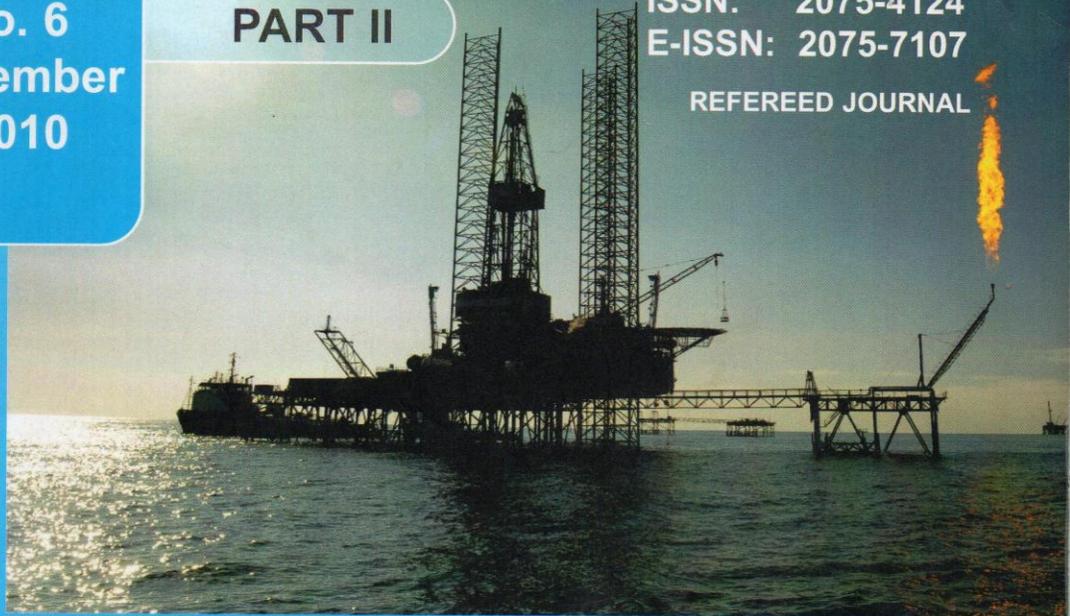


Vol. 2  
No. 6  
November  
2010

PART II

ISSN: 2075-4124  
E-ISSN: 2075-7107

REFEREED JOURNAL



# International Journal of Academic Research

BEYNÖLXALQ ELMİ ARAŞDIRMALAR JURNALI

## FAMOUS AZERBAIJANI SCIENTISTS

Acad. **Shafaat Mehdiyev** (1910-1993)



BAKU, AZERBAIJAN

**A**cademician Shafaat Farhad oghlu Mehdiyev was born on December 15, 1910 in the village of Shalgun in Iran's Sharab district but grew up in Baku's Sabunchu district. In 1930, he began studying geology at the Azerbaijan Oil Institute. He was graduated in geology in 1934.

In 1934 and started working as a geologist for "Azneftkashfiyyat" (Oil Survey of Azerbaijan) and in the survey field in Mardakan and later as a senior geologist in the Mardakan-Turkan survey group. For a few years, he also served as the editor for publications such as "Young Worker," "Azerbaijani Athlete" .In 1939, he was appointed the head of the Geological Fund of Azerbaijan and in 1940 became the head of the Absheron Geological Survey. Mehdiyev completed his graduate study in geological-mineralogical sciences at Azerbaijan's Academy of Sciences and defended his dissertation after returning from World War II. After 5 years, in 1950 he became doctor of sciences. In 1951 he became professor. From 1954 to 1958, Mehdiyev served as the director of Azerbaijan's Institute of Geology. In 1958 he became a member of the Academy of Sciences and went on to mentor 10 postdoctoral fellows and 60 doctoral students in geological mineralogical sciences. His held the position of Rector at Azerbaijan State University [1958-1965].

Academician Shafaat Mehdiyev wrote more than 200 scientific works, including 25 monographs, training manuals and scientific works - mostly about oil and gas deposits. He also served as the editor and compiler for geological and tectonic maps of Azerbaijan and its oil and gas fields. In addition, he wrote a significant number of poems, plays and satiric novels.

Shafaat Mehdiyev died on his birthday in 1993 and is buried in Fakhri Khyaban (Alley of the Honored Ones).

