

東アジア環境問題国際シンポジウム

The 6th International Symposium on the East Asian Environmental Problem(EAEP2012)

SCHEDULE

2012/11/6						
The 6th International Symposium on the East Asian Environmental Problems (EAEP2012) Language: English						
Time	Entrance		Hall-A	Hall-B	Hall-C	
9:00 ~ 9:10	Registration	Poster Exhibition		Opening Greetings		
9:10 ~ 10:40				Session 1 Urban Environments		
10:40 ~ 11:00			Break			
11:00 ~ 12:30				Session 2 Food Rist & Assessment		
12:30 ~ 13:30			Poster Presentation	Poster Presentation and lunch time		
13:30 ~ 15:00			Poster Exhibition		Session3 Aqueous Environment and Hydrology & Combating Desertification	Session4 Atmospheric Environment & Marine Environment
15:00 ~ 15:20				Break		
15:20 ~ 16:50					Session5 Agro-Production Environment (JSPS SOWAC Project Special Session)	

2012/11/7					
東アジア環境学研究会 特別講演会 言語:日本語 (Language:Japanese) -『東アジアの環境問題への取り組み』-					
Time	Entrance		Hall-A	Hall-B	Hall-C
10:00 ~ 10:10	Registration	Poster Exhibition	開会挨拶		
10:10 ~ 11:10			基調講演1: 藤井滋穂 京都大学地球環境学堂長 「地球環境学堂における環境問題への取り組み」		
11:10 ~ 12:10			基調講演2: 窪田順平 総合地球環境学研究所教授 「中国環境問題の現状と課題、東アジア環境問題への展開」		
12:10 ~ 13:00			昼食		
13:00 ~ 14:30			パネルディスカッション 「東アジアの環境問題への取り組み」		
14:30 ~ 14:40			閉会		
14:40 ~ 15:00			写真撮影+懇親会準備		
15:00 ~ 17:00			懇親会		

TIME TABLE

6th November Tuesday

Oral Session1: Urban Environment

9:10-10:30, HaLL-B

1-1 CHARACTERIZATION OF BOTTOM ASHES PRODUCED IN SEVEN MUNICIPAL SOLID WASTE INCINERATORS IN CHINA

Chai Xiaoli¹, Hou Linlin¹, Wang Dongyang¹

¹ College of Environmental Science and Engineering, Tongji University, , Shanghai 200092, China; State Key Laboratory of Pollution Control and Resources Reuse Research, Tongji University, Shanghai, 200092, China

1-2 MODELING OF LANDFILL GAS EMISSION THROUGH VEGETATION

Hirofumi Nakayama¹, Takayuki Shimaoka¹, Mayu Takahashi², Teppei Komiya³ and Xiaoli Chai⁴

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1-3 INFLUENCE OF HEATING PROCESS ON WEIGHT LOSS AND MINERAL PHASE CHANGE IN MSWI ASH: THE LOSS ON IGNITION OF INCINERATION BOTTOM ASH

Shuo Yang¹, Amirhomayoun Saffarzadeh¹, Takayuki Shimaoka¹, Takashi Kawano²

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1-4 HEAVY METALS IN COMMON VEGETABLES GROWING NEAR A PB/ZN SMELTING AREA AND ASSOCIATED HEALTH IMPACTS

Zhonggen Li¹, Xinbin Feng¹, Xiangyang Bi², Guangyi Sun³, Guanghui Li¹, and Jinling Liu¹

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³ Hei Longjiang Institute of Geological Survey, Harbin 150036, China

Oral Session2: Food Risk & Assessment

11:00-12:30, HaLL-B

2-1 CONSUMERS' PERCEPTION AND BEHAVIOR TOWARDS FOOD CERTIFICATION: EVIDENCES FROM THE MILK MARKET IN CHINA

Min Song¹, Xiaoou Gao¹, Tinggui Chen², Teruaki Nanseki³, Hui Zhou⁴ and Dongpo Li⁵

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2-2 CONSUMER WILLINGNESS TO PAY FOR FOOD SAFETY IN SHANGHAI CHINA: A CASE ATUDY OF GAP CERTIFIED MILK

Tinggui Chen¹, Min Song², Teruaki Nanseki³, Hui Zhou⁴ and Dongpo Li⁵

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2-3 CONSUMER PERCEPTIONS UPON FOOD SAFETY AND DEMOGRAPHIC DETERMINANTS IN CHINA: EMPIRICAL ANALYSIS BASED ON A SURVEY OF 512 RESPONDENTS

Dongpo Li¹, Teruaki Nanseki², Shigeyoshi Takeuchi², Min Song³, Tinggui Chen⁴, Hui Zhou⁵

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2-4 CHINESE CONSUMERS' ATTITUDE TOWARDS GAP-CERTIFIED MILK -A CASE STUDY IN BEIJING

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Oral Session3: Aqueous Environment and Hydrology & Combating Desertification

13:30-15:00, HaLL-B

3-1 IN SITU REMEDIATION OF CONTAMINATED AQUACULTURE WATER BY ECOLOGICAL DAM IN YANG CHENG LAKE

Chunjie Li¹, Zhenjia Zhang¹, Aimin Hao², Yasushi Iseri³, Caixia Kang⁴ and Takahiro Kuba⁴

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3-2 IMPACTS OF EUTROPHIC POND WATER ON FEEDING BEHAVIOR AND METABOLIC ENERGY BALANCE OF *SINANODONTA WOODIANA* IN MICROCOSM EXPERIMENTS

Yuxian Liu¹, Aimin Hao², Yasushi Iseri³, Chunjie Li⁴, Zhenjia Zhang⁴ and Takahiro Kuba¹

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3-3 IMPROVEMENT OF WATER QUALITY IN LAKE TAIHU BY AQUATIC PLANTS AND THE RELATION TO CYANOBACTERIA BLOOM

Caixia Kang¹, Aimin Hao², Yasushi Iseri³, Chunjie Li⁴, Zhenjia Zhang⁴ and Takahiro Kuba¹

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3-4 THE FIELD SURVEYS IN 2012 FOR THE LONG-TERM RECONSTRUCTION OF PALEO-ENVIRONMENT AT ARID AND SEMI-ARID REGIONS IN EAST ASIA

Kaoru Kashima¹

¹ Department of Earth and Planetary Sciences, Faculty of Sciences, Kyushu University, 6-10-1 Hakozaki, Fukuoka 812-8581, Japan

3-5 SIMULATION OF SALT ACCUMULATION IN CROP FIELD BY ROOT ION ABSORPTION MODEL

Ryosuke Nomiyama¹, Daisuke Yasutake², Yohei Hioki¹, Shogo Fuji¹, Kenta Tagawa³, Makito Mori², Hiroyuki Cho³, Weizhen Wang⁴ and Masaharu Kitano¹

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Oral Session4: Atmospheric Environment & Marine Environment

13:30-15:00, HaLL-C

4-1 EFFECTS OF MULTI-SUPPORTING STRUCTURE ON WIND TURBINE PERFORMANCE AND RESISTANCE FOR A WIND-LENS TURBINE

Keita Yoshinaga¹, Yuji Ohya², Takashi Karasudani³, Takanori Uchida⁴

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4-2 RESEARCH OF THE NEXT GENERATION SHIP WITH RENEWABLE ENERGY

So Yoshizawa¹, Yuji Ohya², Takashi Karasudani³, Takanori Uchida⁴, Kimihiko Watanabe⁵

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4-3 NUMERICAL SIMULATION OF EXHAUST GAS DIFFUSION BY HYBRID LBM-FVM METHOD

Fei Jiang¹, Changhong Hu²

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4-4 REAL-TIME OBSERVATION SYSTEM FOR FISHERIES IN THE KOREAN WATERS

In-Seong Han¹ and Young Sang Suh¹

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4-5 SEASONAL VARIATION OF VOLUME TRANSPORT THROUGH THE TAIWAN STRAIT

Takeshi Matsuno¹, Cho-Teng Liu², Kaoru Ichikawa¹, Ken-ichi Fukudome¹, and Hsien-Wen Chen³

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4-6 RECENT WARMING IN THE WESTERN NORTH PACIFIC IN RELATION TO RAPID CHANGES IN THE ATMOSPHERIC CIRCULATION OF THE SIBERIAN HIGH AND ALEUTIAN LOW SYSTEMS

Young-Hyang Park¹, Jong-Hwan Yoon², Yong-Hoon Youn³, Frederic Vivier⁴

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Oral Session5: Agro-Production Environment (JSPS SOWAC Project Special Session)

15:20-16:50, HaLL-B

5-1 LINKING ECONOMIC DEVELOPMENT WITH SOCIAL AND ENVIRONMENTAL ISSUES IN VIETNAM

Hoang Van Long¹, Mitsuyasu Yabe¹

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5-2 ASSESSING THE CURRENT STATE AND PROPOSING THE SOLUTION TO THE WASTEWATER TREATMENT AFTER BIOGAS AND SEPTIC TANK IN THE RURAL AREAS OF VIETNAM. A CASE STUDY IN NGOC CUC HAMLET - THUC KHANG VILLAGE - BINH DIEN DISTRICT - HAI DUONG PROVINCE

