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Effects of wind velocity on slant path rain-attenuation for satellite application in Malaysia (Article)

Lwas, A.K.^a [✉](#), Islam, Md.R.^a, Habaebi, M.H.^a, Mandeep, S.J.^b, Ismail, A.F.^a, Zyoud, A.^a^aDepartment of Electrical and Computer Engineering, University of International Islamic Malaysia, Jalan Gombak, Kuala Lumpur, Selangor, Malaysia^bDepartment of Electrical, Electronic and Systems Engineering, University Kebangsaan Malaysia, Jalan Reko, Bangi, Selangor, Malaysia

Abstract

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Earth-to-satellite signals suffer by Earth's atmosphere especially by precipitations. It is more severe in tropical climate. A reliable technique named as synthetic storm technique (SST) was proposed to predict the effects of rain on slant path. SST model uses rainfall-rate time series, velocity of wind in storm, effective length, altitude of site, and elevation angle as the main input parameters. SST was developed based on data collected from temperate regions. Since the rainfall characteristics in temperate regions differ considerably from that in tropical regions. This paper presents storm-speed effects on rain-attenuation prediction using SST based on storm speed, rain rate, and attenuation at Ku-band measurement in Malaysia. The predicted rain attenuation by SST highly overestimates for higher values of storm speed but the predicted duration is close to measurement. For lower values of storm speed, the prediction comes closer to measurement, but the duration extends much longer than the measurement. Hence, predicted rain-attenuation as a function of storm-speed variations by SST is not accurate in tropical regions. © 2015 IAA.

Author keywords

Earth-to-satellite propagation Rain attenuation Storm speed Synthetic storm technique

Indexed keywords

Engineering controlled terms: Earth atmosphere Electromagnetic wave attenuation Forecasting Rain Satellites
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