A02: Eukaryotic communities in wastewater treatment processes as revealed by 18S rRNA gene clone library

Kengo MATSUNAGA*, Kengo KUBOTA*, Erica VONASEK*,
Yasuyuki TAKEMURA*, and Hideki HARADA*

*: Dept. of Civil and Environmental Engineering, Tohoku University

[Kengo MATSUNAGA] matsunaga@epl1.civil.tohoku.ac.jp
[Kengo KUBOTA] kengok@epl1.civil.tohoku.ac.jp

Eukaryotic communities in two different wastewater processes, a full-scale anaerobic/aerobic activated sludge process and a pilot-scale Down-flow hanging sponge (DHS) process, was evaluated by constrcting 18S rRNA gene clone library. The clones close to the member of Opercularia was found to be a dominant eukaryote in anaerobic and aerobic activated sludges, whereas the clones affiliated to phylum Arthropoda were the most predominant in the DHS sludges. Eukaryotic communities of the activated sludges as revealed by 18S rRNA gene clone library were in agreement with published data determined by microscopic observation. On the other hand, eukaryotic communities as revealed by 18S rRNA gene clone library and microscopic observation were significantly different in the case of the DHS sluges; therefore, it was suggested that both molecular and microscopic approaches need to be conducted. The molecular approach can also reveal unidentified eukaryotic gene sequences, which might be important for understanding wastewater treatment processes.

A03: Microbial community structure analysis of landfill leachate-treating reactor by using molecular and cultivation techniques

ISHIKAWA Ayumi*, SHIBUYA Sachiko*, TAMAKI Hideyuki**,HARADA Hideki*, and KUBOTA Kengo*

*Department of Civil and Environmental Engineering, Tohoku University, Japan
**Bioproduction Research Institute, AIST, Japan

[Kengo KUBOTA]kengok@epl1.civil.tohoku.ac.jp

Microbial community structure of a landfill leachate-treating nitrifying reactor was investigated by using molecular cloning and cultivation techniques. The most dominant phylum in the community was the Proteobacteria, which covers 65% of the clone library. In addition, candidate division TM7, OD1, and TM6 were also found as major groups. Clones close to the microorganisms capable of degrading persistent organic matters and of oxidizing ammonia and nitrite in marine environments were retrieved. Total 312 strains were isolated from agar- and gellan gum-based media, in which the isolates close to PAH degraders were obtained. Furthermore, phylogenetically novel microorganisms were also isolated.

A04: Analysis of bacterivorous protozoa in the natural environment

Kanji NAKAMURA *, Masashi SUTO **

* Dept. of Civil and Environmental Engineering, Tohoku Gakuin University
** Suiki technos corporation

[Kanji NAKAMURA] knaka@tjcc.tohoku-gakuin.ac.jp

Bacterivorous protozoa in the Hirose River were enriched with prey bacteria and analyzed. Additional analyses were also carried out by using spring water, groundwater, and soil extract as other sources of protozoa. Although Cupriavidus bacterium was mainly used as prey, other three bacteria that belong to genus Pseudomonas, Bacillus, and Rhodcoccus were also used. Protozoa that ingested bacteria were observed at all sampling stations along the river. In most cases, protozoa that clasified to Chrysophyceae were observed despite of prey bacterial strains. The same type of protozoa were appeared when the other environmental samples was used. These results suggest that Chrysophyceae may play an important role as predator of bacteria introduced in the natural environment.

A05: Development of novel aluminum-based coagulant for effective virus removal

SHIRASAKI Nobutaka*, MATSUSHITA Taku*, MATSUI Yoshihiko*, OSHIBA Atsushi*

*: Division of Environmental Engineering, Faculty of Engineering, Hokkaido University, JAPAN

[SHIRASAKI Nobutaka] nobutaka@eng.hokudai.ac.jp

A novel aluminum-based coagulant for effective virus removal was developed in the present study based on the investigation of roles of the basicity, sulfate ion and aluminum speciation in coagulation of virus. The coagulation process with the novel aluminum-based coagulant effectively removed viruses compared with other aluminum-based coagulants, and achieved apporimately 6-log removals not only in the weakly acidic and neutral pH conditions but also weakly alkaline pH conditions. In addition, Al13 and Al30 polymers were detecteded by electrospray ionization mass spectrometry and 27Al-NMR spectrometry in the novel aluminum-based coagulant. Accordingly, Al13 and Al30 species are probably dominant species to control the virus removal performance, and that lead effective removals of viruses in the coagulation process with novel aluminum-based coagulant even in the weakly alkaline pH condition.

A06: Effect of Pre-chlorination on Ceramic Membrane Fouling Caused by Algal Organic Matter

Tetsuya YAMAKI*, Jae-Lim LIM**, Yasunori YOSHIHARA***, Hitoshi YONEKAWA***, Tatsuo OMURA*

*:Dept. of Civil and Environmental Engineering, Tohoku University
**:Korea Water Resources Corporation
***:METAWATER Co., Ltd.

[Tetsuya YAMAKI] yamaki-tt@n-koei.jp

Algal organic matter (AOM) is one of the factors causing membrane fouling in microfiltration, and pre-chlorination can control membrane fouling by AOM. To evaluate effect of pre-chlorination on membrane fouling by AOM in ceramic membrane treatment, chemical characterization and molecular weight distribution before and after pre-chlorine treatment (1-8 mg･L-1) were analyzed. As a result, concentrations of DOC and neutral sugar increased in all chlorination conditions, while those of protein after chlorination at 4-8 mg･L-1 decreased. Moreover, molecular weight distribution showed that main peak shifted from 7.5 kDa to 5.2 kDa after chlorination. In microfiltration test, all chlorine treatment (1-8 mg･L-1) reduced the membrane fouling. From these results, it is suggested that membrane fouling by AOM was controlled by chlorination because it denatured AOM and varied flock size.

A07: EFFECT OF PRE-COAGULATION CONDITION ON CERAMIC MEMBRANE FILTRATION

MURATA Naoki*,**, AOKI Nobuhiro**, LI Fusheng*, YONEKAWA Hitoshi***, MOTOYAMA Nobuyuki**

*:Graduate School of Engineering, Gifu University, JAPAN
**:R&D Center, METAWATER Co.,Ltd., JAPAN
***:Engineering Division, METAWATER Co.,Ltd., JAPAN

[MURATA Naoki] murata-naoki@metawater.co.jp
[LI Fusheng] lifs@gifu-u.ac.jp

Application of membrane filtration processes in large-scale water treatment facilities has expanded in recent years. In particular, they are increasingly used for surface water treatment (river and lake waters) rather than for groundwater treatment. Generally, coagulation is used to remove colloidal and suspended particles in surface water, but the effects of coagulation, which is a pre-treatment process in membrane filtration, on membrane fouling are scarcely reported. In this research, we studied the effect of coagulation as a pretreatment process of the ceramic membrane filtration system, with the focus being concentrated on investigation of the effect of Gt value of coagulation through experiments of membrane filtration after precoagulation. The results indicate that; the difference in the increase rate of transmembrane pressure depends on the Gt-value of coagulation. The optimum Gt values seem to be existent in the range of 20,000-50,000. Optimization of the Gt-value contributes to suppression of the increase rate of the transmembrane pressure, reduction of the coagulant dosage and reduction of pH control chemicals.

A08: Composition Analysis of Aluminum-Philic Organic Matters Isolated from Capsule of Microcystis aeruginosa

NISHIMURA Naoki*, ITO Hiroaki**, YAMAKI Tetsuya*, MASAGO Yoshifumi* and OMURA Tatsuo*

*:Department of Civil and Environmental Engineering, Graduate School of Engineering, Tohoku University, JAPAN
**:Department of Food, Life and Environmental Sciences, Faculty of Agriculture, Yamagata University, JAPAN

[NISHIMURA Naoki] nishimura@water.civil.tohoku.ac.jp
[ITO Hiroaki] ito@tds1.tr.yamagata-u.ac.jp

Microcystis aeruginosa is a bloom-forming cyanobacterium which causes coagulation inhibition in drinking water treatment. Previous studies on algal organic matters (AOM) of M. aeruginosa, especially on its capsule, have suggested that AOM inhibit coagulation with polyaluminum chloride by forming complex with aluminum in coagulant. In this study, organic matters having high affinity with aluminum ion were isolated from the capsule of M. aeruginosa using affinity chromatography. Molecular size fractionation analysis on isolated organic matters showed no protein peaks and one saccharides peak. This saccharides contained glucose, mannose, and an acidic saccharide. Acidic saccharides have carboxylic radicals in its molecular structure, which enhances adsorption of the saccharides to metals. These results suggested that carboxylic radicals within acidic saccharides of M. aeruginosa capsule form complexes with aluminum ion and inhibit coagulation.

A09: Removal Performances of Estrogens by Aquatic Plants

INAGAKI Yoshihiko*, FUJITA Taishiro*, REIS Andre Rodrigues dos*, SUZUKI Shima* and SAKAKIBARA Yutaka*

*: Deptartment of Civil and Environmental Engineering, Graduate school of Creative Science and Engineering, Waseda University, JAPAN

[SAKAKIBARA Yutaka] sakaki@waseda.jp

In order to clarify the removal performances of estrogens by aquatic plants, experimental studies were conducted using four species of aquatic plants (Ceratophyllum demersum, Riccia fluitans, Spirodela polyrhiza and Limnobium laevigatum) and six enzymes (soluble peroxidase, ionicaly cell wall-bound proxidase, covalently cell wall-bound peroxidase, laccase, polyphenol peroxidase and glutathione-S-transferase) extracted from the plants. Estrone (E1), 17β-estradiol (E2) and 17α-ethinyl estradiol (EE2) were target compounds. It was found that estrogens were efficiently removed by plants as well as by peroxidase and hydrogen peroxide inside plants. Compared with a mathematical model developed based on an assumption of mass transfer diffusion limitation, removal rates of estrogens by aquatic plants were considered to be governed by mass transfer rates of estrogens in liquid film.