Hai Nguyen Do¹, Contin Macro², De Nobili Maria², Thinh Van Nguyen¹ and Truong Xuan Nguyen¹

¹ Faculty of Natural resources and Environment - Hanoi University of Agriculture, Hanoi, Vietnam

² Department of Agriculture and Environmental Sciences, University of Udine, Udine, Italy

5-3 AN IMPROVING OF PERFORMANCE OF FARMER WATER USER COMMUNITY IN CAMBODIA: A CASE STUDY IN STUNG CHIMIT IRRIGATION SYSTEM

Sam Sreymom¹, Yoshiyuki Shinogi¹

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5-4 TRIBUTYL TIN CONTAMINATION OF MARINE SEDIMENTS IN THE MAJOR PORT OF INDONESIA AND NORTHERN KYUSHU, JAPAN

Suzanne Undap^{1,2}, Shizuho Miki¹, Kukuh Nirmala³, Yohei Shimasaki¹, Yuji Oshima¹

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5-5 SIMULTANEOUS PRODUCTION OF BIOPLASTIC AND VALUE-ADDED COMPOST BY USING THERMOTOLERANT BACTERIA

Kenji Sakai¹, Arisa Hayami¹, Vichien Kitpreechavanish² and Vo-Tong Xuan³

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² Faculty of Science, Kastsart University, Thailand

³ Tan Tao University, VietNam

5-6 OPTIMAL OPERATION OF MULTI-PURPOSE RESERVOIR BY CONSTRAINED GENETIC ALGORITHMS

Trieu Anh Ngoc¹, Kazuaki Hiramatsu² and Masayoshi Harada²

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Poster Session

12:30-13:30, Entrance Lobby

P-1 DEEP SHAFT AERATION PROCESSES FOR HIGH CONCENTRATION LANDFILL LEACHATE TREATMENT AT LOW TEMPERATURE

Jing Niu¹, Youcai Zhao¹

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P-2 PERFORMANCE EVALUATION OF NANOSCALE ZERO-VALENT IRON (nZVI) FOR HYDROGEN SULPHIDE REMOVAL IN BIOGAS FROM WASTE ACTIVATED SLUDGE DIGESTION

Su Lianghu¹, Guo Guangzhai², Zhao Aihua², Zhao Youcai¹, Chai Xiaoli¹

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P-3 SUSTAINABLE AND PROFITABLE GREENHOUSE PRODUCTION IN SALINIZED CROP FIELDS UNDER DESERTIFICATION

Yohei Hioki¹, Ryosuke Nomiyama¹, Yuki Sago¹, Daisuke Yasutake², Makito Mori², Hiroyuki Cho³, Weizhen Wang⁴, Yueru Wu⁴, and Masaharu Kitano¹

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P-4 SHAPE AND STRUCTURE OF WATER'S EDGE IN STREAM FOR COEXISTENCE OF SEDIMENT CONTROL AND FISH HABITAT

Koji Takahira¹, Yukihiko Shimatani¹, Yuichi Kayaba², Natsuki Hisaoka³, Yoichi Kawaguchi⁴, Shinya Ikematsu¹ and Tasturou Sato¹

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P-5 THE ROLE OF GROUNDWATER IN SPATIO-TEMPERAL VARIATION OF WATER YIELD IN A SMALL JAPANESE FORESTED CATCHMENT

Sun Haotian¹, Tamao Kasahara², Kyoichi Otsuki²

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P-6 SOIL MOISTURE RETRIEVAL IN THE HEIHE RIVER BASIN BASED ON THE THERMAL INERTIA METHOD

MA Chunfeng^{1,2}, HAN Xujun¹, WANG Weizhen¹, Tetsuo KOBAYASHI¹

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- P-7 SOIL SALIZATION IN A MAIZE FIELD IN THE ARID REGION OF CHINA**
 Shohei Takahashi¹, Kenta Tagawa², Hiroyuki Cho¹, Masaharu Kitano³ and Weizhen Wang⁴
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- P-8 DEVELOPMENT OF THE DEM SYSTEM IN A HYDROLOGICAL MODEL TO SIMULATE THE WATER ENVIRONMENT IN THE SHIKOKU DISTRICT**
 Makito Mori¹, Masayuki Matsuoka¹, Daisuke Yasutake¹
¹ Faculty of Agriculture, Kochi University, B 200 Monobe, Nankoku, Kochi 783-8502, Japan
- P-9 DEVELOPMENT OF NUMERICAL MODEL TO SIMULATE THE TEMPERATURE ENVIRONMENTS IN GREENHOUSES**
 Makito Mori¹, Daisuke Yasutake¹, Yasuyo Nishimura¹
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- P-10 WATER CONSUMPTION BY TREES IN COMMUNITY FOREST SITE IN CAMBODIA**
 Yoshiyuki Miyazawa^{1,2,3}, Makiko Tateishi⁴, Hikaru Komatsu^{1,5}, Vuthy Ma⁶, Tsuyoshi Kajisa⁷, Heng Sokh⁶, Nobuya Mizoue⁷ and Tomo'omi Kumagai⁸
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- P-11 PREPARATION OF ALLOPHANE USING SILICA AND ALUMINUM SOURCE EXTRACTED FROM INCINERATED SOLID WASTE SYNTHESIS**
 Hoang Bac BUI¹, Dinh Hieu VU¹, Xuan Nam BUI¹
¹ Hanoi University of Mining and Geology, Dongngac, Tuliem, Hanoi, Vietnam
- P-12 PREPARATION OF ACTIVATED CARBON-ZEOLITE COMPOSITES (AC-Z COMPOSITES) USING WATER TREATMENT SLUDGE ASH**
 Dinh Hieu VU¹, Hoang Bac BUI¹, Xuan Nam BUI¹
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Session1: Urban Environment

1-1 CHARACTERIZATION OF BOTTOM ASHES PRODUCED IN SEVEN MUNICIPAL SOLID WASTE INCINERATORS IN CHINA

Chai Xiaoli¹, Hou Linlin¹, Wang Dongyang¹

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ABSTRACT

When recycling bottom ash from municipal solid waste incinerators (MSWIs), chlorine content must be decreased to a low level, because chlorine can cause serious corrosion in metals if the residues are used as raw materials of cement production. To better understand parameters that affect MSWI bottom ash quality, samples from seven plants were tested and compared in this study. The results show that physical-chemical characteristics especially heavy metal contents of bottom ash have close correlation with waste inputs and refuse collection mode.

Total chlorine of those samples varies from 0.32 wt. % to 0.66 wt. %, and soluble chlorine accounts for 59%-93%. Food refuse and plastics are important resources of chlorine in the residues, to separate waste plastics from other refuse and reuse the kitchen waste is an effective way to reduce chlorine content in the bottom ash.

KEYWORDS: characterization; incineration; bottom ash; chlorine

1-2 MODELING OF LANDFILL GAS EMISSION THROUGH VEGETATION

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ABSTRACT

Waste landfill sites are one of the largest source of human induced methane emission. In landfill sites, waste is biologically degraded and landfill gas such as CH₄ and CO₂ are generated of anaerobic environment, but the detailed mechanisms of landfill gas emission in waste layer or in cover soil layer, especially the effect of vegetation on landfill gas emission, have not been clarified. In order to find out the effect of vegetation on landfill gas emission from a landfill site, an experiment was conducted by using two soil containers with vegetation and one soil container without vegetation. Through experimental period, CH₄ flux of the vegetated containers was bigger than CH₄ flux of the non-vegetated container. The numerical model of the outdoor experiment was developed on the assumption that the difference of CH₄ flux between the vegetated soil containers and the non-vegetated soil container is caused by CH₄ emission through plants and the driving force of the emission is diffusion in plants bodies. As a result, the model explained the experimental results correctly.

1-3

INFLUENCE OF HEATING PROCESS ON WEIGHT LOSS AND MINERAL PHASE CHANGE IN MSWI ASH: THE LOSS ON IGNITION OF INCINERATION BOTTOM ASH

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ABSTRACT

Loss on ignition (LOI) is a very common method for estimating the volatile species in solid sample. Normally, the measurement of LOI can be convenient and accurate, but for municipal solid waste incineration (MSWI) ash, the process may become intricate due to the complexity of the sample. In the incineration ash, there exists various phases, such as mineral, metal, organic and glass. The reaction and transformation of some materials during heating will influence the measurement. Several incineration bottom ash samples were picked and tested in this study, thermal analysis (TG-DTA) and X-ray diffraction (XRD) were carried out to investigate the weight loss and mineral change during heating (200~1400°C). The comparison shows a big difference (≈10%) between the LOI results measured at high temperature (800°C) and relatively low one (440°C). The mineralogical analysis suggests that the decomposition of hydrate and carbonate phases can't be neglected for the measurement. A long-time heating process should also be avoided because of possible weight gaining due to oxidation of the metallic contents.

