Determination of the Surface Roughness Parameter and Wind Shear Exponent of Kisii Region from the On-Site Measurement of Wind Profiles

Abstract

The research sought to investigate the surface roughness parameter (α) and wind shear exponent (z_0) of the Kisii region (elevation 1710m above sea level, 0.68°S, 34.79°E). A two month experiment was carried out at three sites of Kisii region wheretwo PRO AcuRite 01036 Wireless Weather Stations with pro+ 5-in-1 Sensors were set at different hub heights above the ground and data sent and received by a display board set at a room through remote sensing at an interval of 12 minutes. Data was collected from the display board through the pc connect software, grouped into discrete data and then calculated to represent; mean wind speed, diurnal variation, daily variation and monthly variations. The calculated averages of wind speeds at hub heights of 10m and 13m were then used to determine the wind shear exponent and roughness parameter of the sites. The wind shear exponents were found to be 0.92, 0.41 and 0.52 for Nyamecheo, Kisii University and Ikobe stations respectively. The roughness parameter was also calculated and found to be 3.75m, 0.98m and 1.68m for Nyamecheo, Kisii University and Ikobe respectively with an average of 2.153m.

Key words: *Surface roughness parameter, wind shear exponent, Wind speed*

The Paradox of the East Africa Rainfall: Our Wish

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Abstract

Rainfall is the most important weather parameter in East Africa (EA) region despite exhibiting high spatiotemporal variability. The economy of the region is mainly driven by rain fed agriculture. Unfortunately, the region is very prone and vulnerable to the ongoing climate variability and climate change. These calls for understanding the past and future climate for informed policy formulation that spurs creativity and innovation for sustainable development. This work investigates the climate over EA, focussing on rainfall and temperature. It is based on reanalyzed datasets and Coupled Model Intercomparison Project Phase 5 (CMIP5). The period under study is 1951-2010 (2071–2100) for past (future) with a baseline period (1961–1990). Results show an overall decrease (increase) in rainfall (temperature) over EA. CMIP5 models perform poorly in reproducing rainfall over EA. The models project rainfall increase under the RCP4.5 and 8.5 scenarios. October-December season will record larger increase in rainfall as compared March-May season. The last half of the 21st century is likely to warm by 1.7–2.8 and 2.2–5.4 °C under RCP4.5 and RCP8.5 scenarios, respectively. The central parts of Kenya and the Lake Victoria Basin will record the highest increases in rainfall. The observed reduction in rainfall is extending into CMIP5 model projection period that show increase in rainfall. This is the paradox that calls for caution in the uptake of the findings based on the Global Circulation Models. The actualization of the projected increase in rainfall will be a relief to the population of EA, and therefore it remains to be our wish. There is need for advanced research using Regional Circulation Models so as to come up with climate products for long term planning. Meanwhile, the best advisories are limited to adaptation measures to climate change effects in response to the observed climate, an option that is socioeconomically expensive.

Keywords: Climate projection; Rainfall; Temperature; CMIP5; East Africa

Coping Adaptive Strategies Used by Households and Make Policy Recommendations for Addressing Future Climate Change Impacts on Livelihoods in Kapsokwony Division, Mt. Elgon Sub-County, Kenya

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Abstract

Long term and short changes in climate are disproportionately affecting all parts of the world in equal measure. The most impacted by vagaries of climate change are the most vulnerable and the poor who live in the developing world. Climate change and climate variability impacts the smallholder farmers though they continue to apply traditional technologies in order to cope with climate change vulnerability. In most of the parts the world over, coping strategies are lacking especially in the African States. The purpose of this study was to build new transformation knowledge by integrating the traditional and the modern adaptive technologies in order to transform lives of the indigenous communities in the study area. This paper therefore explores and highlights the existing and modern technologies which can be employed by farmers to counteract the impacts of climate change and climate variability. Data collected through in-depth and informant interviews together with Focused Group Discussions (FGDs) and a structured questionnaire administered to 384 household heads in twelve sub-locations in the study area (Kapsokwony Division) formed the basis of these policy recommendations. The long and short term adaptive strategies and recommendations developed by all the actors including those from the academia and the traditional communities during the research are meant to build climate resilience and adaptive capacity at local and national levels. A framework that has been developed by this research will help support policy decisions in conservation agriculture and livestock rearing systems, water resource management, change in social behavior, accessing early warning information, promotion of organic farming and human health systems. If fully implemented these policy recommendations will go a long way to bring a paradigm shift that will improve livelihoods and enhance social economic development in the region. These recommendations can be replicated in any other region to bring about desired changes to a people impacted by climate change.