*The nation's future success lies with science and education!*

**Heydar Aliyev**  
National Leader of Azerbaijan

# INTERNATIONAL JOURNAL *of* ACADEMIC RESEARCH

Vol. 2. No. 6  
November 30, 2010

## II HİSSƏ - PART II

Daxil edildiyi elmi bazalar:  
Indexed by:

Master Journal List (ISI, Thomson Reuters, USA),  
Zentralblatt MATH (Springer-Verlag, European Mathematical Society, Germany),  
DOAJ (Lund University, Sweden),  
ULRICH's Web (USA)  
EBSCO-Academic Search Complete (USA)  
SCIRUS (Elsevier, Netherlands),  
IndexCopernicus International (Poland), JournalSeek (USA)

PROGRESS" Press Inc.  
Baku, Azerbaijan, 2010

# INTERNATIONAL JOURNAL of ACADEMIC RESEARCH

Vol. 2, No. 6, November, 2010, Part II

All rights reserved.

No part of this journal may be reprinted or reproduced without permission in writing from the publisher, the "Progress-Publishing Co"

Publishing bimonthly

Print ISSN: 2075-4124

Online ISSN: 2075-7107

National reg. No: 2996

## Editorial Board

### Head consultants:

Acad. **Isa Habibbayli**  
Rector of Nakchivan State University,  
Active member of Azerbaijan National  
Academy of Sciences

Prof. Dr. **Rasim Aliguliev**  
Corresp. member of Azerbaijan National  
Academy of Sciences

### Editor-in-Chief:

**Javid A. Jafarzade**

### Deputy Editor-in-chief:

**Nigar Kh. Babakhanova**  
Azerbaijan National Academy  
of Sciences

### Regional Executive Editors:

Prof. Dr. **M.A.M. Ferreira**  
(Portugal)  
Prof. Dr. **M.S. Gaballah**  
(Egypt)  
Prof. Dr. **Sarwoko Mangkoedihardjo**  
(Indonesia)  
Prof. Dr. **Nadejda Savina**  
(Russia)  
Prof. Dr. **Eugen Axinte**  
(Romania)  
Prof. Dr. **Oliwer Osuagwu**  
(Nigeria)  
Dr. **Marek Smoluk**  
(Poland)  
Dr. **S. Georgoulas**  
(Greece)

### Editorial office:

AZ 1006, Baku, Azerbaijan  
4B M. Mushfig str., 107  
Phone: +994 050 531 71 84  
Web: [www.ijar.lit.az](http://www.ijar.lit.az)  
E-mail: [edit@ijar.lit.az](mailto:edit@ijar.lit.az)

© IJAR, 2010

© "Progres" Publishing Co  
© Lit.az - Science Portal

### Indexed by:

Master Journal List (ISI, Thomson  
Reuters), Zentralblatt MATH  
(Springer-Verlag), DOAJ, ULRICH,  
SCIRUS (Elsevier), EBSCO-  
Academic Search Complete,  
IndexCopernicus International,  
JournalSeek

### Honorary Editors:

Acad. **Arif Mekhtiev**

Chairman of the Higher Attestation  
Commission under the President  
of the Republic of Azerbaijan

Acad. **Mahmud Kerimov**

President of Azerbaijan  
National Academy  
of Sciences

### International Advisory and Editorial Board

Prof. Dr. **S.C. Weeber** (USA)  
Prof. Dr. **R. Raducanu** (Romania)  
Prof. Dr. **B. Barratt** (USA)  
Prof. Dr. **R.A. NeSmith** (USA)  
Prof. Dr. **M. Georgiev** (Bulgaria)  
Prof. Dr. **P.H. Siegel** (USA)  
Prof. Dr. **M. Shaughnessy** (USA)  
Prof. Dr. **I. Duyar** (USA)  
Prof. Dr. **M. Merzouki** (Morocco)  
Prof. Dr. **P.E. Kaldis** (Greece)  
Prof. Dr. **M.A. El-Tawil** (Egypt)  
Prof. Dr. **I. Alghazo** (UAE)  
Prof. Dr. **F. Tchier** (Saudi Arabia)  
Prof. Dr. **V. Balan** (Romania)  
Prof. Dr. **T. Aifa** (France)  
Prof. Dr. **D. Eckstein** (USA)  
Prof. Dr. **C. Tunc** (Turkey)  
Prof. Dr. **S. Mahmood** (Pakistan)  
Prof. Dr. **G. Bacik** (Turkey)  
Prof. Dr. **B.G. Nita** (USA)  
Prof. Dr. **A. Joarder** (Saudi Arabia)  
Prof. Dr. **O.M. Waldman** (USA)  
Prof. Dr. **S.J. Newman** (USA)  
Prof. Dr. **R.C. Sharma** (S. America)  
Prof. Dr. **K. Baffour** (S. Africa)  
Prof. Dr. **M. Abdel-Aty** (Egypt)