KEYWORDS: LOI, Incineration ash, heating temperature and time

1-4

HEAVY METALS IN COMMON VEGETABLES GROWING NEAR A PB/ZN SMELTING AREA AND ASSOCIATED HEALTH IMPACTS

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ABSTRACT

Heavy metals (Hg, Pb, Zn, Cd, Cu) concentration in 10 common winter vegetable species (namely, white radish, Chinese cabbage, lettuce, carrot, cauliflower, leek, cabbage, celery, Chinese white cabbage, garlic sprout) growing near a large scale Pb/Zn smelter in Hunan province, China, were investigated. The data showed that contents of Pb and Cd in vegetables were overwhelmingly exceeded the national limit for food (GB 2762-2005), but Hg, Zn and Cu were almost below the limit. The correlations among Hg, Pb, Zn and Cd in vegetables were statistically significant ($p < 0.05$); while Cu only evidently correlated with Cd ($p < 0.05$). The average transfer factor of heavy metals decreased in the sequence of Cd, Zn, Cu, Hg and Pb. The daily intake of heavy metals to the local residents, as compared with the WHO's recommended daily acceptable intake level, showed that the intake of Pb and Cd has surpassed the threshold by 74% and 46%, respectively; while Zn, Cu and Hg were well under the criterion. This study revealed that vegetables growing in the vicinity of this Pb/Zn smelter has being seriously contaminated with Pb and Cd, and this has posed an adverse health risk to the local people.

KEYWORDS: Non-ferrous smelting; Vegetable; Heavy metals; Contamination; Health risk

1-5

RESEARCH ON THE KEY TECHNOLOGIUES OF METHANE EMISSION REDUCTION IN MSW SEMI-AEROBIC LANDFILL SITE

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ABSTRACT

In the light of CH₄ emission in small or medium-sized landfill site in China, this paper is mainly concerned with CH₄ emission reduction technology. On the basis of semi-aerobic landfilling theory and engineering practices, the leachate recirculation control and natural ventilation system parameters were optimized in this research. For further strengthen methane emission reduction in the semi-aerobic landfill site, the methane oxidation cover technology were introduced. The following conclusions were obtained: (1) In semi-aerobic landfill bodies, CH₄ concentration increased significantly from 9.58% in the initial stage to 17.17% in CH₄ production peak stage, and then decreased to 2.82% in the stable period. In addition, natural ventilation system optimization can significantly improve the O₂ content in the landfill body, which means the CH₄ generation can be effectively inhibited. (2) Leachate recirculation can significantly accelerate the landfill methane production rate, and then the landfill site can achieve stabilization early. In addition, leachate pipeline clogging prevention can effectively reduce the methane production in semi-aerobic landfill site. (3) The landfill cover material using aged refuse and new cover soil mixture with the proportion of 1:10 (m/m) can achieve better methane oxidation. In addition, based on the semi-aerobic landfill process, the capillary barrier cover system, with function of rainfall barrier, air permeability and methane oxidation, was presented in this study. (4) According to balance analysis of CH₄ gas emission and oxidation on the landfill operation platform, new cover system can effectively control CH₄ emission. In addition, according to the balance analysis of CH₄ generation and oxidation in the landfill body, in order to control the CH₄ emission, the proportion of aerobic and anaerobic space in landfill body should be at least more than 0.6.

KEYWORDS: Semi-Aerobic Landfill Site; Methane Oxidation; Methane Emission Reduction; Landfill Cover System.

1-6

PRODUCTION CHARACTERISTICS OF N₂O DURING STABILIZATION OF MUNICIPAL SOLID WASTE IN A SEMI-AEROBIC BIOREACTOR LANDFILL

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ABSTRACT

A semi-aerobic bioreactor landfill was proposed to achieve rapid stabilization of municipal solid waste (MSW) and to remove ammonia nitrogen in leachate. Nitrification and denitrification are confirmed as the main nitrogen removal methods. Nitrous oxide (N₂O) is an important intermediate product during these processes and raises the following questions: Can N₂O be produced during the stabilization of MSW in a semi-aerobic bioreactor? What are the characteristics of the changes of N₂O? What are the main influencing factors that cause the production of N₂O? A simulated semi-aerobic bioreactor landfill was designed and operated for 262 d to establish the production characteristics of N₂O. A significant change in N₂O concentration occurred during the study. This change can be divided into four stages. At the initial stage, except for the initial concentration of 563 ppm, N₂O concentration ranged from non-detected to 100 ppm. During the second stage, the N₂O concentration level was lower than that measured during the initial stage and was mostly non-detected. During the third stage, the arithmetic mean and peak values of N₂O were about 2232 ppm and 10000 ppm, respectively. Four major factors influenced N₂O production, namely, nitrate, nitrite, VFA and C/N in leachate. The arithmetic mean value of N₂O in the final stage was 216 ppm, which was much lower than that in the third stage.

KEYWORDS: Nitrous oxide (N₂O), Semi-aerobic bioreactor landfill, Influencing factors, Municipal solid waste

Session2: Food Risk & Assessment

2-1

CONSUMERS' PERCEPTION AND BEHAVIOR TOWARDS FOOD CERTIFICATION: EVIDENCES FROM THE MILK MARKET IN CHINA

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ABSTRACT

In order to increase food safety and restore consumers' confidence, China has set up an integral food safety certification system, which covers the whole process from farm to fork. Could it be accepted and paid by consumers? Based on a consumer survey to 617 respondents in Beijing and Shanghai the top two metropolises in China, this paper selected 466 valid samples to analyze consumers' perception and behavior towards food certification in milk market. The data shows that respondents are rather familiar with agro-products certification, only few respondents understand GAP and HACCP, while 69.3 percent of respondents prefer to buy certificated milk. Moreover, In order to better understand consumers' willingness to buy certificated food, we analyze influencing factors on their purchasing behaviors through the Binary Logit Regression model. The result indicates that age, having background of agriculture, food or medicine, having pre-school child and income all strongly affect farmers' purchase behavior towards certificated milk.

KEYWORDS: Perception; Behavior; Food certification; Consumers; in china

2-2

CONSUMER WILLINGNESS TO PAY FOR FOOD SAFETY IN SHANGHAI CHINA: A CASE ATUDY OF GAP CERTIFIED MILK

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ABSTRACT

From the melamine incident of Sanlu milk powder in 2008 to the industrial gelatin incident of yogurt in 2012, the food safety problems of milk have been plaguing China National. This paper analyzed consumer willingness to pay for food safety in Shanghai China by a case study of gap certified milk. Shanghai consumers were selected for the survey, in which contingent valuation was conducted. We found that Consumers are willing to pay for GAP certification milk average price of 2.40 RMB/250ml, 20% higher than ordinary milk prices. The results of the logistic regression model showed that as the factors that affect consumers' willingness to pay, gender, income, and whether there are preschoolers are statistically significant.

KEYWORDS: Food Safety, Milk, GAP, CVM, WTP

2-3

CONSUMER PERCEPTIONS UPON FOOD SAFETY AND DEMOGRAPHIC DETERMINANTS IN CHINA: EMPIRICAL ANALYSIS BASED ON A SURVEY OF 512 RESPONDENTS

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ABSTRACT

Based on a survey of 512 respondents from Beijing and Shanghai, this paper studies consumer perceptions upon food safety and the major affecting factors. In addition to the basic individual information of gender, age, educational background and employment, the demographic variables include professional experience of the respondent, family composition and annual income as well. The perceptions consist of overall awareness about food safety, major source of information and subjective reliability; understanding on the impact of environmental protection, main menaces to food safety, top source of agro-pollution, most risky procedure or stage; viewpoints on the major responsibility bearer of agro-pollution, best way to control agro-pollution. After the descriptive analysis on demographic characteristics and perception variables, One-way T-test reveals that all the 9 demographic variables are significant in identifying the discrepancies among most of perceptions. Moreover, further analysis is conducted on the impact of demographic variables significant in the level of 0.01. Finally, a variety of policy recommendations are put forward, from strengthening the supervisory responsibility of government, giving full play to the functions of mass media, consolidating the supervision of key sectors, to accelerating the extension of environment-friendly technology.

KEYWORDS: Consumer, Perception, Determinant, Food Safety, China

2-4

CHINESE CONSUMERS' ATTITUDE TOWARDS GAP-CERTIFIED MILK -A CASE STUDY IN BEIJING

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ABSTRACT

Food safety has increasingly come to the forefront of consumer concerns with identification of various food safety issues. Good agricultural practice (GAP) can be considered as a way of advancing the multifunctional roles of agriculture, ensuring agri-products safety, protecting environment, improving animal welfare and farm worker's welfare. The milk consumption per capita is keeping on increasing in China. This study estimated Chinese consumers' awareness of (GAP) and valuation of a GAP label on packaged milk.