Geo-morphometric Analysis of Sub-watersheds for Flash Floods Hazard Management

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Abstract

Flash Floods are difficult to predict in terms of time and place of occurrence because they form rapidly. In addition, the rainfall depths and duration required to cause flash floods will vary with topography, channel characteristics and antecedent conditions. Knowledge of the flash flood hazards as well as vulnerabilities is a fundamental prerequisite in designing action plans for reducing flash flood disaster risks. However, many developing regions with observed flooding incidences are also regions of scarce hydrological data. The meteorological and rainfall systems within such developing regions are rarely well developed while the density of river gauging stations is also poor. However, a tentative flash flood hazard assessment may be achieved through morphometry, the analysis of terrain characteristics, for the factors that contribute to the occurrence of the Flash Floods. Through the study of basin morphometry, we can relate the basin and stream network geometries, shape and relief to the transmission of water and sediment in the basin. Morphometric parameters provide insight into the surface flow, discharge, permeability, infiltration, magnitudes of peak, mean runoff as well as runoff direction and volume. This paper describes a workflow for computing the geo-morphometric parameters from a Digital Elevation Model using QGIS, open source Geographic Information Systems software. The Geo-morphometric parameters were computed for the Breg-Brigach catchment, within the state of Baden Wuertemberg in Germany, normalized and combined to derive Flash Flood Hazard maps. In addition the paper discusses the potential of the Geo-morphometric parameters in Flash Flood Hazard Management by considering the relationship between these parameters and Flash Floods occurrences.

Key Words: DEM, Flash Floods, Geomorphometry, QGIS, Watersheds

Hotel Website Performance Analysis: Case of Kenyan Star Rated Hotels

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Abstract

As travel & tourism organizations increase dependence on web applications for both internal productivity and external communication with customers and partners, performance optimization emerges as an essential business driver. Studies have demonstrated that website performance has a direct correlation with revenue in both ecommerce and advertiser-supported applications. Users expect rich web experiences, but they easily become impatient if pages render too slowly. This paper analyses the performance of star rated hotel website in Kenya and the common and current approaches used to address them. Sixty-four websites of star rated hotel websites were analysed. The tests were conducted via the WebPagetest.org server in Dulles, VA, using Chrome 48on a cable connection.The study identified the areas of need which can be addressed by web performance optimization best practices,

Cloud Computing Adoption and Firm Performance: The Mediating Role of Organizational Mindfulness

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Abstract

Cloud computing as an emerging IT innovation has attracted a growing number of studies in recent years. Key amongst these studies is the adoption of cloud computing. Most studies investigating cloud computing adoption have proceeded along the contours of cloud computing adoption and its effect on firm performance. While extant studies indicate a positive effect of cloud computing adoption on firm performance, the mechanism through which the effect is accomplished is still a black box. This study aims at investigating the mediating role of organizational mindfulness (OM) in the relationship between cloud computing adoption and firm performance. The relationship between cloud computing, firm performance and OM was conceptualized through a priori research model consisting of both measurement and structural components. The research model was tested using Structural Equation Modelling (PLS SEM). The model constructs; Cloud computing adoption, OM and firm performance were measured through reflective indicators. A firm level cross sectional survey was conducted on a sample of 93 firms in the financial, manufacturing and the ICT sectors to validate the model. The results confirm that there is a significant positive relationship between cloud computing adoption and firm performance. There is also a significant positive relationship between cloud computing adoption and OM. Additionally, the study indicates that there is a significant positive relationship between OM and firm performance. A major implication of this study is that organizations that manifest mindfulness are positioned to manage cloud computing effectively and thus improved firm performance. Likewise, by adopting cloud computing, an organization may be influenced towards mindfulness which in turn improves firm performance. The study also shows that the theory of OM plays a role in in understanding IT innovations adoption.