A10: Self-development of the treatment performance of multi stage vertical flow constructed wetlands working for two years

NAKANO Kazunori*, CHIGIRA Junki**, NAKAMURA Kazunori***, YANO Tokuo***, NISHIMURA Osamu**

*:College of Engineering, Nihon University, JAPAN
**:Graduate school of Engineering, Tohoku University, JAPAN
***:Graduate school of Life Sience, Tohoku University, JAPAN

[NAKANO Kazunori] knakano@civil.ce.nihon-u.ac.jp

Water quality in the multi stage vertical flow constructed wetland treating livestock wastewater was monitored and its treatment performance for two years after start-up was evaluated. Although the performance for the first year was affected by the seasonal variation of water temperature, the treatment capacity during winter season was improved significantly at second year, resulting in robust annual treatment performance of the second year. It suggested that the first year's performance of constructed wetland reflected the adapting process to the regional climate condition and the robust developped performance appeared from second year. Based on the treatment performance obtained for second year, the basic treatment unit for BOD, SS, TKN, T-N and T-P was determined as 26.2g-BOD/m2・d, 21.0g-SS/m2・d, 1.60g-TKN/m2・d, 1.55g-T-N/m2・d and 0.36g-T-P/m2・d, respectively.

A11: Resource-Saving Rice Cultivation with Circulated Irrigation of Treated Wastewater

MURAMATSU Ayumi*, WATANABE Toru**, SASAKI Atsushi***, ITO Hiroaki**, KAJIHARA Akihiko**

*: Department of Science of Bioproduction, Graduate School of Agricultural Sciences, Yamagata University
**: Department of Food, Life and Environmental Sciences, Faculty of Agriculture, Yamagata University
***: Laboratory for Instrumental Analysis, Faculty of Engineering, Yamagata University

[WATANABE Toru] to-ru@tds1.tr.yamagata-u.ac.jp

An experiment of rice cultivation with circulated irrigation of treated municipal wastewater in a closed system simulating paddy field was conducted as a feasibility study of resorce-saving cultivation with reduced amounts of irrigation water and fertilizer. In this system, surface water always infiltrate paddy soil, is drained from culvert at the bottom and then return to the surface. Rice growth, yield and its quality such as taste and metal contents were compared between two runs, (1) circulating treated wastewater diluted by the same volume of river water and (2) circulating only river water. In Run 2, chemical fertilizers containing nitrogen, phosphorus and potassium were applied to the system according to the costumary practice. In Run 1, treated wastewater could supply the required amount of nitrogen, while deficiencies of phosphorus and potassium were covered by chemical fertilzers. The result of experiment demonstrated that there were no significant differences in rice growth, yield and its quality between two runs, indicating negligible effect of circulated irrigation of treated wastewater on rice cultivation. However, in both runs, overgrowth of rice and low score of its taste were found probably because nitrogen was not lost by runoff in the closed system.

A12: Reduction of Nutrient Leaching Losses by using a Catch Crop during a Fallow Period following Eggplant Production in a Greenhouse

MAEDA Morihiro*, NAKASONE Yasuhiro**, OKAMOTO Takashi***, ASANO Yuichi****, FUJIWARA Taku*****, NAGARE Hideaki* and AKAO Satoshi******

*: Graduate School of Environmental and Life Science, Okayama University
**: Koa Kaihatsu Corporation LTD
***: Hiroshima City
****: Oyo Corporation
*****: Agriculture Unit, Research and Education Faculty, Kochi University
******: Graduate School of Engineering, Tottori University

[Morihiro MAEDA] mun@cc.okayama-u.ac.jp

Greenhouses are usually irrigated after cropping to remove accumulated salts in the topsoil. Nitrate remained in the soil is reported to be transported to groundwater due to the irrigation, resulting in high nitrate concentration in ground or surface waters. The present study evaluated the effect of a catch crop (dent corn) on leaching losses of nitrogen and phosphorus during a fallow period (catch crop cultivation, salt removal irrigation and reductive soil disinfection) in a farmer's eggplant greenhouse in Okayama, Japan, in 2010 and 2011. Nitrogen leaching was greatly reduced owing to the nitrogen uptake by the catch crop with compared to the control ($p < 0.01$). Differences of nitrogen losses during the fallow period between treatments were 12.2 g m-2 in 2010 and 5.4 g m-2 in 2011, probably due to different contents of mineral nitrogen remained in the soil after eggplant harvests. On the other hand, phosphorus leaching was not significantly different between treatments ($p > 0.05$). The effect of phosphorus uptake by the catch crop may be masked because of the large amount of mineral phosphorus accumulated in the soil. Our results clearly showed that catch crop growth during a fallow period reduced nitrogen leaching in the eggplant greenhouse.

A13: Rapid vermicomposting of fresh fruit and vegetable wastes using earthworm Eisenia foetida

Kui HUANG*, Fusheng LI**, Jiefeng LI*, Denny HELARD*, Kayako HIROOKA**

*Graduate School of Engineering, Gifu University, Japan
**River Basin Research Center, Gifu University, Japan

[Fusheng LI]lifs@gifu-u.ac.jp
[Kui HUANG]q3812102@edu.gifu-u.ac.jp

The aim of this study was to evaluate the feasibility of rapid vermicomposting of different fresh fruit and vegetable wastes (FVWs) including banana peels, cabbage, lettuce, potato and watermelon peels using earthworm Eisenia foetida. For this, the changes of physicochemical properties, microbial profiles and earthworm biology were comprehensively evaluated after vermicomposting for 4 weeks. Compared to controls (without earthworms), vermicomposting caused reductions of the total carbon content by 42.7–52.4% and the carbon to nitrogen ratios by 46.5–61.1%, and increases of the electrical conductivity by 6.7–69.4% and the total phosphorous content by 4.0–52.0%. Vermicomposting revealed a higher microbial activity, density and diversity in end products than controls. The vermicomposting treatment for FVWs allowed a high growth rate of earthworms and an increased number of cocoons. Similar microbial community structures were observed in all vermicomposts, indicating a high degree of bio-stabilization and maturity. The results suggest that rapid vermicomposting is a feasible technology for converting fresh FVWs into valuable products and that the quality of vermicomposts is strongly associated with the properties of initial substrates.

A16: The performance of poly butylene sucinate-co-adipate (PBSA) degrading bacteria inoculation in compost

Satoru OCHIAI*, Keiko KATAYAMA-HIRAYAMA*, Kimiaki HIRAYAMA*, Hidehiro KANEKO*

*:Interdisciplinary graduate school of medicine and engineering, University of Yamanashi

[Hidehiro KANEKO]kaneko@yamanashi.ac.jp

This paper presents the degradation ability of selected strains on poly butylene succinate-co-adipate (PBSA) in culture medium and compost. Thirty four strains of PBSA degrading bacteria were isolated from compost and activated sludge, and six of them were used as inocula for the experiments to investigate PBSA degradation ability in compost. The results revealed that bacteria inoculation could accelerate the PBSA degradation. Two strains (Acinetobacter sp. Strain.S49 and Acinetobacter sp. Strain.S6) showed high ability of degrading PBSA in compost, whereas the other four strains showed minor effects. Based on the findings in this work, the importance to investigate the ability of PBSA degrading bacteria not only using pure culture medium but also using multi-microbial community such as compost was indicated.

A17: Assessment of Impacts of Natural Disasters on Water Supply Utilities using hazard maps

YOSHIKAWA Yasuyo*, YABE Hiroyasu*, KOIKE Makoto*, MORIMOTO Tatsuo*, OGUMA Kumiko**, ARAMAKI Toshiya***, TAKIZAWA Satoshi**

*:Pacific Consultants Co., Ltd., JAPAN
**:Department of Urban Engineering, the University of Tokyo, JAPAN
***:Department of Regional Development Studies, Toyo University, JAPAN

[YOSHIKAWA Yasuyo] yasuyo.yoshikawa@ss.pacific.co.jp

In Japan, we have been severely damaged by natural disasters. Recently, the disasters caused by climate change are also expected. In order to take effective and efficient measures such as broad disaster prevention plans and business continuity plans against such natural disasters, the authors developed 'Water Supply Hazard Map' which can visualize the information of the water supply utilities and their risks, by which we can estimate impacts of disasters in each basin widely and integratedly. Furthermore, the developed 'Water Supply Hazard Map' was applied to Kino river basin and Oyodo river basin. As a result, each impact of the municipalities on water supply utilities such as water intake points, water treatment plants, and affected population could be quantitavely assessed using the indicators such as the seismic intensity levels of the earthquake and the inundation levels of tsunami flood. In addition, differences of the two basins were estimated and it turned out that the affected population in Oyodo river basin was larger and more concentrated in a few specific cities than
those in Kino river basin.