Prof. Dr. **J.C.T. Oliveira** (Portugal)  
Prof. Dr. **T. Kerimli** (Azerbaijan)  
Dr. **R.H. Ismailov** (Azerbaijan)  
Dr. **M. Andrade** (Portugal)  
Dr. **M.J. Uddin** (USA)  
Dr. **E. Hewitt** (Spain)  
Dr. **M. Salehi** (Iran)  
Dr. **I. Kyaruzi** (England)  
Dr. **A. Aliyeva-Kangarli** (Azerbaijan)  
Dr. **G. Babakhanly** (Azerbaijan)  
Dr. **F.L. Reis** (Portugal)  
Dr. **S. Yilmaz** (Turkey)  
Dr. **M. Benhamou** (Marocco)  
Dr. **S.A. Musa** (UAE)  
Dr. **M. Karakuyu** (Turkey)  
Dr. **M. Alias** (Malaysia)  
Dr. **M. Mikulak** (USA)  
Dr. **C. Miller** (England)  
Dr. **J. Penm** (Australia)  
Dr. **A. Al-Maghareh** (UAE)  
Dr. **A. Mak** (Singapore)  
Dr. **F. M. Arain** (Canada)  
Dr. **A. Endong** (Cameroun)  
Dr. **R.K. Ojikutu** (Nigeria)  
Dr. **I. Kitowsky** (Poland)  
Dr. **D. DeTombe** (Netherlands)

### Beynəlxalq Elmi Araşdırmalar Jurnalı (BEAJ)

2009-cu il, Milli Mətbuat Günündə Azərbaycan Respublikası Ədliyyə Nazirliyi tərəfindən rəsmi Dövlət Qeydiyyatına alınıb (№ 2996). BEAJ Beynəlxalq ISSN Mərkəzində (Paris, Fransa) qeydiyyatdan keçərək mətbu orqan kimi ISSN 2075-4124, elektron jurnal kimi E-ISSN 2075-7107 nömrələri ilə beynəlxalq nəşr statusu qazanıb.

Jurnal dünyanın 63 ölkəsinə (universitet və kitabxanalar) paylanır. Jurnalın təsisçisi "Progres" İnternet və Poliqrafiya Xidmətləri Şirkətidir. BEAJ ilde 6 dəfə - Yanvar, Mart, May, İyul, Sentyabr və Noyabr aylarında dərc olunur. Redaksiyanın yazılı icazəsi olmadan materialların təkrar nəşri, tərcümə edilərək yayılması qadağandır. Məqalələr bir qayda olaraq Beynəlxalq Redaksiya Heyətinin yekun qərarı ilə dərc olunur. Məqalələrin elektron versiyası jurnalın İnternet sahifəsində yerləşdirilir və açıq şəkildə istifadəyə verilir (Elektron ISSN-2075-7107 məhz İnternet üzərindən müəllif hüquqlarının qorunmasına xidmət edir).

Növbəti buraxılış tarixi: 30.01.2011

Materiallar toplanıb: 25.08.2010-15.10.2010. Çapa imzalanıb: 30.11.2010.