Automatic Vehicle Barrier Control and Logging

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Abstract

Information management system has become an important part of our daily lives. Today, many vehicles are acquired and bought and this means that traffic management is becoming more and more complex. When vehicles are bought they are assigned identification numbers usually present in a plate that is fixed to both front and back of the car. Normally, vehicle logging is done manually by a gate attendant involved in noting down the vehicle's registration number, type of vehicle, and time of entry before allowing vehicle entry to the premise. The vehicle is logged out when exiting in a similar manner. Automation of vehicle logging process at the gate as well as controlling a barrier to allow the vehicle to pass through is prototyped to supplement manual system which is usually a tiresome monotonous and quite unreliable process. To accomplish this automation task, cameras, sensors, microcontrollers and an image processing are integrated. A vehicle at the gate is detected then a series of processes are initiated to take the details of the vehicle before allowing it in or out through the gate by opening and closing a barrier. By automating the process, the various setbacks and limitations encountered with the use of the manual systems are eliminated. Such drawbacks include, erroneous and inaccurate logging of vehicle information, unreliability of the human element in a system, as well as poor time management. An automated system will ensure that control and logging of vehicles is done accurately and in time efficient manner. Use of such a system will eventually translate to social and economic development because more time and resources will be focussed on a much crucial sector in the society and less focus will be on minor elements such as getting past a manned gate or entry point.

Keywords: Information management system; vehicle logging; image processing, vehicle gate barrier

Competence Network for e-Inclusion and Assistive Technologies

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Abstract
Information and Communication Technology (ICT) has changed how people communicate, transfer knowledge and perform everyday tasks. Access to internet is an important factor in African countries, where availability of computers and smartphones constantly increases. ICT-based assistive tools allow Persons with Disabilities (PWDs) to learn, work in a well-paid job and participate in social activities. However, suitable assistive tools are often not available and unaffordable to people with disabilities. Meru University of Science and Technology (MUST) has established various resources in the sector of Assistive Technology (AT), including various Open Source designs for alternative computer input solutions under *Competence Network for e-Inclusion and Assistive Technology* (CNEAT) program. The objective of the program is to establish, collect, extend and share knowledge, tools and best-practice models for affordable Assistive Technology (AT) and its application. MUST has established AT centers for learners living with disabilities in Igoji Small Home, Kaaga School for the Mentally Challenged and Autistic Children, and Athi Special School in Meru County. The assistive devices were easily configurable (FlipMouse) and usable for persons without limbs; but insufficient due to the high population of users against the quantity of devices. 90% of users prefer to work using the assistive devices and 80% of users prefer to use the system frequently. 60% of the users found it easy to use and the various integrated functions of the system, while 80% felt very confident using the system. The Schools lack ICT devices that can enable them to access learning content provided by the Kenyan Government. Consequently, AT Centre at MUST is now fabricating FlipMouse and FABI for learners with disabilities. ATs would thus, raise self-efficiency of PWDs and hence reduce poverty for Sustainable Development.

Keywords: Assistive Technologies, Sustainable Development, e-Inclusion, Open Source, ICT,

Customer Engagement Factors in Twitter Hotel Brand Pages

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Abstract

Twitter has been adopted by many businesses. More and more tourism organizations are using Twitter to provide various services and interact with customers. This paper seeks to identify the factors influencing customer engagement in Twitter hotel brand pages. The main source of data used in this article is from Twitter's insight data. The 34 selected Twitter Brand Pages were monitored regarding both the brand's activity (posts) as well as the consumers' interactions with the brand's activity (likes, comments, etc.). The Fanpage Karma, a social-media monitoring tool was used to collect the data. A conceptual framework is provided that helps to understand the factors influencing the consumer engagement in Twitter brand pages. This paper proposes an empirical model based on Kenya Star rated brand pages, which can help in increasing the brand engagement in Twitter brand pages.