A18: Study on Galvanic Corrosion of Service Pipes for Water Supply

Satoshi TAMURA* **, Akihito KIBUSHI*, Tomoki MASUKO*,
Toyono INAKAZU**, Akira KOIZUMI**

*:Tokyo Metropolitan Government, Waterworks Bureau
**:Graduate school of Urban Environmental Sciences, Tokyo Metropolitan University

[Satohi TAMURA] tamura-satoshi@waterworks.metro.tokyo.jp

The corrosion of bronze joints – used with stainless steel pipes and many of which remaining in the ground – has been one of the causes of water leakage. Therefore this paper evaluates the progress of galvanic corrosion between stainless steel pipes and bronze joints-equipped pipe to soil potential. First, we measured spontaneous potential of four metals used for service pipes and distribution pipes in six kinds of soil at a laboratory. The result showed that each spontaneous potential varied considerably with passage of time, then the order of the potentials was approximately SUS316 > bronze > lead > ductile cast iron, after four hundred days. In addition, we measured pipe to soil potentials and maximum corrosion depths of 318 pieces of stainless steel service pipes dug mostly in Tokyo area. The result showed that the proportion of corroded bronze joints and the maximum corrosion depth increases with an increase in pipe to soil potential.

A19: Study on Integrated Simulation Model for the Chlorine Residuals Decrease in Water Distribution System

YAMAGUCHI Takashi*, INAKAZU Toyono*, KOIZUMI Akira*,
ARAI Yasuhiro*, TAMURA Satoshi**, KITAZAWA Hiroyoshi***

*:Dept. of Civil and Environmental Engineering, Tokyo Metropolitan University, JAPAN
**:Graduate School of Urban Environmental Sciences, TMU / Tokyo Metropolitan Waterworks, JAPAN
***:Tokyo Metropolitan Waterworks, JAPAN

[YAMAGUCHI Takashi] yamaguchi-takashi@ed.tmu.ac.jp
[INAKAZU Toyono] inakazu@tmu.ac.jp

One of important subjects on water quality management is to control and to reduce the chlorine residuals concentration in water transmission and distribution systems. The purpose of this study is to devise an integrated simulation model for the fluctuation of chlorine residuals concentration in the distribution system. We used a field survey data in order to device the useable chlorine residuals decrease model in actual facilities.

First, we developed an integrated simulation model to estimate the chlorine residuals at the distribution reservoir exit using 5 explanatory variable. Secondly, we devised estimation model for the chlorine residuals in distribution area to apply the GIS for tap water using the chlorine residuals at the water supply station exit caluculated on the above-mentioned model as a input value. Finally, we evaluated the reduction of chlorine residuals in the sevice pipe branched from the distribution pipe compared the chlorine residuals between the survey data and estimated value applied our model.

A20: Economic Impact for Local Industry on Changing Water Price Comparison of Two Different Cities

SUGIMOTO Yasuaki*, KOIKE Atsushi**, HOSOI Yoshihiko***

*Nippon Koei Co.,LTD, Research and Development Center
**Dept. of Civil Engineering, Kobe University
***Dept. of Social System Engineering, Tottori University

[SUGIMOTO yasuaki] a6433@n-koei.co.jp

The difference of the unit price of water used has been focused. Since water pricing has some effects on the local economic development, it is important to set an appropriate water price considering the amount of water used in different type of industries. In this study, a statistical approach has been performed to examine the relationship between unit price of water use and area characteristics such as the rate of manufacturing business amount, immigration of laborers and management of sewerage system. In addition, a local economic model that includes the manufacturing industries and households has constructed. In terms of economic welfare, it is desirable to reduce unit of water price in the local area which is depended on the manufacturing industries.

A21: Behaviors and risk assessment of anti-influenza virus drugs in upstream section of Neya River

Ryohei TAKANAMI*, Shogo TANIGUCHI*, Shintarou HAYASHI*, Rabindra Raj GIRI**, Hiroaki OZAKI*

* Dept. of Civil Eng., Osaka Sangyo University, JAPAN ** New Industrial R & D Center, Osaka Sangyo University, JAPAN

[Ryohei TAKANAMI] r-nami@cnt.osaka-sandai.ac.jp

Newly developed simultaneous extraction and quantitation methods for oseltamivir phosphate (OP), oseltamivir carboxylate (OC) and zanamivir hydrate (ZH) were used to monitor the drugs in upstream section of Neya River water in Osaka during the last three consecutive influenza seasons (2009/2010, 2010/2011 and 2011/2012). High concentrations of the drugs (particularly for OC) were observed in the water in the three seasons. Influenza index values, defined as average number of reported influenza cases per hospital within the coverage area during a week, were also calculated. Strong direct correlations between the index values and measured drug concentrations in the water (particularly for OC) indicated that influenza index values may be used in estimating concentrations of anti-influenza drugs in receiving waters in seasonal influenza. An ecological risk assessment indicated that the antiviral drugs at concentrations observed in Neya River water may not have negative impacts to the environment except in pandemic influenza cases. These findings can be a useful reference for other similar cases and for further investigations.

A22: Attenuation of Pharmaceuticals and Personal Care Products in a Bypass Channel and River

Seiya HANAMOTO, Hiroki SUGISHITA, Norihide NAKADA, Naoyuki YAMASHITA, Hiroaki TANAKA

Research Center for Environmental Quality Management, Kyoto University

hanamoto@biwa.eqc.kyoto-u.ac.jp

In order to mitigate the pollution of the river water attributed to the urban wastewater discharged from the middle part of Yodo river basin, bypass channel system with river water treatment facilities was equipped at Yodo River basin. In this study, attenuation of 53 pharmaceuticals and personal care product (PPCPs) were clarified both in the Yodo river bypass channel system and the river by the field survey and these two were compared considering several scenarios for the system operation in order to evaluate the utility of the Yodo river bypass channel system. As the result, attenuation of PPCPs in the Yodo river bypass channel system was suggested to be comparable to that in the river line or smaller than that in the case of expansion of inflow and area covered by the channel, due to photolysis by sunlight and adsorption to the sediment in the river line.

A23: Effect of habitat condition and fine particulate sediment on oxygen consumption rate in a river floodplain

OKADA Shiena*, ITO Jun*, YOSHIMURA Chihiro*, MASUYAMA Takaaki*, and FUJII Manabu*

*Dept. of Civil Engineering, Tokyo Institute of Technology

[OKADA Shiena] okada.s.ac@m.titech.ac.jp

In this study, we investigated i) relationship between habitat type and qualitative and quantitative characteristics of deposited sediment and (ii) the characteristics of deposited sediment and respiration activity of the sediment as determined by oxygen consumption rate in a floodplain of the Tagliamento River. Field observation indicated that C/N ratio and size of sediment increased in upstream-connected backwater and main stream, while habitats with high abundance of trees provided high density of fine particulate sediment (FPS) as well as high content of fine particulate organic matter (FPOM). We confirmed that the FPS density and FPOM content have strong correlation with dissolved oxygen consumption rate, suggesting that the oxygen consumption rate in water column is influenced by habitat type and quality and quantity of sediments.

A24:

Sort-Term Chronic Toxicity Test of Three Aquatic Organisms Applied to First Class River in Japan

Junpei MORITA*, Yusuke YASUDA*, Keiichiro KAGOTA*, Ikumi TAMURA*,Norihisa TATARAZAKO** and Hiroshi YAMAMOTO***

*Graduate School of Integrated Arts & Sciences, University of Tokushima,
**National Institute for Environmental Studies
***Institute of Socio, Arts, and Sciences, Graduate school of the University of Tokusima

(Junpei MORITA)c101241022@tokushima-u.ac.jp
(Hiroshi YAMAMOTO) hiroshi@iastokushima-u.ac.jp

Various chemical substances are used in our industrial, agricultural, and daily activities, and are continuenly discharged into the environment. Several toxic chemical substances have been detected from wastewater and surface water, and their additive or synergistic effects have become growing concerns. Thus, there is an apparent limitation in the risk assessment and management based on the individual chemical assays. In the present study, 28 samples were collected at first class rivers in Japan between October 2011 and April 2012. We conducted the short term chronic toxicity test using fish, daphnia and algae of the USEPA's whole effluent toxicity (WET) method to evaluated the toxic effects of the river water samples, and investigated distribution and trend of the toxicity all over Japan. As results, the significant growth inhibition for green algae (Pseudokirchnerella subcapitata) was found from three samples. The significant mortality and reproductive effects were found for Ceriodaphnia dubia from eight samples. The significant inhibition of hatching and survival was found for zebra fish (Danio rerio) from four samples.

A25: One consideration about application of the rubble bed protection work concrete block to fishway works and flood control function

Takahide HONDA*, Shuichi ASARI** , Junichi AKINO*, Koji TAKAZAWA*, Kiyomitsu TAKASHIMA**, Hiroshi KOBAYASHI**

*:Kyowa Concrete Industry Corporation Engineer Department
**:Kyowa Concrete Industry Corporation Technical Research Center

[Takahide HONDA] honda.t@kyowa-concrete.co.jp
[Shuichi ASARI] asari.s@kyowa-concrete.co.jp

The rubble fishway works are attracted attention from the viewpoint of restoration of river environment because it make migration path of various aquatic creatures possible by creating various flow field and create satisfactry river landscape and adopt landscape of periphery. But, design technique of the rubble fishway works which used a native rock is not established and there are many problems. So, in this research, We installed the rubble bed protection work concrete block imitated gravel materials of natural river with grade 1/10 and 1/20, and We did hydraulic model experiment and the going up experiment that used Tribolodon hakonesis, Gnathopogon elongatus, Eriocheir japonica etc. As a result I confirmed going up of all genus of a creature used for experiment with longitudinal slope 1/10 that were severe condition as the rubble fishway .And We suggested the hydrology equation that could do simply examination about going up of fishes by observation data of flow velocity and water depth with hydraulic model experiment. Further I confirmed energy dissipating effect as low pitch falling works because roughness modules of an artificial stone became big value.