Format: 60x84 1/8. Şrift: Arial. Sahifələrin sayı: 500 (268+232). Məqalələrin sayı: 78. f.v. 62.5. Tiraj: 1000

**MATHEMATICS, COMPUTING TECHNOLOGY AND INFORMATICS**

**Purnomo Budi Santoso**  
THE DEVELOPMENT OF A CASE-BASED REASONING SYSTEM IN RELATIONAL  
MODEL USING GROUP TECHNOLOGY FOR ACADEMIC ADVISING.....287

**Babak Ghasemi, Masoud Hashemi**  
E-MAIL AS AN EDUCATIONAL TOOL FOR  
IMPROVING UNIVERSITY STUDENTS' WRITING SKILL.....295

**HYDROLOGY, ENVIRONMENTAL ENGINEERING,  
ENVIRONMENTAL INFORMATION SCIENCES, GEOTECHNOLOGY**

**Rispiningtati**  
MODEL OF WATER ALLOCATION AND PRICE FOR MULTI FUNCTIONAL RESERVOIR.....303

**Endang Purwati, Herlien Indra Wahyun**  
OPTIMIZATION ON PENSTOCK DIMENSION OF AMPEL  
GADING HYDRO ELECTRICAL POWER, INDONESIA.....307

**Lisa Dwi Wulandari**  
SPACE-METAPHOR CONCEPT IN URBAN  
OPEN SPACE, A CASE STUDY OF MALANG CITY SQUARE.....310

✓ **Suhardjono, Lily Montarcih Limantara, Soemarno, Eko Nurhayati**  
VERIFICATION OF DISCHARGE MODEL BASED ON WATER  
BALANCE IN COBANRONGO WATERSHED OF EAST JAVA.....314

**Prastumi, Endang Purwati**  
DESIGN FLOOD AT ARBORETUM OF SUMBER BRANTAS, EAST JAVA, INDONESIA.....317

**Lisa Dwi Wulandari**  
TYPOLOGY AND MORPHOLOGY OF SPATIAL  
SETTLEMENT IN THE TRADITIONAL VILLAGE OF PENGLIPURAN, BALI.....320

**Bambang Rahadi, Anek Masrevaniah**  
THE INTERCEPTION-INFILTRATION ABSTRACTION  
METHOD TO DEVELOP SPATIAL DISTRIBUTED (SIMODAS).....325

**S.P. Gautam, P.S. Bundela, A.K. Pandey, Jamaluddin, M.K. Awasthi, S. Sarsaiya**  
CELLULASE PRODUCTION BY PSEUDOMONAS SP.  
ISOLATED FROM MUNICIPAL SOLID WASTE COMPOST.....329

**BOTANY, PLANT BIOLOGY AND PLANT PROTECTION,  
BIOTECHNOLOGY AND BIOCHEMISTRY**

**H.A. Mansour, S.H. El-Hanafy, R.A. El-Ziat**  
*CONOCARPUS ERECTUS* PLANTS RESPONSE TO SALINE  
IRRIGATION WATER AND GIBBERELLIC ACID TREATMENTS.....333

**W.M. Ahmed, H.H. El-khadrawy, Faragalla M. El Moghazy,  
Emtenan M. Hanafi, M.M. Romany, Salwa M. Habeeb**  
FIELD OBSERVATIONS ON THE RELATIONSHIP BETWEEN  
BABESIOSIS AND REPRODUCTIVE DISORDERS IN FEMALE BUFFALOES.....340

**S.A. Ghanem, A.M. Aboul-Enein, A. El-Sawy, M.R. Rady, Mona M. Ibrahim**  
*IN VITRO* PROPAGATION AND CARDIAC GLYCOSIDES CONTENT OF *DIGITALIS LANATA*.....348

**A.M.M. Al-Naggar, R. Shabana, M.R. Rady, S.A. Ghanem,  
M.M. Saker, A.A. Reda, M.A. Matter, S.A.M. Eid**  
*IN VITRO* CALLUS INITIATION AND REGENERATION IN SOME CANOLA VARIETIES.....356

**CHEMISTRY**

**Hossam Ibrahim Al-Itawi**  
PRESSURE-VOLUME-TEMPERATURE CHARACTERISTICS  
OF AMORPHOUS POLYMER BLENDS.....362

# **Verification of Discharge Model Based on Water Balance in Cobanrondo Watershed, Indonesia**

*Suhardjono*  
*Lily Montarcih Limantara*  
*Soemarno*  
*Eko Nurhayati*

Department of Water Resources, Faculty of Engineering, Brawijaya University, Malang 65145,  
Indonesia

## **Abstract**

This paper studied the verification of discharge model based on water balance. Discharge model based on water balance was influenced and considered to the model was not only rainfall but there were many factors instead of soil water content, water loss and land use rate. The land use rate would be the functions of forest area, irrigated rice field, residential area, farm, dry field and shrub. Verification was carried out in Cobanrondo watershed, East Java, Indonesia. Results could be recommended to use this model in many watersheds.