A total of 307 respondents in Beijing were asked to answer a series of questions about their preference of milk purchasing.

The results revealed that Chinese consumers have low knowledge of GAP, only very few of the respondents know about GAP. More than 75% of the respondents have never heard GAP before the survey. Although consumers have little idea of GAP, most of the respondents consider GAP is necessary. More than 60% of the respondents are willing to pay for GAP-certified milk with extra money while about 33% of the respondents would buy milk with GAP certification if the price won't change

KEYWORDS: Consumers' attitude, food safety, agricultural risk, good agricultural practices

Session3: Aqueous Environment and Hydrology & Combating Desertification

3-1

IN SITU REMEDIATION OF CONTAMINATED AQUACULTURE WATER BY ECOLOGICAL DAM IN YANG CHENG LAKE

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ABSTRACT

Yang Cheng Lake, which is famous with the crab culture, now faces the water quality deterioration. Ecological dam is designed for in situ remediation of contaminated aquaculture water. The device of ecological dam is comprised of ecological floating bed, which is 2 meters long and 1 meter wide, and immobilized biological media, which is fixed on the floating bed and immersed in the lake water. In this study, two in situ demonstration areas are constructed in the crab culture farms to investigate the improvement of water quality. Each area is surrounded by seine with dimension of 20 meters long and 10 meters wide to avoid crabs entering. In one demonstration area, forty-eight devices are connected and laid in surrounding, on which water spinaches are planted. In the other demonstration area there is no device, which is established in contrast. After three months' operation, the water quality in the demonstration area with ecological dam is improved obviously, comparing with that in contrasted area and that in crab breeding area.

KEYWORDS: Yang Cheng Lake; aquaculture; ecological dam; in situ; remediation

3-2

IMPACTS OF EUTROPHIC POND WATER ON FEEDING BEHAVIOR AND METABOLIC ENERGY BALANCE OF *SINANODONTA WOODIANA* IN MICROCOSM EXPERIMENTS

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ABSTRACT

The bivalve *Sinanodonta woodiana* is widely distributed throughout Chinese freshwaters and is an important economic pearl mollusk. Recently, *S. woodiana* as a tool in biomanipulation of lakes in China due to its strong suppression of phytoplankton, have been attracted increasingly more attention. In order to evaluate the impact of *Microcystis* blooming pond water on the physiological behavior in a bioenergetic method, microcosm experiments were performed with eutrophic pond water and bivalves in laboratory in six days, including one group with sediment and the other group without sediment. In this experiment, filtration rate, absorption efficiency, oxygen consumption rate and ammonia excretion rate of *S. woodiana* were measured on the 0 day and 6th day, also the percentage changes of phytoplankton with different size scale were measured every two days for each group. The results indicated that after 6 days exposure to *Microcystis* blooming pond water, the SFG (scope for growth) value as a measure of metabolic energy balance for *S. woodiana* decreased and the picoplankton (< 2 μm, including small single-cell *Microcystis* sp.) percentage in total phytoplankton was reduced in the group without sediment; however, in the group with sediment, the SFG value increased and microplankton (> 20 μm, including colony-forming *Microcystis* sp.) percentage was reduced obviously on the 6th day. This phenomenon indicates that without sediment only the phytoplankton

with size < 2 µm can be filtered by *S. woodiana* and the bivalves themselves could not grow well in the *Microcystis* blooming pond water; however with sediment group, phytoplankton with size > 20 µm was reduced obviously after six days and the bivalves themselves could grow well after six days' exposure to this eutrophic water. Therefore, it can be concluded that *S. woodiana* can be used as an effective biomanipulation tool in eutrophic water, and also it indicated that bivalves can be attached on sediments especially when they were hang cultured in practice.

KEYWORDS: *Sinanodonta woodiana*, eutrophication, biomanipulation, feeding behavior, SFG.

3-3

IMPROVEMENT OF WATER QUALITY IN LAKE TAIHU BY AQUATIC PLANTS AND THE RELATION TO CYANOBACTERIA BLOOM

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ABSTRACT

Lake Taihu, the third largest freshwater lake in China, is facing serious eutrophication problems. Therefore, the water quality in Lake Taihu should be improved immediately. To improve water quality of the lake and control algae bloom, the effect of *Vallisneria asiatica* which is one of the macrophytes spread over Lake Taihu, with different biomass on water quality and algae was researched. The results showed that in the laboratory experiments, DTN, DTP, and Chl.a decreased and the biomass of *Microcystis* sp. reduced with the increase of biomass of *V.asiatica*. Therefore, it was expected that *V. asiatica* could control an excess of *Microcystis* sp. in Lake Taihu. Furthermore, through microscopic observations, we discovered that during experimental period, lots of diatom (*Nitzschia* sp.) appeared in the *Microcystis* sp. community resulting in settling down of algae in case of small quantity of *V. asiatica*. This is maybe one of important reasons of the biomass of *Microcystis* sp. reduced largely. At the same time, epiphytic *Cocconeis* sp. appeared while *Nitzschia* sp. lessened in the tanks with large quantity of *V. asiatica*, which indicated that there was competition between epiphytic *Cocconeis* sp. and *Nitzschia* sp.

KEYWORDS: Lake Taihu; eutrophication; *Vallisneria asiatica*; algae bloom.

3-4

THE FIELD SURVEYS IN 2012 FOR THE LONG-TERM RECONSTRUCTION OF PALEO-ENVIRONMENT AT ARID AND SEMI-ARID REGIONS IN EAST ASIA

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ABSTRACT

There are two methods to monitor environmental changes and desertification at arid and semiarid regions. The first one is the short-term monitoring, and examined the changes during several years or decades by meteorological, hydrological, geophysical and geochemical observations. The second one is the long-term monitoring, and presumed changes of environment during hundreds or thousands years using geologic and geographical methods. Although a lot of expeditions have reported short-term changes, the reports for long-term environmental changes have been limited because it takes a lot of efforts to take efficient samples to presume in detail environmental histories.

Department of Earth and Planetary Sciences, Kyushu University has started international research project to make long-term monitoring of desertification in East Asia to correspond with the East Asian Environmental Problems Project of Kyushu University. In cooperation with Mongolian Academy of Sciences, National University of Mongolia, Xinjiang University in China, the field surveys have been done to obtain samples for long-term monitoring at lakes, ponds and marshes in Mongolia and north western China using geological and geographical methods. Our researches presumed long-range (about hundreds or thousands years) changes of the lowering of lake levels and under ground water levels, the reducing of forest areas and the expanding of deserts in those regions. The desertification has been accelerated in these two hundred years in both regions.

In 2012, we took the field surveys in north Mongolia and Xinjiang region, north-east China. The long-term changes of climates and water resources during these 10,000 years were examined using geologic and geomorphic methods.

KEYWORDS: Climatic changes, Desertification, Mongolia, The Global Warming, Xinjiang

3-5

SIMULATION OF SALT ACCUMULATION IN CROP FIELD BY ROOT ION ABSORPTION MODEL

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ABSTRACT

In the crop fields of arid and semi-arid regions under desertification, salinization of soil and groundwater is a serious problem for sustainable agriculture. The salinization can be affected by active and selective ion absorption by crop roots, and therefore it is essential to evaluate the root ion absorptive function under the salinized condition. The rate of root salt absorption of the major crops such as corn and sunflower plants under the salinized condition were analyzed by applying the transpiration-integrated model of root ion absorption affected by leaf transpiration. The characteristics of root salt absorption were represented by two model parameters of Q_{max} and K_M , which relate to the potential absorbing power and the ion affinity of transport proteins on root cell membranes, respectively. In the soil column experiment under the salinized condition, simulation of salt accumulation in the root zone soil was conducted using the evapotranspiration-integrated model, which is transformed from the transpiration-integrated model. Daily changes in salt accumulation in the root zone soil of the column were simulated reliably by applying the evaporation-integrated model.

KEYWORDS: Evapotranspiration-integrated model, Desertification, Root ion absorption, Soil salinization, Transpiration-integrated model

Session4: Atmospheric Environment & Marine Environment

4-1

EFFECTS OF MULTI-SUPPORTING STRUCTURE ON WIND TURBINE PERFORMANCE AND RESISTANCE FOR A WIND-LENS TURBINE

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ABSTRACT

Renewable energy resources including wind power generation are receiving more and more attention these days. In Japan, however, because of small land area, steep terrain, and population concentration in plane area, it is difficult to construct massive wind farm on land. The concept of offshore wind farm can overcome this problem. There are 2 types of offshore wind power generation, one is fixed-bottom, the other is floating body. Since most of Japanese EEZ is too deep for fixed-bottom type, we choose a floating body type for wind power generation. We have developed a wind turbine with a brimmed diffuser (Wind-Lens Turbine) that has an additional hollow structure (Wind-Lens) consists of a diffuser shroud and a ring-shaped brim at the diffuser exit periphery. To install the Wind-Lens Turbine in an offshore wind farm, we need to size up the Wind-Lens Turbine. This time, we propose a multi-supporting structure appropriate to the floating platform and investigate the effects of multi-supporting structure on the wind turbine performance and resistance for the Wind-Lens Turbine. We make some wind tunnel experiments and numerical simulations. The multi-supporting structure shows the almost same power output with that of a Wind-Lens Turbine supported by a mono-pole type.