A26: EFFECTS OF VELOCITY ON SWIMMING BEHAVIOR OF A QUINTET OF AYU

Kouki ONITSUKA(1), Juichiro AKIYAMA(1), Kazuya MIHARA(1), Bin SHIRAOKA(1)

(1):Civil Engineering, Kyushu Institute of Technology

[Kouki ONITSUKA] onitsuka@civil.kyutech.ac.jp

Swimming behavior of a school of fish in running water has not been investigated. Recently, Onitsuka et al. investigated on the swimming behavior of isolated or a couple of fish in running water. In this study, the swimming behavior of a school of ayu, consinting of 5 fishes, in running water was investigated. It was found that the streamwise length of a school increases and the spanwise length of that decreases with an increase of the flow velocity and also that the swimming speed in the streamwise direction increases with an increase of the flow velocity. The turning angle of swimming trajectory decreases with an increase of the flow velocity. The individual distance becomes larger when the velocity is increased.

A27: EFFECTS OF HORIZONTAL FORM OF POOL-AND-WEIR FOSHWAY ON MIGRATION CHARACTERISTICS OF FISH

Kouki ONITSUKA*, Juichiro AKIYAMA*, Koichiro MATSUDA**,
Saori KURAMOTO*, Shohei NOGUCHI*

*:Civil Engineering, Kyushu Institute of Technology, Japan
**:Toyo construction, Japan

[KURAMOTO Saori] K.saori0607@gmail.com

Fishways have been constructed to facilitate migration of fish past dams, waterfalls and rapids. It is necessary to understand appropriate geometrical shape of the fishway. The most of fishway in Japan is pool-and-weir fishway. In order to get high value of migration rate, it is necessary to set up pool length is larger than width of pool. However there is little information of effects of the form of the pool on migration rate from other than a rectangle. In this study, the form of the pool in a pool-and-weir fishway was changed 3 patterns and the discharge in each form was changed. It was found that the form of pool affects on the migration route.

A28: Relationship between the distribution points of sand containing difficult-to-settle fine particles and the geological structure in an area upstream from a dam: The case study on Hitotsuse Dam Basin, Miyazaki

MURAKAMI Toshiki*, SUZUKI Yoshihiro**, OISHI Hiroyuki***, NAKAO Toshio****

*:Technical Dept., Miyazaki Branch, Kyusyu Electric Power Co., Inc., JAPAN
**:Dept. of Civil and Environmental Engineering, Miyazaki University, JAPAN
***:Investigation and Analysis Engineering Dept., West Japan Engineering Co., Inc., JAPAN
****:Dept. of Biological Production and Environmental Science, Miyazaki University, JAPAN

[SUZUKI Yoshihiro] suzuki@civil.miyazaki-u.ac.jp

Through a soil survey, the authors collected soil samples from different strata at locations where landslip had occurred in the upstream area of a dam reservoir suffering from long-term turbidity. And soil specimens that might be responsible for accelerating the turbidity were obtained from the soil samples, using a simple suspension method. The soil specimens were categorized into four risk levels, indicating their degree of turbidity. Further, we prepared a detailed geological block diagram, which specifies different geological structures based on metamorphic grades. As a result, it was found that there was a significant correlation between the distribution of geological structure and the locations where high-risk-level soil samples were collected. This information is useful for determination of the distribution of soil structure at specific locations where there is soil causing turbidity, contributing to effective countermeasures for long-term turbidity in dam reservoirs.

A29: Factor Analysis of High Turbidity Phenomenon in Ogouchi Reservoir Caused by the Suspended Matter Inflow During Heavy Rain

Kimiko YAMAZAKI 1, Michihiko MURAYAMA 1*, Akira KOIZUMI 1,
Katsuhide YOKOYAMA 1, Hideyuki AOKI 2, Tomoe IWAMOTO 2

1:Dept. of Civil and Environmental Engineering, Tokyo Metropolitan University
2:Bureau of Waterworks Tokyo Metropolitan Government

[Michihiko MURAYAMA] murayama-michihiko@tmu.ac.jp

Following periods of heavy rain from severe storms and typhoons, water with high turbidity and high levels of suspended matter flows into reservoirs from watershed areas. High turbidity levels may continue to persist for some time. Furthermore, when reservoir water turns cloudy, it can disrupt water purification system and resources for an extended period. This paper, as basic research, measures the movement of high turbidity water through Ogouchi Reservoir in order to control water quality by releasing high turbidity water during heavy rains. We compare suspended solids between normal conditions and periods of high turbidity, and this analysis of suspended solids that flow into the reservoir during rainfall forms the basis of our data. We discuss the causes of turbidity and consider its influence. As a result, we show that the high turbidity in the reservoir is due mainly to clay particles with the size of less than 5μm. Moreover, we confirmed that the suspended solids contain certain amount of phosphorus which is consisted mainly of phosphate ion.

A30: Seasonal Change and Trap of Dissolved Silicate in Hyugami Reservoir

Hiroshi KUMAGAI*, Yuko ISHIBASHI*, Yoshito TANAKA*,and Hiroshi Matsuo**

* Fukuoka Institute of Health and Environmental Sciences, JAPAN
**:Fukuoka Foundation for Sound Health, JAPAN

kumagai@fihes.pref.fukuoka.jp

We estimated seasonal changes in the dissolved silicate (DSi) in Hyugami reservoir in Fukuoka prefecture by field surveys, and also calculated trap values. DSi concentrations in surface water decreased in periods of diatom blooms from spring through autumn, while the concentrations in bottom water increased from one to three months after the blooms. In winter, the breakdown of thermal stratification led to homogenized DSi values throughout the whole water. These seasonal changes altered concentrations in the outflow water as well. From spring through autumn, concentrations in outflow tended to be lower compared to those of the inflow. Conversely, the concentration of outflow in winter tended to be higher than that of the inflow. This regression from bottom water in winter reduced DSi traps through the year. Material balance analysis revealed that the DSi trap values in Hyugami reservoir in FY2010 and FY2011 were −2.0% and 10.9%, respectively. We estimated that the DSi trap for the full-year was 5.2%.

A31: Effect of Food Source on the Growth of Nuttallia olivacea

MARUO Chikako*, FUJIBAYASHI Megumu*, AIKAWA Yoshio* and NISHIMURA Osamu*

*:Department of Civil and Environmental Engineering, Tohoku University, JAPAN

maruo@tech.eng.tohoku.ac.jp

Bivalve is one of the representative animal of tidal flat. The objective of this study is to clarify the effect of food source affecting growth of bivalve (Nuttallia olivacea) . Carbon stable istope (SI) , composition of fatty acid (FA) and fatty acid specific stable carbon isotope (FA-SI) . In the result, SI of the bulk sample indicated main food sources roughly. However the composition of FA revealed that EPA and DHA were useful nutrients for bivalve. Furthermore, FA-SI showed terrestrial EPA and DHA are more important food source. Therefore, it was considered FA-SI analysis was useful to clarify food web of various ecosystem.

A32: Quantification of enteric viruses and microbial indicators in Ishinomaki coastal area

HATA Akihiko*, INABA Manami*, KATAYAMA Hiroyuki*, FURUMAI Hiroaki*

*:Dept. of Environmental Engineering, Graduate School of Engineering, the University of Tokyo

[HATA Akihiko] hata@env.t.u-tokyo.ac.jp

Waterborne and oyster-borne diseases are great concerns in Ishinomaki coastal area because a wastewater treatment plant was unable to utilize activated sludge process after the tsunami. In this study, we detected several kinds of enteric viruses, which are one of the most probable causes of the infection, and microbial indicators in quantitative manner. Two virus concentration methods, i.e., a novel large volume method and a conventional small volume method, were performed for a comparison purpose. Efficiencies in each of nucleic acid extraction and RT-qPCR were evaluated by internal controls. Aichi viruses and GII- and GIII-F-specific RNA phages were dominantly detected. GI- and GII-noroviruses and sapoviruses, causative agents of viral gastroenteritis, were also found. Viruses and indicators seemed to diffuse from wastewater treatment plant in both horizontal and vertical directions. The large volume virus concentration method gave higher positive ratio than the small volume method. However, the virus detection was more likely to be affected by RT-PCR inhibition. High molecular weight (>10 kDa) organic compounds which absorb 254 nm ultraviolet were assumed to be causes of the inhibition. We demonstrated distributions of pathogenic viruses in Ishinomaki coastal area as well as need for methods to relieve RT-PCR inhibition efficiently.

