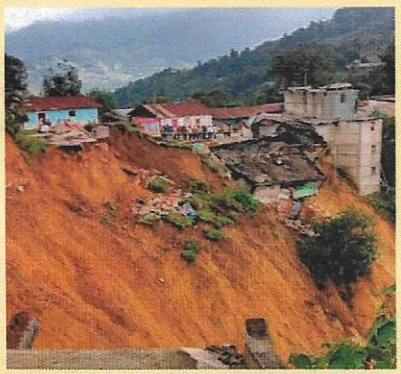
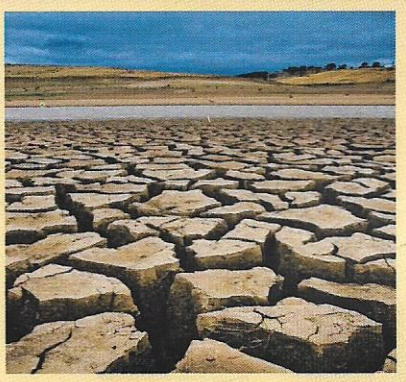
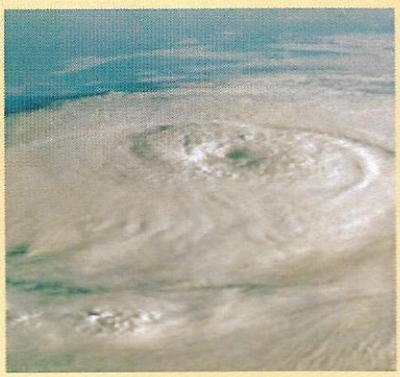
ABSTRACTS






International Roundtable on the Impact of Extreme Natural Events: Science & Technology for Mitigation IRENE2017

13th-15th December 2017

Colombo, Sri Lanka

Research Centre - Technology for Disaster Prevention
South Eastern University of Sri Lanka

NASTEC

Abstracts of the International Roundtable on the Impact of Extreme Natural Events: Science and Technology for Mitigation

IRENE2017

Editors

B. G. N. Sewwandi
M. M. F. Naja

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13th December 2017

Session I: Extreme Events I

Chairperson: Prof. Dr. M.M.M. Najim

11.30 am Assessment of Desertification, (Extreme Natural Events) In Iran by ANN & IMDPA Model
A. R. N. Namagh and Z. Golizadeh

11.45 am An Overview of Mauritius, the Hazards being faced due to Extreme Natural Events and the Counter Measures being undertaken.
D. J. Robin

12.00 pm Long-term Temperature Trends in Climatological Zones of Sri Lanka
G. Naveendrakumar, Meththika Vithange, J. Obeysekera, S. Pathmarajah and M.C.M. Iqbal

12.15 pm The Use of Remote Sensing and GIS for Drought Assessment: The Case of Southern Province
Lusekelo Kasunga

12.30 pm Impact of Extreme Climate on Crop Production and Management Techniques in Batticaloa District, Sri Lanka: Review on Flood and Drought
A. Narmilan, B.G.N. Sewwandi and S. Puvanitha

12.45 pm The Impacts of Extreme Natural Events: S&T Awareness, Development and Education in Myanmar
Myat Soe Aung

1.00 pm Ensuring continuity of health service provision and promoting health of communities during drought situations: Circular guidelines by Ministry of Health.
N.W.A.N.Y.Wijesekara and **T.T.S. Wickramarachchi**

1.15 pm **Lunch**

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SRI LANKA

Long-term Temperature Trends in Climatological Zones of Sri Lanka

G. Naveendrakumar[1,2*], Meththika Vithange[3], J. Obeysekera[4], S. Pathmarajah[5] and M.C.M. Iqbal[6]

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Ambient temperature in Sri Lanka greatly influences each and every venture throughout the island. The gradual climate change in global scale further worsens the existing situation causing tremendous impacts. The primary objective of this study is to assess the presence and significance of linear temperature trends in climatological zones in Sri Lanka, with year as an explanatory variable. This study presents long-term trends in averages and extreme temperatures corresponding to the major climatic zones that are Dry Zone (DZ), Intermediate Zone (IZ) and Wet Zone (WZ) in Sri Lanka.

The data used for this study consist 55-year records of raw (or unadjusted) temperature (°C) for the period of 1961-2015. In this regard, daily maximum (T_{max}) and minimum (T_{min}) ambient air temperature records at 20 synoptic meteorological stations scattered throughout three climatic zones in Sri Lanka were selected for the analysis. The daily average temperature (T_{ave}) was calculated as the mean of daily T_{max} and T_{min}. The heat-index calculations were performed using 20-year (1996-2015) relative humidity (RH, %) data. The climatic zonal RH average was obtained by grouping stations in respective zones. The slope of the trend lines in the fitted model was tested for the statistical significance using standard methods. Primarily, the trends in average and extreme measures were performed for annual values. For the majority of the measures, the non-parametric Mann-Kendall trend test and Sen-Theil regression was utilized. To test the data with the seasons, modified seasonal Mann-Kendall trend test was applied. The pre-whitening method was

used to remove autocorrelation from the time series. For the extreme events, Generalized Linear Modelling (GLM) of the parameters of the Generalized Extreme Value (GEV) distribution was used. The analysis was executed in the R-programming environment, and depending on the need, necessary packages were used.

Nearly 30% of the total stations detected for significantly increasing trend in T_{max} and T_{min}, each. Nuwara Eliya was the only station showed a significantly decreasing T_{max} trend. In DZ, the 50% of the stations were detected for significantly increasing T_{max}, while it is 20% for T_{min}. At least eight stations showed for an increasing trend in T_{max} and T_{min} in DZ. Though it was not significant, the Mannar station was observed for increasing T_{max} and decreasing T_{min} trend. There was a decrease in the number of stations, significant for the 2-day, 3-day, 5-day and 7-day recurrence temperature pattern was observed for annual T_{ave}. Being a DZ district, though the Anuradhapura station was detected for the increasing trend during 2-day and 3-day recurrence pattern, it was insignificant during 5-day and 7-day events. Galle was the only WZ station observed for the significance in 3-day, 5-day and 7-day events. All time negative trend was observed in Katugastota which is in WZ followed by Bandarawela in IZ for the time period considered. Badulla was found to show significantly increasing T_{ave} trend for 2-day and 7-day events. The only station with significantly decreasing trend in 3-day recurrence pattern in T_{ave} was Katugastota. It was observed that the slightly higher T_{ave} and heat-index values in DZ than any other climatic zones in Sri Lanka. According to zonal mean heat-index, the least heat stress could be felt in IZ followed by the WZ. It is noteworthy, though WZ of Sri Lanka experience slightly more RH (in average of 73%) than IZ, the heat stress felt is a bit higher. The IZ of Sri Lanka experienced the lowest heat-index value, which implies a cooler climate compared to other parts of the island. The apparent temperature felt in overall is 27 °C (real feel like temperature), island-wide.

Results showed that there was a much difference in T_{max} and T_{min} prevailed in three climatic zones of Sri Lanka. The overall trend suggests the warming temperature in Sri Lanka in terms of T_{max} and T_{min} except for a few stations in WZ and DZ. The findings may help in speculating a big picture of vulnerability to extreme climate in Sri Lanka.

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