KEYWORDS: Wind-Lens Turbine, Multi-supporting structure

4-2

RESEARCH OF THE NEXT GENERATION SHIP WITH RENEWABLE ENERGY

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ABSTRACT

Recently, as the number of international trading ships has been constantly rising due to the economic growth of the developing countries, their influence on the global environment has been concerned, even though ships are greener transportation mode than any other mode such as airplanes and trains. In terms of reducing the burden to the earth, the variety of eco-ships have been invented and used practically. They are mainly aiming at generating electricity from solar and wind energy. An eco-ship with a vertical axis wind turbine is one of the examples and has been already working. However, that wind turbine works less effectively under high wind speeds than the horizontal axis ones. Therefore, to take advantage of a strong sea-wind, we suggested the installation of the horizontal one, Wind-Lens Turbine, which is a wind turbine system that consist of a diffuser shroud with abroad-ring flange at the exit periphery and can generate more electricity approximately twice than the existing ones. We evaluate the possibility whether it is profitable by examining the energy balance in a whole ship.

KEYWORDS: Wind Lens Turbine, Eco-ship

4-3

NUMERICAL SIMULATION OF EXHAUST GAS DIFFUSION BY HYBRID LBM-FVM METHOD

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ABSTRACT

The air pollution by automobile exhaust gas is still a serious environmental problem, especially near roadside. Particularly, diesel engines emit large quantities of air pollutants including fine particulate matter. Investigation of the behavior of these particulate matters is important for the solution of such environment pollution problem. A stable hybrid numerical method based on the coupled lattice Boltzmann (LB) scheme and finite volume method (FVM) is developed to simulate the exhaust gas diffusion and particulate matter movement. A subgrid-scale (SGS) model is incorporated for large-eddy simulation (LES) of the turbulence flow. In this paper, as an example the exhaust gas diffusion from a moving bus is simulated and discussion is made on future application of the proposed simulation technique to the solution of automobile air pollution problems.

KEYWORDS: Numerical simulations, Hybrid LBM-FVM method, Exhaust gas diffusion, GPU computing

4-4

REAL-TIME OBSERVATION SYSTEM FOR FISHERIES IN THE KOREAN WATERS

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ABSTRACT

Mass mortalities of fisheries resources were frequently occurred by abnormal oceanic conditions. In recent, these phenomena have been occurred almost every year in the Korean Waters by climate change effect. To prevent the fisheries damage and predict the abnormal oceanic condition, real-time observation system is very useful in fisheries. For this purpose, National Fisheries Research and Development Institute (NFRDI) in Korea operate real-time observation system since 2004. This system is consists of 27 stations as mooring buoys/aquaculture farms and product temperature, salinity and dissolved oxygen data with 30 minute interval. Real-time oceanographic data are sent to fisherman and scientist by mobile SMS (Short Message Service), mobile homepage and internet homepage. This system is more helpful to aqua culturist for breeding management and food supply. Sea surface temperature anomaly was about -2~-4 °C in January 2011 and about 4~5 °C in July 2012 in the Korean Waters. These abnormal temperature conditions were the main causes of mass mortality and change of catch amount in fisheries. However, damage in fisheries at that time was minimized by this real-time observation system. This system also applied to marine leisure information and harmful algae bloom monitoring. NFRDI will extend this system to offshore in near future.

KEYWORDS: Real-time system, fisheries, abnormal oceanic condition, ocean buoy, mass mortality

4-5

SEASONAL VARIATION OF VOLUME TRANSPORT THROUGH THE TAIWAN STRAIT

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ABSTRACT

Current system in the East China Sea is controlled by not only the Kuroshio but also inflow from the Taiwan Strait as well as outflow through the Tsushima Strait. Many literatures refer to the seasonal variation of the inflow from the Taiwan Strait. However, there is no reliable data of the current field in the strait due to various difficulties of the long term observations. Volume transport through the Taiwan Strait (TwS) has been monitored since January 2009 with ADCP installed on the regularly operating ferry boat across the strait. The ferry boat, TaiMa, is serving a round trip a day between Keelung and Matsu Islands located near the main land of China. Three years long monitoring data show clear seasonal variation in the volume transport into the East China Sea, large in summer and small in winter. The variation of the volume transport has a good correlation with wind speed along the strait. The volume transport is relatively stable in summer, while it shows high variability from autumn to spring. The long term monitoring data of the current field across the Taiwan Strait were obtained first time. However, there is serious data lack in winter due to cruise cancellation by bad weather or regular maintenance.

KEYWORDS: Taiwan Strait Current, volume transport, seasonal variation, monitoring with ferry boat.

4-6

RECENT WARMING IN THE WESTERN NORTH PACIFIC IN RELATION TO RAPID CHANGES IN THE ATMOSPHERIC CIRCULATION OF THE SIBERIAN HIGH AND ALEUTIAN LOW SYSTEMS

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ABSTRACT

Based on a new East Asian winter monsoon (EAWM) index and by analyzing the relationship between sea surface temperature (SST) anomalies and different atmospheric and oceanic factors in winter, this study investigates the causes of the recent unusual warming in the western North Pacific. Our analyses emphasize the dual contribution from the atmosphere and ocean to the local SST variability, with the relative importance of each contributor varying with the period and place. In the period 1970-1989, the EAWM, controlled mostly by the Siberian High, is predominantly responsible for the SST variability in most of the western North Pacific, whereas in the period 1990-2005 ocean dynamics become increasingly important in most places or even dominant in the Kuroshio-Oyasio Extension (KOE) region.

The delayed response of the KOE SST to basin-wide wind stress curl forcing via Rossby waves is epoch-dependant and is significant at lags of 1, 3, and 4 yr before 1990 but only at 1 yr afterwards. This epoch dependency of the impact of Rossby waves is related to the different location of the centers of action of wind stress curl in the midlatitude North Pacific between the two epochs. In addition, mean advection of the EAWM-driven anomalous SST from the southern East China Sea, which can be transported into the KOE region in about a year by the Kuroshio, likely affects the KOE SST lagged by 1 yr.

The strongest positive SST trend observed in the western North Pacific results from the combined effects of the abrupt weakening of the EAWM due to the unprecedented decline of the Siberian High and the increasing ocean's role. The latter is best evidenced by

the 1-yr delayed response of the western North Pacific via the gyre circulation adjustment to the basin-wide decadal scale wind stress curl change associated with the northward shift of the strengthened Aleutian Low.

KEYWORDS: Climate change, sea surface temperature, western North Pacific, East Asian winter monsoon, Siberian High, Aleutian Low, wind stress curl

Session5: Agro-Production Environment (JSPS SOWAC Project Special Session)

5-1

LINKING ECONOMIC DEVELOPMENT WITH SOCIAL AND ENVIRONMENTAL ISSUES IN VIETNAM

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ABSTRACT

The era of economic development in Viet Nam started in 1986 since the Doi Moi (Economic Renovation) was introduced. After more than two decades, the country has achieved many benefits in terms of economic and social welfare improvements, including, income per capita, education, and health care services as a result. However, there have been social and environmental problems as a consequence. The country is now facing many challenges to achieve sustainable development if these problems are not solved or mitigated. This paper will present and discuss the social and environmental problems associated with economic development including income inequality between regions, urban and rural areas, majority and the ethnic minorities, the uplands and the lowlands, water pollution, land contamination, air pollution, solid wastes, natural resource degradation and biodiversity loss. Finally, some orientations and solutions in term of development policies will be recommended.

KEYWORDS: Income Inequality; Environmental Pollution; Environmental degradation; Forest degradation; Biodiversity loss

5-2

ASSESSING THE CURRENT STATE AND PROPOSING THE SOLUTION TO THE WASTEWATER TREATMENT AFTER BIOGAS AND SEPTIC TANK IN THE RURAL AREAS OF VIETNAM. A CASE STUDY IN NGOC CUC HAMLET - THUC KHANG VILLAGE - BINH DIEN DISTRICT - HAI DUONG PROVINCE

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ABSTRACT

As population densities increased and economic emerged in the recent years, the surface waters in the rural of Vietnam has suffered from various negative effects and their quality quickly deteriorated. In our study area at Ngoc Cuc hamlet, Thuc Khang village, Binh Dien district, Hai Duong province, the surface water areas were rapidly scaled back. Unfortunately, since animal manure and night soil were restricted in its use as the fertilizer for plant, there was an increase in amount of the pollutants, which was used in biogas and septic tank. The wastewater from these systems subsequently ended up in the scaled-back surface water area, stimulating the water quality pollution. Chemical analysis results of these wastewater suggested that the concentration of COD and $\text{NH}_4^+\text{-N}$ was extremely high, ranging from 140-241 mg/l and 20.1-57.8 mg/l, respectively. To deal with these issues, in this research, many local aquatic plants were studied to investigate their specific abilities to treat the wastewater discharged from biogas and septic tank before they harm the surface water. Among the aquatic plants, *Eichornia crassipes*, one species of water hyacinth showed the best treatment ability, rapidly increasing its biomass and tremendously decreasing the concentration of COD, PO_4^{3-} , $\text{NH}_4^+\text{-N}$ of the waste water from 1.8-2.7 times, 5.1-11.6 times and 5.6-7.6 times, respectively. The results also suggested the effect of another aquatic plant, *Enydra fluctuans*. Lour, one species of rice paddy herb in reducing the concentration of COD, $\text{NH}_4^+\text{-N}$ from 1.6-2.0 times and 3.7-4.2 times, respectively. Furthermore, significantly higher dissolved oxygen and

redox state were recorded in the treated wastewater.