A33: Numerical analysis of flow field and transportation of swimming larvae in Yamaguchi Bay using three-dimensional fluid dynamics model

NOBUTA Saki*, KANNO Ariyo*, YAMAMOTO Koichi*,
TANAKA Yoji**, SEKINE Masahiko*

*:Graduate school of Science and Engineering, Yamaguchi University, JAPAN
**:Graduate School of Urban Innovation, Yokohama National University, JAPAN

[NOBUTA Saki] sakin@civil.yamaguchi-u.ac.jp

The purpose of this research is to figure out the transport mechanism of the swimming larva in Yamaguchi bay. The method of this research is the numerical analysis using three-dimensional fluid dynamics model considering drying out and flooding of the tidal flat, wind stress, and water density ,which ware not considered in the previous studies. In this calculation, it was found that the flow changes by considering these factors and that the larva is exchanged between the Minami tidal flat and east part of Naka tidal flat. This result indicates the importance of considering the wind stress and density difference in the numerical analysis.

A34: Effects of Thermal Treatment of Waste Activated Sludge and Trace Metals on the High-rate Thermophilic Anaerobic Digestion of Sewage Sludge

Masanobu TAKASHIMA*, Eri NAKAKIHARA** and Ryoko IKEMOTO**

* Dept. of Applied Nuclear Technology, Fukui University of Technology
** Graduate School of Natural Science and Engineering, Kanazawa University

[Masanobu TAKASHIMA] takasima@fukui-ut.ac.jp
[Eri NAKAKIHARA] nakaeri@staff.kanazawa-u.ac.jp

This study attempted high-rate thermophilic anaerobic digestion of sewage sludge by applying thermal pretreatment of waste activated sludge (170oC and 1hr) and trace metal addition (0.49 mg-Ni/L and 0.54 mg-Co/L). For this purpose, thermophilic anaerobic digesters were maintained at a short HRT of 10 days throughout this study. The thermal pretreatment not only increased VS and VSS destruction by 6% and 9%, respectively, but also improved dewaterability of digested sludge drastically. The trace metal addition showed negligible effect on the overall performance, except for the reduced VFA concentrations in the digested sludge with a statistical significance. DGT analyses implied that the majority of soluble Ni and a portion of soluble Co are present in a bioavailable form. Furthermore, the Co content in the influent sewage sludge was suspected to be insufficient nutritionally. Microbial analyses based on PCR-DGGE detected the archaea, Methanosarcina sp. and Methanosarcina thermophila, in the digested sludge.

A36: Comparative Survey on Characteristics of Sewage Sludge and Its Anaerobic Digestion Performance in Sewage Treatment Plants in Japan

Taira HIDAKA, Tsutomu UCHIDA

Materials and Resources Research Group, Public Works Research Institute, Japan

[Taira HIDAKA] hidaka@pwri.go.jp
[Tsutomu UCHIDA] uchida@pwri.go.jp

Co-digestion of sewage sludge and other organic wastes is a promising technology, but performance of the co-digestion might be different in different sewage treatment plants. Characteristics of sewage sludge were analyzed and its anaerobic digestion performance was evaluated by batch experiments in eight sewage treatment plants all over Japan. The methan conversion ratio of the mixed sludge was around 0.6. The TCODCr/VS and PCODCr/VSS ratios of the mixed sludge and the digested sludge were around 1.7. The effect of co-digestion with synthetic food waste was similar in different plants. These results can be used to estimate co-digestion performances in different sewage treatment plants.

A37: Study on Adsorption Behavior of the Perfluorooctanoic Acid and its Potential of Generation from Precursor during Biological Treatment Process in Wastewater Treatment Plants

Yuji SUZUKI1, Shuhei TANAKA1, Shigeo FUJII1 Chinagarn KUNACHEVA1 Masuhiro HAYASHI2 and Norimitsu SAITO3

1Graduate School of Global Environmental Studies, Kyoto University
2Graduate School of Environmental Engineering, Kyoto University
3Research Institute for Environmental Sciences and Public Health of Iwate Prefecture

suzuki@eden.env.kyoto-u.ac.jp

Main objective of this study was to examine the behavior of perfluorooctanoic acid (PFOA) during biological treatment process at WWTP by doing three laboratory-scale studies including (a) a batch adsorption experiment of PFOA onto activated sludge, (b) a semi-batch experiment to treat wastewater containing PFOA with activated sludge, and (c) a batch biodegradation experiment of 1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH) which is one of the PFOA precursors. Fresh and acclimated activated sludge were used in this study. As a result; 1) PFOA loading with synthetic wastewater into semi-batch reactor resulted in increased amount of PFOA attatched with activated sludge in the reactor. 2) At the end of the experiment with PFOA loading with real wastewater, the sum of the total amount of PFOA found in effluent and in the reactor was as much as 198% of the sum of the total amount in influent. 3) On the 8th day of 8:2 FTOH biodegradation experiment, PFOA was identified as much as 2.9% of the orginal molar concentration.

A38: contamination of perfluorinated compounds (PFCs) in seven municipal wastewater treatment plants in Bangkok, Thailand

Pattarawan CHULARUEANGAKSORN1*, Shuhei TANAKA1, Chinagarn KUNACHEVA1, Shigeo FUJII1 , Hidenori HARADA1 and Suwanna Kitpati BOONTANON2

1Graduate School of Global Environmental Studies, Kyoto University.
(Yoshida-honmachi, Sakyo-ku, Kyoto 606-8501, Japan)
2Department of Civil Engineering, Mahidol University.
(25/25 Phuttamonthon 4 Rd., Salaya, Phuttamonthon, Nakorn Pathom 731170, Thailand)

maomaona@hotmail.com

Perfluorinated compounds (PFCs) are synthetic chemical which is persistent, bio-accumulative and suspected to be toxic. Municipal wastewater treatment plants (MWWTPs) have been identified as sources of PFCs contamination in water environment. This study focused on the contamination of eleven PFCs in samples collected from seven MWWTPs and in Bangkok, Thailand. The samples were collected from major of wastewater treatment processes in order to understand the behavior of PFCs in MWWTPs. All MWWTPs used activated sludge process to treat wastewater. The result showed that Chong Nonsi MWWTPs had the highest of PFCs concentration in final effluent (63.6 ng/L). Perfluorootane sulfonate (PFOS) and perfluorootanoic acid (PFOA) were predominant PFCs detected in final effluents than other PFCs. Final effluents had higher PFCs concentration than influents of the MWWTP which indicated that conventional wastewater treatment process using activated sludge was not effective to remove PFCs. Long carbon-chain PFCs tended to adsorb on particulate phase more than short carbon-chain ones. Comparing to other countries, the effluent concentration levels of PFOS and PFOA in Thailand were lower than those in Denmark, Taiwan and Singapore. However, several PFCs were detected in MWWTPs, suggesting municipal wastewater is one of the sources of PFCs contamination in the environment.

A39: Investigation of the occurrence of N-nitrosamines and their formation potential in wastewater treatment plants

Suchul YOON, Norihide NAKADA, Naoyuki YAMASHITA, Hiroaki TANAKA

Research Center for Environmental Quality Management, Kyoto University

yoon@biwa.eqc.kyoto-u.ac.jp

The objectives of this study were to determine the occurrence and fate of N-nitrosamines in wastewater treatment plants (WWTPs: X and Y), and to evaluate formation potential of N-nitrosamines on chlorination (FPCl) and efficiency of FPCl reduction by biological treatment. We also investigated the residual FPCl in the final discharge. As the results, the concentrations of N-nitrosamines in the influent were ranged from 3 to 237 ng/L. The removal efficiencies of N-nitrosamines were ranged from 28 to 99% by biological treatment. The production rates of N-nitrosamines were ranged from 14 to 66% by disinfection. The N-nitrosamines FPCl in WWTP X were higher than those in WWTP Y, and the efficiencies of N-nitrosamines FPCl reduction by biological treatment were ranged from 2 to 94% in WWTPs X and Y. The concentrations of residual N-nitrosamines FPCl were ranged from 2 to 848 ng/L in the both WWTPs. Thus, N-nitrosamines could be produced in water purification or reclamation plants using discharge from WWTPs.

A40: Treatment Characteristics of Wastewater Containing Organic Trace Contaminants in Ozone-Added Activated Sludge Process

NISHIMURA Fumitake*, OKADA Yukiko**, MASUDA Michiko***,NAKAGAWA Yuko*, HIDAKA Taira****,FUJIWARA Taku***** and TSUNO Hirosh*,******

*:Dept. of Environmental Engineering, Kyoto University
**:Yonden Consultants Incorporated
***:Dept. of Architecture and Civil Engineering, Nagoya Institute of Technology
****:Public Works Research Institute
*****:Agriculture Unit, Natural Sciences Cluster, Research and Education Faculty, Kochi University
******Osaka Sangyo University

nishimura.fumitake.3n@kyoto-u.ac.jp

Ozone-added activated sludge process is one of the modified processes for reduction of excess sludge production. Although ozone-added activated sludge system was originally developed in order to reduce excess sludge production, it is expected that its direct ozonation to activated sludge can also remove some biorefractory compounds by chemical oxidation, and the treatment efficiency and stability can be increased as results. In this study, phenol was used as a biorefractory compound in wastewaters and behaviors of EDCs at sludge ozonation were also investigated in order to evaluate several functions of ozone-added activated sludge process. The treatment characteristics were investigated with lab scale experimental setups. It is made clear that direct ozonation to activated sludge within a range of 15 mgO3/gSS does not inhibit biological activities and biorefractory compound(phenol) is promptly removed chemically. On the other hand, the experimental case without ozonation can not remove phenol quickly and biological activity is inhibited by existence of phenol. These results suggest that the system can treat wastewaters which contain biorefractory compounds effectively and stably besides both bulking control and low excess sludge production.

