Model Based on Level of Vulnerability to Climate Change in Coastal Area of Semarang City

Astuti K.D. , Pangi P., Yesiana R., Harjanti I.M.

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[a] Diponegoro University, Indonesia



## Abstract

Slum settlement is one of the significant global problems which requires special concern in the discussion agenda of Sustainable Development Goals (SDGs) of 2016-2030. The Sustainable Development Summit held in New York in September 2015 formulated that one of SDGs goals is to build inclusive, safe, resilient, and sustainable cities and settlements. In Indonesia, the achievement of this goal is stated in National Medium-Term Development Plan 2015- 2019, i.e. creating 0% urban slum settlement which is supported by policies expected to accommodate the achievement of national development targets. Semarang Mayor Decree No. 050/801/2014 concerning the Determination of the Location of Housing Environment and Slum Settlements in Semarang City has been issued as the basis to identify slum settlements scattered throughout Semarang city, in terms of location, physical condition, and social conditions. This study was conducted by case studies on slum settlements in Trimulyo Village and Mangkang Wetan Village, Semarang city, Central Java Province, Indonesia, to formulate a slum upgrading model based on the resilience level of coastal communities towards climate change. The analysis included identifying the characteristics of slum settlements, scoring analysis to determine the resilience level possessed by coastal communities, and analysis of pentagon assets used to formulate slum upgrading models. The results of the study showed that these two research areas had a moderate level of vulnerability, with several different characteristics of asset ownership, particularly those related to human and social assets. Increasing the quality of human

resources and social relations in the community was more intensified in the environment and community in Trimulyo, while improving the physical quality of the environment through housing improvements was carried out in Mangkang Wetan. © 2021 GJGP-Undip.

Author keywords

Coastal community; Slum upgrading; Vulnerability

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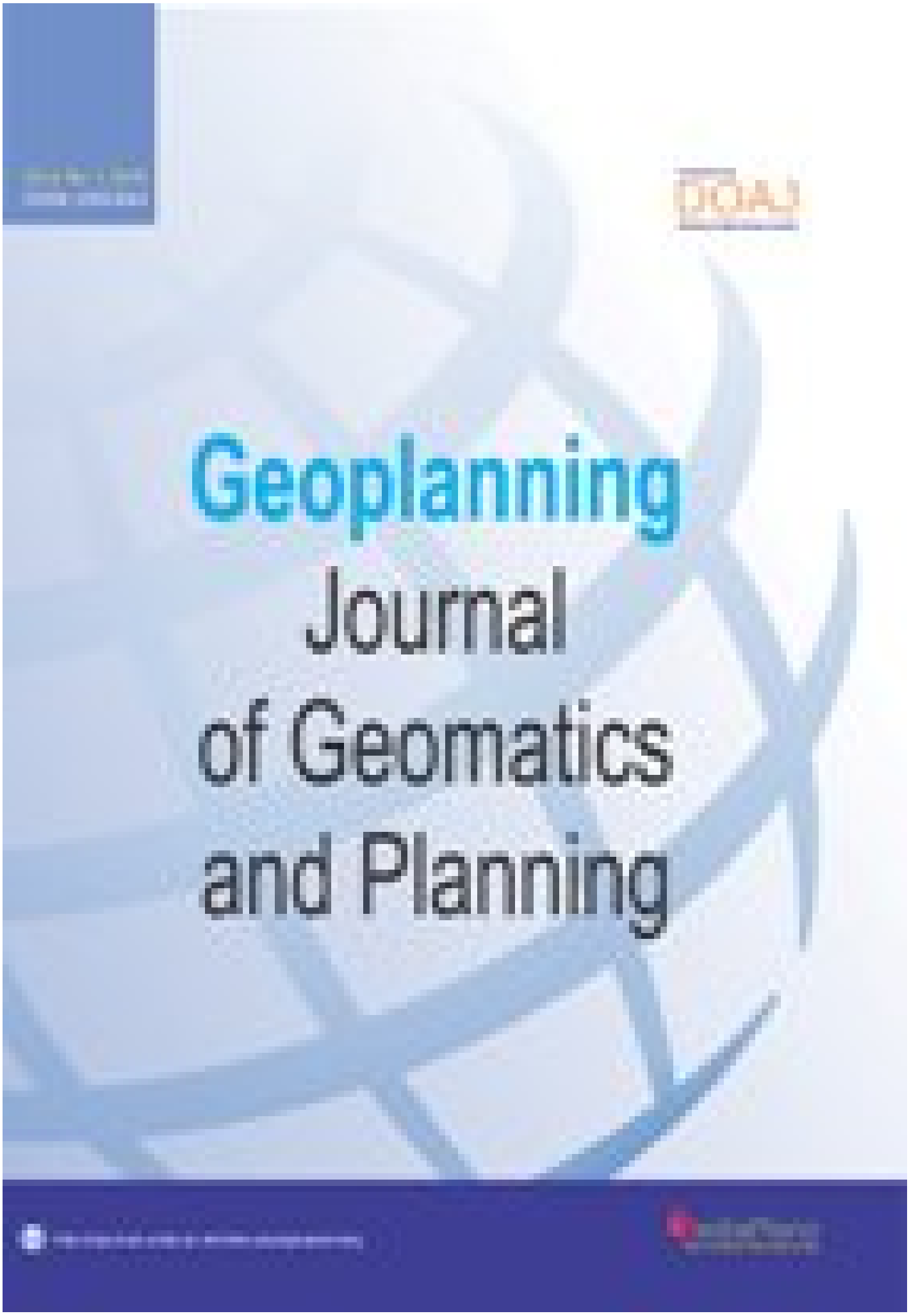


