INTERCEPTION LOSS CANOPY COVER, c FORMULATION THEORY

BY :

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Contents

UNIVERSITI TEKNOLOGI MARA

PEMENANG Anugerah Kualiti Perdana Menteri 2008

Surat Kami : 600-RMI/ST/FRGS 5/3/Fst (57/2011)
Tarikh : 20 Julai 2011

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Y. Brs. Profesor/Tuan/Puan

KELULUSAN SKIM GERAN PENYELIDIKAN FUNDAMENTAL (FRGS) FASA 01/2011

Tajuk Projek	:	Interception Loss Canopy Cover, c Formulation Theory
Kod Projek	:	600-RMI/ST/FRGS 5/3/Fst (57/2011)
Bidang	:	Sains Tabii dan Warisan Negara
Tempoh	:	01 Julai 2011 – 30 Jun 2013 (24 bulan)
Peruntukan Diluluskan (KPT)	:	RM 75,000.00
Peruntukan Pengurusan	:	RM 3,750.00 (5%)
Peruntukan Pengoperasian Penyelidikan	:	RM 71,250.00 (95%)
Ketua Projek	:	Pn Azinoor Azida Abu Bakar

Dengan hormatnya perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan pihak Kementerian Pengajian Tinggi melalui surat JPT.S(BPKI)2000/09/010 Jld.11 (52) yang bertarikh 6 Jun 2011 telah meluluskan kertas cadangan penyelidikan Y. Brs Profesor/tuan/puan untuk di biayai di bawah Skim Geran Penyelidikan Fundamental (FRGS) Fasa 01/2011.

3. Bagi pihak Universiti kami mengucapkan tahniah kepada Y. Brs. Profesor/tuan/puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyiapkan projek ini dengan cemerlang.

4. Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dari peruntukan yang diterima.

Peringkat Pertama	20%
Peringkat Kedua	40%
Peringkat Ketiga	40%

5. Untuk tujuan mengemaskini, pihak Y. Brs. Profesor/tuan/puan adalah diminta untuk menandatangani perjanjian FRGS, melengkapkan semula kertas cadangan penyelidikan, mengisi borang setuju terima projek penyelidikan dan menyusun perancangan semula bajet yang baru seperti yang diluluskan. Sila lihat lampiran bagi tatacara tambahan untuk pengurusan projek.

Sekian, harap maklum.

"SELAMAT MENJALANKAN PENYELIDIKAN DENGAN JAYANYA"

Yang benar

PROFESOR DR ABU BAKAR ABDUL MAJEED
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3. Report

3.1 Proposed Executive Summary

The interception phenomenon is normally considered as one of the losses in hydrological cycle that comes into intention of many hydrologists for several decades. The total amount of interception loss is quite limited in storm events, especially in those which cause flooding. However, it is a very important process from the viewpoints of water resources management and energy exchange near the ground surface.

Since the interception losses are geographically variable, there are no established standard field methods especially for the forest-based case studies. Most of the interception models obtained the data from the standard meteorological data, and from the literature, indirect methods and direct methods. But there are many flaws to the methods and the data that makes the model underestimates or overestimates the interception. Clearly, it is important to prepare a good data to determine the interception.

The objective of this study is to measure the canopy cover at lowland forest, and to investigate the effect of canopy cover, c of physical parameters on interception simulation. The effect is significant and is quantified by a newly developed formula which relates the canopy cover with annual canopy evaporation, annual effective potential evaporation, canopy capacity, and temporal resolution. Using this formula, true annual canopy evaporation invariant to temporal resolution can be derived from annual effective potential evaporation and canopy capacity. The concept of operational parameter value and its calculation algorithm will be proposed. The operational parameter values corresponding to their true values and temporal resolutions will be used in model operation with the hydrological data of the same resolution, and reproduced the true annual canopy evaporation very well. This implies the necessity to use operational parameter(s) according to temporal resolution of the data in hydrological simulation.

3.2 Enhanced Executive Summary

This study is designed to investigate the effects of canopy cover to interception loss at arificial/man-made forest Bukit Lagong Forest Reserve, FRIM, Kepong, Malaysia. The interception loss was determined from measured values and calculation of original and revised Gash model.

The two plots were chosen in this study namely Plot11 and Plot12. In the plot, a subplot with the area of 400m^2 (20 x 20 m) was marked for each plot. In this study, only trees with dbh greater than 10 cm were selected. 21 trees were identified that have dbh greater than 10 cm in Plot11 and 20 trees in Plot12. The trees were identified, tagged and numbered. Plot11 is dominated by *Kulim* species while Plot12 is occupied with several species namely *Keladan, Keruing, Simpoh* and *Mempisang.*

For the field measurement, 12 months (April 2012 until April 2013) data were collected to determine the interception loss. The data that were collected are rainfall, throughfall and stemflow and it was collected in daily basis. The interception loss was calculated using direct calculation and both original and modified Gash model for comparison. During study period, 94 rainfall events are recorded and assessable in quantifying the interception loss. Hemispherical photography using fisheye lens was used to capture the canopy cover images at every points on both plots and were analyzed using WinSCanopy 2009a and RGBFisheye.exe software program for the year 2012 and 2013.

From the results, the measured interception loss from Plot11 and Plot12 is 284.02mm (13.55%) and 226.77mm (10.82%), respectively. From original Gash model, the calculated interception loss is 308.47mm (14.72%) and 285.33mm (13.61%) for Plot11 and Plot12 respectively. Interception loss calculated from revised Gash model is 333.91mm (15.93%) and 329.93mm (15.74%) for Plot11 and Plot12. The relationship between interception loss and gross rainfall was obtained. the values of canopy cover derived are 93.77% and 95.01% for Plot11 and Plot12 respectively. This can be concluded that the Bukit Lagong mixed dipterocarp forest have a dense canopy density which influence the interception phenomenon in hydrological cycle.