A41: Enhancement of 2,4-dichlorophenoxyacetic acid removal by gene bioaugmentation of activated sludge

SODA Satoshi*, ANAMI Yasutaka*, TSUTSUI Hirofumi*,**, HASHIMOTO Kurumi*, MATSUDA Masami*, INOUE Daisuke*,***, SEI Kazunari*,***, IKE Michihiko*

*:Division of Sustainable Energy and Environmental Engineering, Osaka University, JAPAN
**:Agriculture Unit, Research and Education Faculty, Kochi University, JAPAN
***:Department of Health Science, School of Allied Health Sciences, Kitasato University, JAPAN

[SODA Satoshi]soda@see.eng.osaka-u.ac.jp

Plasmid-mediated bioaugmentation was demonstrated using sequencing batch reactors (SBRs) for enhancing 2,4-dichlorophenoxyacetic acid (2,4-D) removal by introducing Cupriavidus necator JMP134 and Escherichia coli HB101 harboring 2,4-D-degrading plasmid pJP4. C. necator JMP134 (pJP4) can mineralize and grow on 2,4-D, while E. coli HB101 (pJP4) cannot grow on 2,4-D because it lacks the chromosomal genes to degrade the intermediates. The SBR introduced with C. necator JMP134(pJP4) showed 100% removal against 200 mg/l of 2,4-D just after its introduction, after which 2,4-D removal dropped below 12% on day 7 with decline of the introduced strain. The SBR introduced with E. coli HB101(pJP4) showed low 2,4-D removal, i.e., below 20%, until day 7. Transconjugant strains isolated on day 7 from both SBRs belonged to Pseudomonas plecoglossicida and could not grow on 2,4-D. Both SBRs started removing 2,4-D after day 16, with the appearance of 2,4-D-degrading transconjugants belonging to Burkholderia sacchari.

A42: Evaluations of short-chain fatty acid degradation and electricity generation in Single-chamber Microbial Fuel Cell

KUBOTA keiichi*,**, YAMAGUCHI* Takashi, SYUTSUBO Kazuaki**

*Department of Environmental Systems Engineering, Nagaoka University of Technology
**Center for Regional Environmental Research, National Institute for Environmental Studies

[KUBOTA Keiichi] kubotak@stn.nagaokaut.ac.jp
[SYUTSUBO Kazuaki] stubo@nies.go.jp

In this study, a single chamber Microbial Fuel Cell (MFC) was applied for the treatment of synthetic wastewater with the aim of evaluations of short-chain fatty acids degradation (propionate, butyrate) and electricity generation. As the result, process performance of short-chain fatty acids (containing propionate, butyrate and valerate) fed MFC was obtained COD removal 88% and coulombic efficiency 59.9% at external resistor of 100 Ω. This performance was almost equivalent to acetate fed MFC. Furthermore, the influence of external resistance value to the performance of the MFC was investigated. The changes in value of external resistance showed strong influence on organic removal in the short-chain fatty acids fed MFC than the acetate fed MFC. Organic removal rate was tended to increase at low external resistance in the short-chain fatty acids fed MFC. Biodegradation rate of propionate or n-butyrate was observed different trend at external resistance value. At high value external resistance, degradation of n-butyrate was promoted. On the other hand, propionate was obtained high biodegradation rate at low value external resistance.

A43: THE PARTICLE REMOVAL DETERIORATION BY INFLUENT TEMPERATURE RISING IN A SETTLING TANK AND THE EFFECT OF NEW BAFFLE
- A COMPUTATIONAL FLUID DYNAMICS STUDY

Mitsuharu TERASHIMA*, Hidenari YASUI**, Koichi SUTO***, Chihiro INOUE*** and Tatsuya NOIKE****

*:Kurita Water industries Ltd., JAPAN
**:Faculty of Environmental Engineering, The University of Kitakyushu, JAPAN
***:Graduate School of Environmental Studies, Tohoku University, JAPAN
****:Advanced research Institute, Nihon University, JAPAN

[Mitsuharu TERASHIMA] mitsuharu.terashima@kurita.co.jp

In this study we evaluated the performance of the full-scale settling tank when the influent temperature rose and the effect of a new baffle to minimalize the deterioration using CFD calculation. A temperature rising of 5 ˚C inverted the influent and effluent density and make a temperature stratification. The temperature stratification lead to increase of effluent SS concentration more than twice during 4.5 times of HRT. The baffle prevented the warm plume from reaching the outlet weir directly and broke the temperature stratification. Under constant temperature, not rising up, the effluent SS concentration from the baffled settling tank was a little larger, but when the temperature rose up, the effluent SS concentration from the baffled settling tank was much smaller and temporary SS increase continued much shorter.

A44: Fundamental Study about Removal of Boron in Industrial Wastewater and Final Disposal Site Wastewater

Eishi YOSHIKAWA1, Atsushi SASAKI2, Hisashi MOMIYAMA3,
Mikio SATO3 and Masatoshi ENDO1

1:Graduate School of Science and Engineering, Yamagata University
2:Technical Division of Instrumental Analysis, Faculty of Engineering, Yamagata University
3:Fujigikenkagaku Inc.

[Eishi YOSHIKAWA] twd12710@st.yamagata-u.ac.jp

The removal of boron by the hydroxyapatite formation reaction using Ca(OH)2 and (NH4)2HPO4 in room temperature has been reported. This method's the reaction time was shortened to 1/10 of that of the conventional technique. Reaction temperature, reagent's grain size and reagent including inpurities for this method was investigated. This method was also tested in two real wastewater samples (grass industrial wastewater and final disposal site wastewater). The amount of residual boron in two real wastewater samples was also reduced under boron effluent standard by using this method. In this method, removal of boron was concerned with purty of Ca(OH)2 reagent and coexisting ions in wastewater.

A45: UASB Treatment Performance of Sulfate-Rich Wastewater from Ethanol-Related Chemical Industry

Yong Hu*, Zhaoqian Jing**, Yuyu Liu*, Yu-You Li*

*:Graduate School of Environmental Studies, Tohoku University, Sendai 9808579, Japan
**:College of Civil Engineering, Nanjing Forestry University, Nanjing 210037, China

[Yong Hu] huy@epl1.civil.tohoku.ac.jp

In this study, in order to evaluate the effect of COD loading rate on UASB reactor treating synthetic wastewater containing sulfate, acetate acid and ethanol, a continuous experiment was operated by shortening HRT stepwise from 48 to 2 h. The experiment results indicated that at COD loading rate 12.3 g-COD/L/d, the COD removal rate was maintained above 86.5%. With HRT in the range of 3-12 h, 47.5%-54.4% of the influent COD was converted into biogas methane, and 21.4%-28.0% was converted into sulfide. After this continuous operation of the UASB reactor, granular sludge with an average particle size of 1.8 mm and sedimentation velocity of 96.5 m/h was gained. In addition, the anaerobic degradation pathway of ethanol under sulfate-rich condition was investigated according to the test result of methane-producing activity (MPA) and sulfate-reducing activity (SRA).

A46: Treatment Performance of Synthetic Sewage by Submerged Anaerobic Membrane Bioreactor (SAMBR)

Takayuki SUNABA*, Shintaro TAKAHASHI**, Shinichiro WAKAHARA**, Yu-You LI***, Hideki HARADA*

*:Dept. of Civil and Environmental Engineering, Tohoku University,**: KUBOTA Corporation, ***:Graduate School of Environmental Studies, Tohoku University

[Takayuki SUNABA] sunaba@epl1.civil.tohoku.ac.jp

A Submerged Anaerobic Membrane Bioreactor (SAMBR) combining anaerobic digestion and membrane separation has been attracting attention recently, because it may recovery methane and reduces sludge production. In this study, a lab-scale SAMBR treating soluble synthetic wastewater were continuously operated for 110 days at a room temperature of 25 oC to investigate the effect of hydraulic retention time (HRT) on the treatment performance. The HRT was changed from 48 to 6 hours by 4 steps. At a HRT of 12 hours, COD and BOD removal efficiencies were 94%, 96%, respectively. As a result, 72% of input COD was converted to methane, and sludge production was 0.1 gVSS/gCODrem, which is about 1/3 of that for activated sludge process. Continuous operation was successful for over 70 days without membrane cleaning using backwash and chemical.

A47: Fate of Pharmaceutical and Personal Care Products in Treated Sewage during Soil Aquifer Treatment

Takashi YONETANI*, Songkeart PHATTARAPATTAMAWONG**, Shinya ECHIGO**, Yuto MORITA*, Yumiko OHKOUCHI** and Sadahiko ITOH**

*: Dept. of Environmental Engineering, Graduate School of Engineering, Kyoto University, JAPAN
**: Graduate School of Global Environmental Studies, Kyoto University, JAPAN

[Takashi YONETANI] yonetani@urban.env.kyoto-u.ac.jp

The fate of pharmaceuticals and personal care products (PPCPs) in soil aquifer treatment (SAT) was investigated for the introduction of a water reuse system with SAT in Japan. A series of batch experiments simulating short-term SAT with decomposed granite soil was conducted to evaluate the biodegradability and sorption characteristics on nine PPCPs, and to search microbial transformation products produced through SAT. The degradability of PPCPs greatly varied among the tested PPCPs. Thus, SAT should be combined with WWTP and WTP effectively. In addition, several transformation products were found and their backbone structures were similar to those of original compounds. The risk of these transformation products is yet to be determined, but more serious attention should be paid to the fact that unknown compounds will remain even after SAT and may pose health risks when reused.