KEYWORDS: *Eichhornia crassipes*, *Enydra fluctuans*.*Lour*, rice paddy herb, wastewater treatment, water hyacinth.

5-3

AN IMPROVING OF PERFORMANCE OF FARMER WATER USER COMMUNITY IN CAMBODIA: A CASE STUDY IN STUNG CHIMIT IRRIGATION SYSTEM

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ABSTRACT

Irrigation plays an important role in boosting agricultural production. Government is in the position of both physical infrastructures development and management. Having recognized that the government-managed schemes have not been performed well, a new approach called Participatory Irrigation Management (PIM) is introduced by establishing a Farmer Water User Community (FWUC) to completely or partly manage the transferred scheme. Yet, the performance of FWUC has not lived up to the expectation as being reported by both government and external agencies.

The utmost goal of this research is how to improve the performance of the FWUC to be able to accomplish its expectation. Hence, four main objectives are developed viz. how scheme is managed, the performance of the FWUC through its established objectives, its performance based on farmers' perceptions, and what and how factors affect the current performance.

This research is employed with a convergent parallel design method in which both qualitative and quantitative approached are both engaged. There are four methods of data collection namely survey in which 236 farmers are involved, key informant interview for FWUC committee members, direct observation during a village meeting and existing related documents collection. Analysis method for quantitative data comprises of descriptive statistics and logistic regression model (operative and socioeconomic indicators as independent variables) for assessing based on farmers while qualitative data consists of coding, classifying and describing.

Asian Development Bank provided loan for government for this system construction and FWUC establishment. The Stung Chinit irrigation system has been transferred to the FWUC partly. A main canal and reservoir are still in charge of the government while secondary and tertiary canals are FWUC's responsibility and quaternary canal is in care of farmer. Continuous, proportional, and rotational supply modes are employed to the main, secondary and tertiary, and

quaternary canals, respectively. However, rotational supply mode for the field ditch has been proved to be failed in meeting the water demand, so both FWUC and farmer have changed to flood expansion mode, a traditional way of water management.

There are six established objectives of FWUC and only two of them are reached, namely water distribution planning and the ensuring of operation and maintenance (O&M) for the planning, implementation and reporting and feedback procedure which all stakeholders are involved. Water delivery aim has not yet achieved due to the supply mode of which head-ender gets water first as well as weak discharged rate that is out of the range of min. and max. safe discharged rate. The objective of balancing income from irrigation service fee (ISF) and total expenditure has also not yet accomplished. An ISF collection indicator shows a very good rate but a self-sufficient indicator reveals that the best percentage up to 2011 is just 55% that FWUC can pay for the expense while the other share comes from government subsidy. Likewise, the last two objectives, which mainly on conflict resolution and internal rule enforcement have not yet fulfilled because of limited legitimate power of FWUC and low participation from farmers.

Descriptively, only 36% of respondents are satisfied with the overall performance. The logit model used to assess the performance of FWUC through farmers' perceptions claims that all operative indicators including timeliness, adequacy, appropriate maintenance and proper ISF are statistically significant and affect their satisfaction. Only equity indicator is not yet satisfied specifically for tail-enders.

The last objective of the research identifying factors influencing the performance generates the four major players. FWUC itself determines the performance based on knowledge and experience, available budget and so on while physical infrastructures do due to system design, O&M, and others. Authorities consist of central and local government who influence the FWUC through their supports and power devolution whilst farmers sway the performance of FWUC by their participation in terms of ISF payment, rule compliance, and role performance etc. All the four groups' characteristics from aspects of technical, financial, social, physical, and political are the influencing factors determining the current performance.

In conclusion, the performance of the FWUC is in average rate for some objectives are obtained and the most of operative indicators are satisfied by the farmers. The identified factors that are interrelated play an important role on the performance. Through these, three main things have to paid attention on to improve the FWUC's performance: infrastructure and technology have to be checked with the local farmers and government's capacity to make sure the suitability, budget solvency is still a serious problem for sustainability while farmer initiation would be a best

requisite to foster participation leading to sustainable irrigation management expectation of this PIM approach. The implication for this research is for particularly medium and large scale irrigation scheme in Cambodia using the results above as the mainstay.

5-4

TRIBUTYLTIN CONTAMINATION OF MARINE SEDIMENTS IN THE MAJOR PORT OF INDONESIA AND NORTHERN KYUSHU, JAPAN

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ABSTRACT

Tributyltin (TBT) has been widely used as an antifouling in marine environments since the early 1960s. TBT is highly toxic to non-target aquatic organisms, so in 2003 the International Marine Organization imposed a worldwide ban on TBT. However, there is no regulation established in Indonesia yet. The aim of this study is to investigate contamination level of TBT in marine sediment at Jakarta, Bali and Manado cities of Indonesia and Northern Kyushu of Japan. Sediment samples were collected from 20 stations in Indonesia on January 2011 and from 9 stations in Northern Kyushu of Japan in September 2010. TBT and DBT concentrations in the samples were analyzed by gas chromatography coupled to mass spectrometry. TBT and DBT were detected in sediment samples collected in Indonesia and Japan. High concentration of TBT was found in samples collected in front of shipyard area; Bitung Seaport (4.25 µg/g wet.wt) in Manado and Benoa Seaport (0.21 µg/g wet. wt) in Bali. In Hakata Port Fukuoka Japan, beside shipyard, high TBT concentrations were detected (0.63 µg/g wet.wt). Thus this study suggests that shipyard activity is might be major source of TBT pollution in Indonesia and Japan.

KEYWORDS: Tributyltin; Marine pollution; Sediment; Indonesia

5-5

SIMULTANEOUS PRODUCTION OF BIOPLASTIC AND VALUE-ADDED COMPOST BY USING THERMOTOLERANT BACTERIA

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ABSTRACT

Here, we would like to report a new method for simultaneous production of high optically-active L-lactic acid and compost showing plant growth promoting activity from food waste. Purified L-lactic acid with high optical activity can be a material for poly-L-lactic acid, a recyclable bio-plastic. Compost showing plant growth promoting activity would be useful as a kind of functional fertilizer rich in nitrogen, with low C/N ratio.

We newly isolated a bacterium that showed activities such as calcium phosphate-solubilization, nitrogen-fixation, conversion of L-tryptophan to indole-3-acetic acid. We identified the bacterium as *Bacillus subtilis* KBKU21. Cells of *Bacillus subtilis* KBKU21 showed growth promotion of baby corn and maize. The isolate accumulates certain amount of L-lactic acid with high optical activity and high organic acid selectivity at 43°C in standard kitchen refuse medium. The residue of standard kitchen refuse medium separated by centrifugation after the cultivation contained certain amount of nitrogen, phosphorous, and potassium with relatively lower C/N ratio.

When *Brassica campestris* 'Komatsuna' was cultivated with the residue after the cultivation of the isolate as soil amendment, the growth was significantly promoted compared to the experimental runs with amendment prepared using *Bacillus coagulans* T27 or *Bacillus subtilis* N3-6, both of which accumulated comparative amount of L-lactic acid.

OPTIMAL OPERATION OF MULTI-PURPOSE RESERVOIR BY CONSTRAINED GENETIC ALGORITHMS

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ABSTRACT

The aim of this study is to find a methodology to establish the optimal rule curves of reservoir operation based on a multi-purpose reservoir system. Dau Tieng Reservoir with the effective water storage of 1.58×10^9 m³ is located at the upper Saigon River. Its goals are: (1) flood control; (2) domestic and industrial demands; (3) pushing salt water intrusion for the downstream area; and (4) agriculture irrigation as economic and social aspects. We proposed the reservoir operation model using a constrained genetic algorithm where GA optimization search was constrained to fitness function by penalty function. The proposed model was formulated involving various water demands with different weighted priorities those were configured into the objective function. The penalty functions designed for various constraints integrated into objectives of operation process to perform the fitness function. The model performance was simulated for last 20 years with 1 month interval and evaluated through a generalized shortage index to water demands. The derived results of all CGA cases with associated environmental flow requirements significantly improved the efficiency and effectiveness of water supply capability to various water demands as compared to current operation. Of which, the CGA case 3 was achieved much better water releases from reservoir by small derived GSI values (0.33), smallest water shortages of environmental unmet water (0.11 m³/s) and highest water usage (63.8%). Thus, the derived results of CGA case 3 were presented as the best rule curves of reservoir operation with associated environmental flow requirement. As above-mentioned results, the CGA was evidenced as an effective and a powerful tool in optimal strategy searching for multi-purpose reservoir operations.

