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Cloud cover, cloud liquid water and cloud attenuation at Ka and V bands over equatorial climate

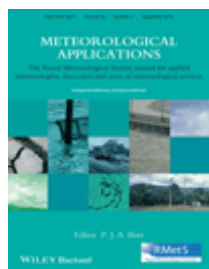
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Article first published online: 14 OCT 2013

DOI: 10.1002/met.1417

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Issue



Meteorological Applications

[Early View \(Online Version of Record published before inclusion in an issue\) \(/journal/10.1002/\(ISSN\)1469-8080/earlyview\)](http://onlinelibrary.wiley.com/doi/10.1002/(ISSN)1469-8080/earlyview)

Additional Information

How to Cite

Omotosho, T. V., Mandeep, J. S. and Abdullah, M. (2013), Cloud cover, cloud liquid water and cloud attenuation at Ka and V bands over equatorial climate. *Met. Apps.* doi: 10.1002/met.1417

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Publication History

1. Article first published online: 14 OCT 2013
2. Manuscript Accepted: 17 MAY 2013
3. Manuscript Revised: 6 MAY 2013
4. Manuscript Received: 30 JAN 2013

Funded by

- Universiti Kebangsaan Malaysia. Grant Number: 04-01-02-SF0599
- xxx. Grant Number: UKM-GUP.NBT-08-28-115
- xxx. Grant Number: UKM-DLP-2011-003

- Abstract
- [Article \(/doi/10.1002/met.1417/full\)](/doi/10.1002/met.1417/full)
- [References \(/doi/10.1002/met.1417/references\)](/doi/10.1002/met.1417/references)
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Keywords:

cloud cover statistics; cloud temperature; cloud liquid water contents; 0 °C isotherm height; cloud attenuation

ABSTRACT

Cloud cover statistics and their diurnal variation have been obtained from *in situ* and satellite measurements for three equatorial locations. Cloud liquid water content, 0 °C isotherm height and cloud attenuation have also been obtained from radiosonde measurement using the so-called Salonen model at Kuala Lumpur (Malaysia). The results show a strong seasonal variation of cloud cover and cloud liquid water content on the two monsoon seasons. The Liquid Water Content (LWC) obtained from radiosonde and the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI) is higher during the Northeast Monsoon season, which corresponds to the period of higher percentage cloud cover and high rainfall accumulation. The International Telecommunication Union—Region (ITU-R) model underestimates the cumulative distribution of LWC values at the present station. The relationship of the cloud attenuation, derived from the profiles of liquid water density and temperature within the cloud, shows an underestimate by the data obtained from the ITU-R model. The cloud attenuation at Kuala Lumpur is somewhat underestimated by the ITU-R model up to about 1.2 dB at Ka (30 GHz) and 3.4 dB at V (50 GHz) bands. The results of the specific attenuation can be used for the estimation of cloud attenuation at microwave and millimetre wave over earth-space paths. The present data are important for planning and design of satellite communications at Ka and V bands on the Earth–space path in the equatorial region.

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