A48: Removal characteristics of coliform bacteria by certified structure type small-scale Johkasou

Naoki TAKAHASHI**, Hitoshi MATUHASHI*, Osamu NISHIMURA*, Ryuichi SUDO*

*:Graduate School of Engineering, Tohoku University
**:Miyagi Prefectural Authority for Living Environment

[TAKAHASHI Naoki] takahashi@eco.civil.tohoku.ac.jp
[NISHIMURA Osamu] osamura@eco.civil.tohoku.ac.jp

The removal characteristics of coliform bacteria by certified structure type small-scale Johkasou were studied. The results showed that among 25units of investigated Johkasou 24 units could meet the effluent quality standard of coliform bacteria count under 3,000cfu/mL before chlorination, and all units could remove coliform bacteria count less than 1,000cfu/mL after chlorination. However, about 200cfu/mL of coliform bacteria count was detected, in spite of having detected residual chlorine in effluent over 2mg/L. Coliform bacteria count in effluent before chlorination was negatively correlated with nitrifying ratio and positively correlated with SS, respectively. Therefore it was considered that highly removal of coliform bacteria was possible by advanced Johkasou which could remove nitrogen and SS.

A49: Estimation of Lead Sorption Based on Phosphorus Dissolution from Apatite

KATOH Masahiko*, GOTOH Shingo*, SATO Takeshi*

*: Department of Civil Engineering, Gifu University, JAPAN

[KATOH Masahiko] mkatoh@gifu-u.ac.jp

This study investigated the relationship between a apatite solubility and an amount and mechanisms of lead sorption using apatite samples, which have different cristalinities and impurities contents, to estimate the amount of the lead sorption onto the apatite from phosphorus extraction by a citric acid. The amount of the lead sorption increased linely with increases in an amount of calcium dissoleved from the apatite. It was considered that the sorption mechanism of lead were both precipitation of Pb-phosphate minerals like pyromorphite and surface complexations onto the apatite. The amounts of the lead sorption by surface complexations were almost equivalent even if the solubility of apatites was different, indicating that the increases in the solubility would only induce to the precipitation to increase the lead sorption. It was also confirmed that the maximum amount of lead sorption can be predicted from phosphorus extraction by 0.01M citric acid.

A50: Effect of thermal treatment of pig manure on methane fermentation

Yutaka DOTE*, Tomoo SEKITO*, Yoshifumi GOTOH**, and Yoshihiro SUZUKI*

*:Dept. of Civil and Environmental Engineering, University of Miyazaki
**:MIURA Co., Ltd

[Yutaka DOTE] dote@civil.miyazaki-u.ac.jp

Thermal treatment of pig manure followed by batch and continuous methane fermentation was conducted in order to evaluate its effect on fermentation performance. Up to 200° C of thermal treatment, solubilization of VSS proceeded, but transformation of dissolved TOC with high molecule count into VFA was minimal. The high temperature led to retardation of initial gas generation and low gas generation rate. At 250° C, no gas generation occurred. At 150° C, methane generation per input VS with thermal treatment was 1.2 times greater than that without thermal treatment. The thermal treatment of standard pig manure was disadvantageous to net energy recovery. However, it was estimated that thermal treatment of manure with SS concentration of greater than 2.3 times the SS of standard manure increased net energy recovery over that without thermal treatment.

A51: Study on the Difference of Determinants of Pro-environmental Behavior Derived from its Sociality

MATSUMOTO Kazuaki*, KAMIKO Naoyuki**, SHIMIZU Toshiyuki***

*:Graduate School of Science and Engineering, Ritsumeikan University, JAPAN
**:Dept. of Environmental Systems Engineering, Ritsumeikan University, JAPAN
***:Japan International Corporation of Welfare Services, JAPAN

[MATSUMOTO Kazuaki] rv005059@ed.ritsumei.ac.jp

Pro-environmental behavior which needed for sustainable society may have deferent determinants or effect from it according to character of behavior. This study intended to provide knowledge for effective promotion of pro-environmental behavior by clarifying deference determinants and its effects of behavior caused by character of behavior. In the result, it become clear that low-sociality behavior strongly affected from cost-benefit evaluation, and high-sociality behavior strongly affected from social norm evaluation by covariance structure analysis using reply data of questionnaire survey. There was deferent result from previous studies what may caused by today's social situation.

A52: Evaluation of acceptability of treated wastewater usage for improving urban river environment

Yoshiomi OTSUKA*, Kiyo KURISU**, Aya KUBOTA*** and Jun NAKATANI***

*:Department of Information Science and Arts, Toyo University
**:Research Center for Advanced Science and Technology, The University of Tokyo
***:Department of Urban Engineering, Graduate School of Engineering,The University of Tokyo

[Yoshiomi OTSUKA] y_otsuka@toyo.jp

Treated wastewater have had potential of urban water resources and expect to be applied to maintaining the river environment. Arakawa basin, suburban area of Tokyo, was selected as the model and an acceptability of using treated wastewater for the purpose of improving urban river environment was analyzed by an online questionnaire. The 78.9% of residents approve the scenario and value the quality of treated wastewater. Residents who don't appreciate their neighborhood environment show high acceptability of using treated wastewater and strongly expect that urban rivers would provide the natural habitat of wild lives. It indicates that the secondary effects derived from the river water quality improvement by introducing treated wastewater to urban rivers should be focused on for the actual planning decisions.

A53: Public Consious Structure of Tap Water and their Factors

ISHIMOTO Tomoko*, ITOH Sadahiko*

*:Dept. of Urban Management, Graruate School of Engeneering, Kyoto University

[ISHIMOTO Tomoko] ishimoto@urban.env.kyoto-u.ac.jp
[ITOH Sadahiko] itoh@urban.env.kyoto-u.ac.jp

Recently, water supply utilities have been faced with the decrease of people who drink tap water. In this study, various factors affecting public perception of tap water were analysed by factor analysis and structural equation modeling to demonstrate public conscious structure of tap water. As a result, it was found that the public satisfaction for tap water as drinking water was affected by the satisfaction for taste of tap water which depended on the anxiety for chlorious odor and the satisfaction of tap water safety. In additon, it was found that the dissatisfaction for the information provided by water supply utilities has an indirect affect on the satisfaction for taste and safety of tap water. On the other hand, it was shown that public attitude to tap water can be improved by the apporopriate countermeasure of water supply utilities because of the less contribution of the factors caused by societal changes.

A54: Food sources of benthic community and origin of sedimentary organic matter in tidal flats of two river mouths in Shikoku Island

OTANI Sosuke*, KOZUKI Yasunori**, KURATA Kengo***, NAKAI Shigefumi****

*:Department of Technological Systems, Osaka Prefecture University College of Technology, JAPAN
**:Ecosystem Design, Institute Technology and Science, The University of Tokushima, JAPAN
***:Research Center for Coastal Lagoon Environments, Shimane University, JAPAN
****:Mitsubishi Electric Information Network Corporation, JAPAN

[OTANI Sosuke] otani@osaka-pct.ac.jp
[KOZUKI Yasunori] kozuki@eco.tokushima-u.ac.jp

The objective of this study is to clarify food sources of benthic community and estimate the origin of sedimentary organic matter using carbon and nitrogen stable isotope ratios in two tidal flats of river mouth. The δ13C value of sediments around reed community is lower in the upstream section, but is higher in the downstream section in both tidal flats. Contribution of terrestrial organic matter in the downstream section of the tidal flats was lower than that in the upstream section. Although benthic consumers were distributed in the stations with sediment containing terrestrial organic matter, they did not assimilate terrestrial organic matter as their food sources. Moreover, benthic consumers have selectively assimilated food sources supplied from water column. The δ13C value and contribution of terrestrial organic matter of sediment showed statistically significant differences among the groups of stations distinguished according to cluster analysis for particle size composition and difference in elevation. Benthic consumers mainly assimilating MPOM and benthic diatoms as their food sources, however, were distributed in the stations of sediment groups with rich terrestrial organic matter. These results implied that food sources of benthic community did not correspond to sediment characteristics in the tidal flats of river mouth.

A55: Analysis of sedimentary organic carbon origin in Taihu lake using by carbon and nitrogen stable isotope ratio

FUJIBAYASHI Megumu*, NOMURA Munehiro*, XU Xiaoguang*, LI Xianning**, AIKAWA Yoshio*, NISHIMURA Osamu

*:Graduate School of Engineering, Tohoku University, JAPAN **:Graduate School of Energy and Environment, Southeast University, CHINA

[FUJIBAYASHI Megumu]fujibayashi@eco.civil.tohoku.ac.jp
[NISHIMURA Osamu]osamura@eco.tohoku.ac.jp

Contribution of autochthonous (cyanobacteria) and allochthonous (reed) organic matter to sediment and utilization of organic matter by bacteria and benthic animals in northeast area of hypereutrophic lake, Taihu lake were investigated. Although Taihu lake suffered algal bloom almost over a year, two sources mixing model of carbon stable isotope ratio analysis showed that contribution of reed was more dominant than cyanobacteria in Taihu lake. Food web analysis using by bulk carbon and nitrogen stable isotope ratio indicated benthic animals mainly assimilated cyanobacteria. Moreover carbon stable isotope ratio of bacterial fatty acids in sediment showed bacteria have also assimilated cyanobacteria. These findings indicated turnover of cyanobacterial carbon was faster than reed, which seemed to be a reason sediment organic carbon was mainly originated from reed in Taihu lake.