KEYWORDS: Objective function, water shortages, environmental requirement, Dau Tieng Reservoir, penalty function

Poster Session

P-1 DEEP SHAFT AERATION PROCESSES FOR HIGH CONCENTRATION LANDFILL LEACHATE TREATMENT AT LOW TEMPERATURE

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ABSTRACT

Abstract: In this work, a pilot-scale deep shaft aeration bioreactor (DSAB) with 110 m deep and 0.5 m diameter of managing 10-20 tons leachate per day was carried out to treatment the high concentration landfill leachate at low temperature (< 15 °C). The results showed that with the chemical oxygen demand (COD) and ammonia nitrogen (NH₃-N) concentrations of the raw leachates ranged from 4000 to 10000 mg/L and 1500 to 2200 mg/L, the removals of COD, total organic carbon (TOC), total nitrogen (TN) and NH₃-N were 67-85%, 72-93%, 55-70% and 66-94%, respectively. During this processes, nitrite accumulation may have adverse effects on the removal of the contaminants in leachate. In addition, the analysis of Gel permeation chromatography (GPC) of dissolved organic matters (DOM) in leachates before and after through the DSAB revealed that the larger molecular weight matters (0.16×10² kDa <MW<3.8×10³ kDa) were degraded into the small ones (0.07 kDa <MW<0.55 kDa).

KEYWORDS: deep shaft; aeration; landfill leachate; low temperature

P-2 PERFORMANCE EVALUATION OF NANOSCALE ZERO-VALENT IRON (nZVI) FOR HYDROGEN SULPHIDE REMOVAL IN BIOGAS FROM WASTE ACTIVATED SLUDGE DIGESTION

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ABSTRACT

Performance evaluation of nanoscale zero-valent iron (nZVI) for removing hydrogen sulphide in biogas produced during waste active sludge (WAS) anaerobic digestion was conducted in this work. Research was performed in 500-mL serum bottles under mesophilic conditions. The total amount of hydrogen sulphide in biogas during 20 days anaerobic digestion was decreased from 191.3 µg to 3.9, 0.5 and 0.3µg in the WAS without sulphate-dosing, and decreased from 2218.1µg to 88.0, 2.1 and 0.5µg in the sulphate-dosed WAS (addition of 700 mg/L of sulphate), respectively, at the rates of 0.05, 0.10 and 0.20% (wt) of nZVI. The addition of nZVI considerably decreases the ORP level from -150 to -177~-209 mV with pH ascending from 7.58 to 7.82~8.25 after 20 days anaerobic digestion in the presence of 0.05~0.20% nZVI. The bioavailability of phosphorus and biogas yield was decreased in the nZVI-dosed sludge; however, the methane yield increased in the presence of 0.05 and 0.10% nZVI. nZVI can be a high effective reagent for hydrogen sulphide removal for sulphate-rich WAS during anaerobic digestion.

P-3

SUSTAINABLE AND PROFITABLE GREENHOUSE PRODUCTION IN SALINIZED CROP FIELDS UNDER DESERTIFICATION

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ABSTRACT

In arid and semi-arid regions, the salinization of soil and groundwater has been a serious problem for agriculture, so it is desired to establish technologies for sustainable and profitable farming under salinity control. In this study, the greenhouse system based on the soil-less culture of high sugar tomatoes and the solar desalination applying the salinized groundwater was proposed and examined by the preliminary experiments. First, tomato plants were grown by applying the salinized solution of which ion composition was adjusted to that of the salinized groundwater found under the crop fields. The fruits grown with the solution resulted in 8% in Brix, this suggested that the salinized groundwater was applicable to production of high sugar tomatoes. Second, the solar desalination system unit consisted of 10 black pipes connected in a zigzag. The air introduced to the piping was heated to higher than 70 °C by the solar radiation in the fine daytime and was saturated with water vapor from the salinized solution flowing in the pipe line. This indicated that fresh water could be reproduced from the introduced air, when the condensation process occurred at outside air temperature. Thus, the greenhouse system proposed could be expected to approach to sustainable and profitable farming under desertification.

KEYWORDS: Desertification, Sustainable and profitable agriculture, Soil-less culture, High sugar tomato, Solar desalination

P-4

SHAPE AND STRUCTURE OF WATER'S EDGE IN STREAM FOR COEXISTENCE OF SEDIMENT CONTROL AND FISH HABITAT

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ABSTRACT

We have studied the improvement methods of stream, which controls sediments and conserves fish habitats. To let this study progress, we performed field works in Saigo River and Itabitsu River in Fukuoka Prefecture. In Saigo River, we monitored the riverbed shapes, materials and so on, in different two sections of the cross-sectional profile. One had flat riverbed, the other had water-route that formed by dredging. The result was that the sediment deposition rates in the water-route section were slower than in the flat section. In Itabitsu River, a nature-friendly river work was done in 2005 by about 3 times of width of a river expansion compared with the upper and lower style, by the non-fixation of the waterside and by the existing of megaliths in the water-route. We investigated the distribution of fishes and the physical property for each one time in 2005, 2008, 2009 in 3 or 4 sections repaired by different methods. The result was that the sections in which provided with non-fixed water's edge and a lot of megaliths in the water-routes had more kinds of and density of fishes than other sections. These results showed that control of the deposits sedimentation in stream could be coexistent with the conservation of the fish habitat by shape and structure of the water's edge.

KEYWORDS: Sediment control; Water's edge; Water-route; Fish habitat; Nature-friendly river work

P-5

THE ROLE OF GROUNDWATER IN SPATIO-TEMPERAL VARIATION OF WATER YIELD IN A SMALL JAPANESE FORESTED CATCHMENT

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ABSTRACT

Water yield from forested watershed is of great interest, and various studies examined the runoff processes from diurnal to annual time scales. Despite the effort, spatial and temporal variation in stream flow generation process is not well understood. In Japan, a large portion of forested area is plantation and has been abandoned for years. Recently, an effort to manage the plantation forest by thinning is gaining attention, with its consequence of increase in water yield and sediment transport. Our study site is located in a small experimental watershed with the area of about 3ha and with steep terrain, which will be thinned 50% percent of the planted vegetation and its effects will be studied. Runoff process is affected by the catchment vegetation, but also strongly controlled by the topography and belowground environment. Thus, it is important to understand the runoff process in the study watershed before analyzing the effects of thinning. In the study watershed, the water yield calculated at the upstream gauge and watershed outlet varied seasonally. During May to September, water yield from the upstream catchment was greater than the one calculated at the watershed outlet, and the remaining of the year the trend was reversed. This spatial variation in water yield suggests that the runoff process differs even within a small watershed. Here, we studied the runoff processes by measuring riparian water table, groundwater table in relation to stream flow across the watershed to understand the difference in runoff process between upstream and downstream catchments and the mechanism controlling the reversing trend.

KEYWORDS: water yield, groundwater, spatio-temporal variation

P-6

SOIL MOISTURE RETRIEVAL IN THE HEIHE RIVER BASIN BASED ON THE THERMAL INERTIA METHOD

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ABSTRACT

Remotely sensed soil thermal inertia method has been recognized as a promising means for land surface soil moisture retrieval from the early 1970's. In order to estimate the land surface soil moisture in arid regions, a real thermal inertia (RTI) model was formulated based on the heat conduction equation and an approximated energy budget equation at the land surface. Using the MODIS (moderate-resolution imaging spectrometer) land surface temperature and reflectance, the soil thermal inertia of the Heihe River Basin (HRB), China, was retrieved based on the RTI model. Further, using a thermal inertia-soil moisture model along with auxiliary data such as soil texture and bulk density, land surface soil moisture was estimated. The results were approximately verified by the observations made at three AWSs. The soil moisture in the HRB exhibits a seasonal variation with higher values in summer and autumn and lower values in winter and spring, and also exhibits considerable spatial variation with higher values in the upstream district and lower values in the downstream district.