Key words: discharge model, water balance, verification

## **Introduction**

One of the global climate exchanges are the increasing of frequency and intensity of climate extreme such as hurricane, flood, and drought. Some research before were shown many indicators climate exchange as rise in sea level [1], flood, drought, some wealthy problem and any problem in water resources development. A continuing problem in hydrology is the estimation of discharge for design purpose on watersheds with only limited available data. The rainfall model differentiates between high and low intensity events. The resulting rainfall statistics were checked by comparisons with measured data. [2] Physically based rainfall-runoff models are used in hydrology for a wide range of application such as the extension of stream flow records, estimation of flow for unmeasured watersheds, prediction of the effects of land use change and examination of the effects of climate change [3]

In fact, many regions had realized deficit in water. It was caused by 1) upstream of watershed that was not well maintained would influenced the downstream; 2) some upstream of watersheds were as critical condition; 3) human needs of water would be increasing; and 4) there was not regional management based on water balance. There are many patterns to develop discharge model. One of them is based on regression analysis [4]. Statistical regression is one of the patterns for analyzing hydrological models [5]. This was intended to formulate discharge model. This model was due to water balance so that was produced design of management land cover which was based on water balance and would fulfill any kinds of problem in water resources. Validity of model was needed for recommending application of this model in many watersheds. Therefore, verification in several watersheds was considered to perform this model.

## Materials and Methods

Location of this study for verification was Cobanrondo Watershed. The area was 1835.17 ha. Map of Cobanrondo Watershed was as Figure 1.

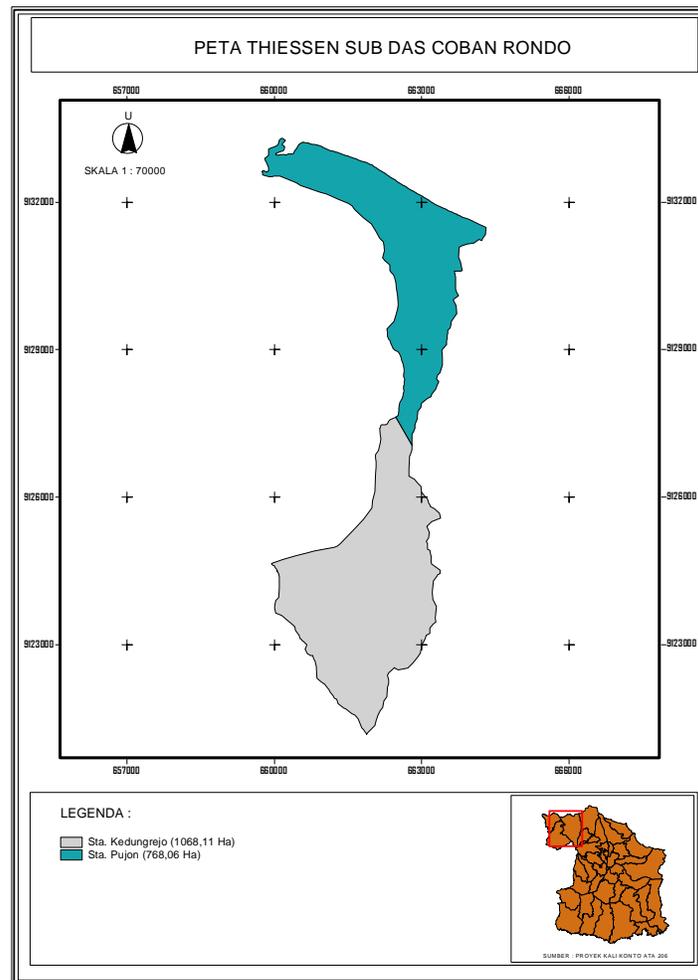


Figure 1 Map of Cobanrondo Watershed

The data used for this study consisted of primary and secondary data. Primary data was measurement of river discharge in year 2009 and soil sample of each land use. Secondary data was consisted of: 1) daily rainfall from year 1998 to 2008; 2) topography map in scale of 1 : 25,000, 3) climate data from year 1998 to 2008, 4) digital photography for land sat and aster, 5) digital map of land use, and 6) water level at Cobanrondo in year from 1998 to 2008.