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*Corresponding author(s) email:
envcart@yahoo.gr

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# Practical Methods of GIS for Archaeologists: Viewshed Analysis - The Kingdom of Pylos Example

George D. Malaperdas [1*]

1. *Department of History, Archaeology and Cultural Resources Management, University of The Peloponnese, Greece*

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## Abstract

Visibility (or Viewshed) Analysis in archeology is a function given through GIS, in purpose to contribute in the field of archaeology and especially in landscape archeology, by reconstituting the visual panorama of a study area of the past. The concept of landscape archeology is a multidimensional research process that is not limited to archaeologists but places a special emphasis on a multidisciplinary approach. Mycenaean Messenia was the area of study and analysis of the visual panorama for two important reasons. First of all, it is a large area, which presents territories of varying heterogeneity in terms of morphology, while having a large sea front and an open observation horizon. Secondly, it is one of the continental regions of the Mycenaean period, which has evoked the largest number of residential facilities, structures and tombs, and also has been extensively studied by archaeologists since the 1920s. The main aim of this paper is to make an effort to identify archaeological information, through the bibliographic references of the archaeologists who studied the area, with the GIS visibility analysis. For that reason, the author tries for those residential locations that have been assigned a role or function of the site by archaeologists, such as an observation station, to be controlled in parallel and on the basis of new technologies (GIS and Viewshed Analysis) if this view is verified.



## 1. Introduction

Messenia Prefecture is located in the Southwest edge of the Peloponnese (Figure 1), Greece. Messenia was the Kingdom of Pylos during the Mycenaean Era. The river Neda constitutes the conventional northern frontier of the region under study, while the eastern boundary was the plain ground before the mountain Taygetos. Neda is still used today as the boundary between the Prefectures of Messenia and Elis (Liko, 2012; Simpson, 2014).

GIS for archeologists is important, especially in supporting aspects of location and information that are in accordance with the interests of protecting archaeological assets (Lockwood & Masters, 2021). Otherwise, geospatial techniques in GIS can also help in systematic conservation planning to protect historical objects (da Silva et al., 2020). Furthermore, the importance of using GIS has also helped in archaeological conservation, especially for tourism and environment planning, also digital archiving development planning.