KEYWORDS: Heihe River Basin, RTI model, Soil moisture

P-7

SOIL SALINIZATION IN A MAIZE FIELD IN THE ARID REGION OF CHINA

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ABSTRACT

In order to investigate the proceeding process of the soil salinization in a vegetated field, the monitoring of soil water content (θ) and electrical conductivity (σ_b) have been performed using TDR measurement systems since May in 2012 at the field located in a middle of the basin of the Yellow River in China, classified in a dry region. The beat and maize were cultivated at the same period in the field. From the measurement result between May 18th and July 6th, it was found that not only θ values but σ_b at the depth of 0.05 m from the surface responded very sensitive to the rainfall events comparing with other deeper measurements. The mean values of θ and σ_b in this field during June were compared from the view of the vertical profile among this year, 2008 and 2009. In the years between 2008 and 2009, the θ and σ_b were measured in the same field under the condition of maize growing. The results showed that the patterns of the θ distributions were quite similar among three years but the σ_b distribution in 2012 was different from other two years or the overall σ_b values were higher. This expressed that the increase of EC in the groundwater affected remarkably against the upper soil up to the surface.

KEYWORDS: TDR, Maize field, Soil water, Salinization

P-8

DEVELOPMENT OF THE DEM SYSTEM IN A HYDROLOGICAL MODEL TO SIMULATE THE WATER ENVIRONMENT IN THE SHIKOKU DISTRICT

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ABSTRACT

Water environment has been one of the major concerns in the Shikoku District as a factor affecting nature in the district. Detailed information for topography or land-use is urgently required to estimate such environment quantitatively. In the present study, using a topographical data set, we developed a DEM system in our hydrological model to simulate related elements. Inverse distance square method was used to resample the original data, creating a new elevation data in the DEM. It also includes sky factor derived from an original method to evaluate thermal environment. The estimated elevations were compared with measured ones for meteorological stations in the study area. The former totally agree with the latter though inconsistency was seen at some sites.

KEYWORDS: DEM, hydrological model, water environment

P-9
DEVELOPMENT OF NUMERICAL MODEL TO SIMULATE THE TEMPERATURE ENVIRONMENTS IN GREENHOUSES

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ABSTRACT

A simple numerical model was developed to simulate temperature environments in greenhouses. The model was constructed on the basis of radiation/heat budget at the surfaces of the soil and the roof. Variation in incoming radiation at each of the surfaces was approximated by a Fourier series as a boundary condition, and equations for meteorological variables were linearized in the similar manner. Surface and air temperatures were estimated in the linearized system as a function of time. To incorporate the effects of greenhouse into the model, diffusivity for heat was assumed as a function of the dimensions of the house. It was confirmed that the simulated results were roughly consistent with the observed ones.

KEYWORDS: Greenhouse, temperature environment

P-10
WATER CONSUMPTION BY TREES IN COMMUNITY FOREST SITE IN CAMBODIA

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ABSTRACT

Sap flux of a native and two alien tree species in Central Cambodia was measured in order to reveal its seasonal trends and its interspecific variation in the Monsoon Asian region. Measurements were carried out in a 10-15 year old forest both in dry season and in rainy season defined by the different rainfall patterns. The seasonal trend in ground water table depth differed from that of rainfall; ground water table depth reached zero at the end of rainy season and increase gradually at the arrival of dry season. In dry season, sap flux divided by the equilibrium evaporation (J_s/E_{eq}) of a native species, Popel (*Shorea roxburghii*) showed sharp drops at the end of dry season, but in mid rainy season in an alien species, Eucalyptus (*Eucalyptus camaldulensis*). In Popel, J_s/E_{eq} was negatively correlated with the ground water table depth, but was positively correlated in Eucalyptus, possibly due to the negative effects of flooding. The seasonal variation in sap flux was as large as its intraspecific variation, which was a major controlling factor for tree-level water uptake in this young forest site. In conclusion, the transpiration characteristics of this forest were species-specific and explained by the dynamics of ground water table depth, rather than the arrival of rainy/dry season defined by rainfall events.

KEYWORDS: Community forest, flooding, ground water, interspecific comparison, Monsoon Asia, sap flux, soil drought

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PREPARATION OF ALLOPHANE USING SILICA AND ALUMINUM SOURCE EXTRACTED FROM INCINERATED SOLID WASTE SYNTHESIS

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ABSTRACT

In this research, we investigated the ability to synthesize both zeolitic materials and allophane from incinerated solid waste of a municipal incineration plant. The incinerated solid wastes were ground into small particles by using ball-mill grinder for 15 minutes and mixed thoroughly. The mixtures of ground sample with particle sizes of under 75 μ m (200-mesh sieve) (3.3 ~ 30 g) and NaOH solution with different concentrations (1, 2, and 5 M) at determined ratios (1:10, 1:20, and 1:30 g/ml) were reacted at different temperatures (100, 150 and 200 °C) for different reaction times (1 ~ 9 days) in autoclave system. 15 experimental cases with different conditions were examined. The reacted solution was then filtered through a membrane of 0.45 μ m. The obtained products include the solid residue and the residual Si-rich solution. The solid residues containing the synthesized zeolitic materials were washed with distilled water several times and dried at 100 °C for 1 day.

The concentrations of Si, Al and Na in the sodium silicate solution extracted from water-cooling incinerated solid waste were measured by X-ray fluorescence spectrometer. The results were 1,710; 6.2 and 45,000 mg/l, respectively. The sodium silicate solution was diluted 10 times. Aluminum chlorite hexahydrate (AlCl₃.3H₂O) was added to the solution until the mole ratio of Si/Al reached 0.75 and then the mixture was stirred vigorously for 1 hour. The final solution displayed pH value of around 13. A solution of 1 N HCl was added at the speed of 0.3 ml/min to bring the pH of the solutions to 4 and 5. The solutions were heated at 96 °C for 7 days. After being cooled to room temperature, the suspended material was flocculated by using 0.1 N ammonia solution. The mixed solution was then centrifuged at 5000 rpm for 10 minutes. The collected gel was acidified with a few drops of 35 % HCl and dialyzed immediately using distilled water for 2 days. Distilled water was changed every 5 hours. The synthesized products were finally obtained by freezing-drying the dialyzed suspension for 2 days. The synthetic products were characterized by using X-ray diffraction (XRD); Fourier transformed infrared (FT-IR) spectrometry, scanning electron microscope (SEM) with energy dispersive X-ray spectroscope (EDX) and

BET nitrogen adsorption.

The results indicated that the suitable conditions for obtaining both SiO₂ extraction and synthesized zeolitic materials are 200°C of reaction temperature, 1:30 of sample/NaOH ratio, 2M of NaOH concentration, and reaction time over 24 hours. The zeolitic materials are defined such as zeolite Na-P1, tobermorite, hydroxy-sodalite, hydroxy-cancrinite and pectolite-1 A. The hollow spherical allophane was then successfully synthesized from that extracted silica solutions at pH = 4 and 5, at 97°C and for 7 days. The Si/Al mole ratios are 0.71 and 0.81, and the BET specific surface areas are 304 and 273 m²/g for allophane formed at pH = 4 and pH = 5, respectively. This study provides a simple and effective method of synthesizing allophane and zeolitic materials using cheap and abundant silica and aluminum sources from incinerated solid waste as well as from other waste ashes. The synthetic allophane and zeolitic materials can be applied to environmental treatments.

KEYWORDS: Allophane, Zeolite, Synthesis, Incinerated solid waste, Recycling

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**PREPARATION OF ACTIVATED
CARBON-ZEOLITE COMPOSITES
(AC-Z COMPOSITES) USING WATER
TREATMENT SLUDGE ASH**

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ABSTRACT

This study investigated the synthesis of activated carbon-zeolite composites (AC-Z composites) using water treatment sludge ash (SS). To prepare the precursors (i.e., silicates and activated carbon) for further synthesis of AC-Z composites, the governing conditions during alkaline fusion/carbonation processes were selected based on the specific surface area and the target zeolite species identified of the resultants. The effects of reaction time during hydrothermal and aging processes on the species formation and variation in the target AC-Z composites were studied. In addition, the performance of AC-Z composites was evaluated using heavy metals, organic dye (methylene blue), and/or their combinations.

The results indicated that, the preparation of precursors, a 3:7 SSW mix ratio (i.e sewage sludge ash/water purification sludge ash by wt %) and a NaOH/SSW=1.5 were the optimum operational conditions for alkaline fusion/carbonation process. The carbon content in zeolite ranged from 8~13%, were identified in resultant AC-Z composites. The cation exchange capacities of the AC-Z composites synthesized in this study were found ranging from 348-445meq/100g. The maximum adsorption capacity in single and mixed adsorption tests of lead, copper and methylene blue were found to outperform the commercial zeolites. The synthesized AC-Z composites were characterized by combining the hydrophobic and hydrophilic properties, thus showing the excellent adsorption efficiency for both metal ions and organic dye. This suggests the preparation of AC-Z composites by alkaline fusion/carbonation and hydrothermal processes are feasible and various applications of the resultant AC-Z composites are potential.

This work demonstrated that it is feasible and beneficial to synthesize activated carbon-zeolite composites (AC-Z composites) with water treatment sludge ash as starting silicon, aluminum and carbon sources. The results may contribute to the recycling of water treatment sludge and the production of green activated carbon-zeolite composites.

KEYWORDS: Sludge ash, Alkaline fusion,
Hydrothermal, Carbon-zeolite composites