To formulate the discharge model, there was carried out some models as the steps of methodologies. The methodologies were consisted of: 1) to analyze watershed rainfall rate, 2) to

analyze potential evapotranspiration, 3) to analyze water holding capacity, 4) to analyze actual evapotranspiration, 5) to analyze run off rate from January to December, it was used water balance method; 6) to formulate discharge model. Table 1 was described summary of formulating discharge model. Formulation of the discharge model was as below [6]:

$$Q(\text{forest}) = -0,158 + 0,000039 P + 0,0173 A - 0,000074 E + 0,00174 \Delta S$$

$$Q(\text{farm}) = 0,337 - 0,000018 P - 0,111 A - 0,000077 E + 0,000568 \Delta S$$

$$Q(\text{residential}) = -0,167 - 0,000003 P + 0,159 A - 0,000114 E + 0,000216 \Delta S$$

$$Q(\text{irrigated rice}) = 0,397 - 0,000024 P - 0,103 A - 0,000284 E + 0,000661 \Delta S$$

Note: P = rainfall, A = area of land use, E = evapotranspiration,  $\Delta S$  = the change of soil water content

## Results and Discussion

Discharge model based on water balance as above was verified on Cobanrondo watershed. The comparison discharge between output of model and observed discharge was as Table 1.

Table 1 Comparison between model and observed discharge

No	Model Discharge (m <sup>3</sup> /s)	Observed Discharge (m <sup>3</sup> /s)
1	0.94274	0.8500
2	0.65570	0.8000
3	1.04558	0.7406
4	0.05454	0.2100
5	1.29572	0.5048
6	0.22835	1.0200
7	0.99930	0.6300
8	1.82654	1.3104
9	0.49766	0.4889
19	0.14074	0.4800
11	0.53522	0.8855
12	0.43691	0.4139
13	0.29492	0.4800
14	0.15173	0.1300
15	0.54055	0.6860
16	0.44755	0.2520
17	0.54875	0.5083
18	0.92556	0.5900
19	0.49009	0.5787
20	0.57496	0.1726

Based on statistical analysis:  $t_{\text{calculated}} = 0.38 < t_{\text{table}} = 1.684$  and  $Z_{\text{critical}} = 0.38 < Z_{\text{table}} = 1.96$ , each for level of significant = 5%, it was concluded that the samples which were used in this

research was from the same population and the average of discharge between model and observed were not significantly difference.

## Conclusions

The formulation of discharge model based on water balanced was well applied on Cobanrondo watershed. Comparison of model and observed discharge had carried out and based on statistical analysis as above there was no significance different between two of them.

## References

1. Susandi, Armi dkk. 2008. Dampak Perubahan Iklim Terhadap Ketinggian Muka Laut Di Wilayah Banjarmasin. *Jurnal Ekonomi Lingkungan* Vol. 12/No.2/2008
2. Nandakumar, N; and Mein, R.G., 1997. Uncertainty in Rainfall-Runoff Model Simulations and the Implications For Predicting The Hydrologic Effects Of Land Use Change. *Journal of Hydrology*, 192: 211-232
3. Hoybye, Jan; and Rosbjerg, Dan. Effect of Input and Parameter Uncertainties in Rainfall-Runoff Simulations. *Journal of Hydrologic Engineering*, July 1999 Vol. 4 No. 3, page 214-224
4. Montarcih L., Lily. 2009. *Hidrologi Teknik Terapan*. CV Asrori. Malang, 233 pages
5. Rasad, T. Devi; Gupta, Rajiv; and Prakash, Satya. 1999. Determination of Optimal Loss Rate Parameters and Unit Hydrograph. *Journal of Hydrologic Engineering*, Vol. 4 No. 1, page 183-187
6. Suhardjono, Montarcih L., Lily, Soemarno and Noerhayati, Eko. 2010. Discharge Model Based on Water Balance in Brantas Upstream River, Indonesia. *International Journal of Academic Research*, Vol 2, Issue 5, September 30