Several previous researches used viewshed analysis for spatial observation, especially archaeological conservation efforts. Viewshed are defined as the areas within the key location study area that could be viewed from one or more observation locations. Conversely, the viewshed from a particular site of interest (the areas that can be viewed) are also the areas from which the site can be seen.

The viewshed analysis has been widely accepted by the archaeological community, since many works has been done on this direction (da Silva et al., 2020; Gillings, 2015; Jones, 2006; Lake & Woodman, 2003; Lockwood & Masters, 2021; Wheatley & Gillings, 2002). By looking at the existing developments, this paper has a different

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*Corresponding author(s) email:
bswafiyudeen@gmail.com

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# Modelling Precipitable Water Vapour (PWV) Over Nigeria from Ground-Based GNSS

Bawa Swafiyudeen [1*], Usman I. Sa'i [1], Adamu Bala [1], Aliyu Z. Abubakar [1], Adamu A. Musa [2], Nura Shehu [1]

1. *Department of Geomatics, Ahmadu Bello University, Zaria, Kaduna, Nigeria*
2. *Department of Surveying and Geoinformatics, Nuhu Bammalli Poly, Zaria, Kaduna, Nigeria*

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## Abstract

Global Navigational Satellite System (GNSS) over the past and present time has shown a great potential in the retrieval of the distribution of water vapour in the atmosphere. Taking the advantage of the effect of the atmosphere on GNSS signal as they travel from the constellation of satellite to ground-based GNSS receivers such that information (water vapour content) about the atmosphere (mostly from the troposphere) can be derived is referred to as GNSS meteorology. This paper presents the spatiotemporal variability of Precipitable Water Vapour (PWV) retrieved from ground–based Global Navigation Satellite System (GNSS) stations over Nigeria for the years 2012 to 2013. In this paper, the GNSS data were processed using GAMIT (ver. 10.70). The GNSS PWV were grouped into daily and monthly averages; the variability of the daily and monthly GNSS PWV were compared and validated with the daily and monthly PWV from National Centre for Environmental Prediction (NCEP) and monthly Rainfall data for the study years respectively. The results revealed that the spatiotemporal variability of PWV across Nigeria is a function of geographic location and seasons. The result shows that there is temporal correlation between GNSS PWV, NCEP PWV and rainfall events. The research also affirms that GNSS PWV could be used to improve weather forecasting/monitoring as well as climate monitoring.



## 1. Introduction

Global Navigational Satellite System (GNSS) over the past and present time has shown a great potential in the retrieval of the distribution of water vapour in the atmosphere (see for example Bevis et al., 1994, 1992; Davis et al., 1985; Gurbuz et al., 2015; Isioye et al., 2016). The potential of GNSS in meteorology was first proposed by Bevis et al. (1992). Ground-based GNSS meteorology can be advantageous in numerical weather forecasting. Regionally and globally, it can be adopted for climate monitoring and atmospheric research.

Taking the advantage of the effect of the atmosphere on GNSS signal as they travel from the constellation of satellite to ground-based GNSS receivers such that information (water vapour content) about the atmosphere (mostly from the troposphere) can be derived is referred to as GNSS meteorology (Xiaoming et al., 2010; Uang-Aree et al., 2014). Water vapour gradiometers, LiDAR, Radio Sounds and solar spectrometers are other techniques that can be used for water vapour retrieval, but one disadvantage is that they are expensive unlike their GNSS counterpart. In this study, the GAMIT (Herring et al., 2010; Li, 2021) has been used to estimate Precipitable Water Vapour over Nigeria from ground-based GNSS stations. The ionosphere and the troposphere are among the major cause of GNSS signal delay as they travel down to the earth surface from constellation of satellite. The ionospheric delay can be mitigated using dual frequency GNSS receivers and utilizing its dispersive characteristics (Tregoning et al., 1998; Wielgosz et al., 2019; Perevalova et al., 2020). To the Geodesist, the atmospheric errors are a cause for concern but for meteorological studies, the tropospheric error is useful for climate studies and other related applications.