A57: Mechanisms of Arsenic Release into Groundwater in Seino Basins, Nobi Plain

NISHIZAWA Takaki*, KATOH Masahiko**, HORI Akiko**, SATO Takeshi**

*Graduate School of Civil Engineering, Gifu University
**Department of Civil Engineering, Gifu University

[NISHIZAWA Takaki] nishizawa-takaki@pref.gifu.lg.jp

Arsenic has been frequently detected over the Japanese environmental standard (0.01mg/L) in groundwater in western part of Nobi Plain. Arsenic leaching experiments using sediments samples in which arsenic was detected over or under the standard, by water, humic acid and calcium ion solution were carried out to investigate the mechanisms of arsenic release into groundwater. Dissolved organic carbon (DOC) leached from Nobi formation might enhance arsenic release, which arsenic sorbed onto iron oxide in the sediments, into groundwater constantly by competition of DOC and arsenic sorption and by arsenic-DOC complexation. Lower concentration of calcium ion in groundwater, south-western part of Nobi Plain might result in higher concentration of arsenic in the groundwater.

A58: Fluoride Contamination in Drinking Water in Sri Lanka and Fluoride Removal by Using Chicken Bone Char

Ayuri MOTOYAMA*, Tomonori KAWAKAMI*, S.K. WERAGODA**,
Koji OKUGAWA*, Yuka SERIKAWA*, Masamoto TAFU***, Saori TAKAMATSU***

*:Dept. of Environmental Engineering, Faculty of Engineering, Toyama Prefectural University, JAPAN
**:National Water Supply and Drainage Board, Regional Support Centre,Sri Lanka
***:Dept. of Ecomaterials Engineering, Institute of National Colleges of Technology, Toyama National Colleges of Technology, JAPAN

[Tomonori KAWAKAMI]kawakami@pu-toyama.ac.jp

Groundwater is indispensable source of drinking water for the residents of the central north province of Sri Lanka such as Anuradhapura region. Many residents suffer from dental fluorosis and skeleton fluorosis due to high concentration of fluoride in drinking and cooking water. Spatial distribution of the fluoride concentration was investigated in 8 regions in Sri Lanka. The fluoride concentration was found to be quite different even between adjacent wells. This fact indicates that the residents can select wells for drinking water according to the fluoride concentration to reduce adverse effects of fluoride on their health. However, when the residents are not able to access wells with low concentration of fluoride nearby, fluoride should be removed. We propose fluoride removal by chicken bone char since it is a low cost material, and it would be acceptable from a religios point of view. It was found that the optimum carbonization temperature was 600℃ to remove fluoride.

A59: Effect of Chemical Properties of Humic Substances on Iron Complexation in Natural Waters

IMAOKA Akira*, FUJII Manabu*, YOSHIMURA Chihiro*

*:Department of Civil Engineering, Tokyo Institute of Technology, JAPAN

[IMAOKA Akira] imaoka.a.aa@m.titech.ac.jp
[FUJII Manabu] fujii.m.ah@m.titech.ac.jp
[YOSHIMURA Chiro] yoshimura.c.aa@m.titech.ac.jp

It is important to understand complexation between humic substances and iron in view of the assessment of iron bioavailability in natural water environment. In this study, iron complexation by humic substances from a variety of origins were investigated by measuring stability constant and complexation capacity using the competitive ligand method. In addition, relationship between such complexation parameters and chemical properties of humic substances was examined. Statistically significant positive correlation between the complexation capacity and amount of aromatic carbons of humic substances (as determined by 13C-NMR) was provided. Therefore, functional groups resident in aromatic region are likely responsible for iron coordination. In addition, stability constant has significant correlation with sulfer and nitrogen content of humics (as determined by elemental analysis), suggesting that sulfonic and amino groups bind to iron with higher stability constant.

A60: Effect of pH and ionic strength on ligand exchange reaction between ferric fulvic acid and siderophore desferrioxamine B

ITO Hiroaki*, FUJII Manabu**, MASAGO Yoshifumi***, WATANABE Toru*, OMURA Tatsuo***

*:Department of Food, Life and Environmental Sciences, Faculty of Agriculture, Yamagata University, JAPAN
**:Department of Civil Engineering, Tokyo Institute of Technology, JAPAN
***:Department of Civil and Environmental Engineering, Tohoku University, JAPAN

[ITO Hiroaki] ito@tds1.tr.yamagata-u.ac.jp

Effect of pH and ionic strength on the ligand exchange reaction between ferric fulvic acid and siderophore (desferrioxamine B) was examined in the range from pH 6.0 to 9.0 and ionic strength from 0.01 to 0.7 M. The results showed that higher pH rendered higher ligand exchange reaction rate in the pH greater than 8.0. On the other hand, in the pH below 8.0, the ligand exchange rate constants was found to vary less than an order of magnitude. Ionic strength resulted in insignificant changes of the ligand exchange rate constants. These results suggest that pH plays important role in the ligand exchange reaction in coastal and seawaters and the lakes under algal bloom where pH typically exceeds 8.0.

A61: Field Survey on Antimony Contamination around the Tsugu Old Mine

HORIUCHI Masato*, SAITO Tomokazu**, MORI Syunsuke***

*:Department. of Architecture, Daido University, Japan
**:Makino Ltd.
***:Kotobuki Kakoki Ltd.

horiuchi@daido-it.ac.jp

Tsugu old mine located at Kitashitara Country, Aichi Prefecture was selected for field survey area. Antimonite had been mined at this old mine for 17 years until 1955. Antimony concentrations in soil and river water around the old mine were determined.

The results obtained in this study were summarized as follows.

1) Antimony concentrations in soil as water-soluble, acid-soluble and content were much higher around the old smelter than other area. Maximum content was 5,500mg/kg detected at near the old smelter. This value exceeds maximum natural abundance by almost 6,000times.
2) The ratio of water-soluble and content of antimony around the smelter was 0.30%(average). This value is much lower than that obtained at another smelter or a chemical fiber factory.
3) Arsenic and lead concentrations in soil around the old smelter were higher than antimony concentrations. Those two heavy metals are contained in antimonite or in other ore. It was considered that the residue of ore refining had caused these metal contaminations.
4) Valency of antimony in soil or river water was determined by APCDT extraction test. Antimony (V) was preferential in both soil and river water.

A62: The Evaluation of Greenhouse Gas Emission from Sewage Treatment Plant Including Direct/Indirect Emission and Dissolved Gas Effluent

MASUDA Shuhei *, KYONO Takafumi **, LI Yu-You *** and NISHIMURA Osamu ****

* Dept. of Environ. Eng., Akita National College of Technology
** Environ. Systems Eng. Course, Advanced Engineering Faculty, Akita National College of Technology
*** Graduate School of Environ. Studies, Tohoku University
**** Dept. of Civil and Environ. Eng., Tohoku University

masuda@akita-nct.jp

We discussed the influence of the difference of the three evaluation method on the counting greenhouse gas emission from sewage treatment plant. We calculated the amount of CH4 and N2O by three method, 1st:IPCCs' guideline, 2nd: the guideline in Japan, and 3rd: the method including the direct and indirect emission of N2O, the emission of dissolved N2O through treatment water, and the direct emission of CH4. The amount of GHGs calculated by Japans' method was lower than that of GHGs calculated by IPCCs' method, even both were calculated based on the identical data. The difference of the results among IPCCs' method, Japans' method, mix method and D-mix method was mainly arised by the indirect emission of N2O, it was supposed that the indirect emission of N2O was important factor quantatively in GHGs calculation. The amount of the dissolved N2O in treated water was almost equal to that of the direct gas emission of N2O, so the dissolved N2O was supposed to be a potential source of N2O emission.

A63: Greenhouse Gases Emission Factors and it's Reduction Measures in Sewage Treatment Plant

SANO Itsumi*, MASUDA Shuhei**, LI Yu-You*, ***, NISHIMURA Osamu*, HARADA Hideki*

*:Dept. of Civil and Environmental Engineering, Tohoku University, JAPAN
**:Dept. of Environmental Engineering, Akita National College of Technology, JAPAN
***:Graduate School of Environmental Studies, Tohoku University, JAPAN

[SANO Itsumi] itsumi@epl1.civil.tohoku.ac.jp
[LI Yu-You] yyli@epl1.civil.tohoku.ac.jp

The emission factors and reduction measure of greenhouse gases (GHGs) in sewage treatment plant were assessed based on the calculation of LCCO2 and the measurement of CH4 and N2O. A total of 3 different typical types of sewage treatment system were investigated at each season for over a year, and the emission amount of GHGs and GHGs emission factor for each plant were identified. The three main sources for GHGs were the electric consumption, nitrous oxide from sludge incineration process and on-site methane production. The on-site methane emission was found in aeration tank and was depended on the season and water temperature. The nitrous oxide emission was depended on not only the temperature but also the treatment system. Based on the results of this study, GHGs reduction measures from sewage treatment plant was suggested.

A64: Measurement of Vertical Profile of Suspended Particulate Matter (SPM) Number Concentration Using Small SPM Sampler Hung on Mooring Cable of Captive Balloon

TAKANO Yasuhide*

*:Department of Civil and Environmental Engineering, School of Science and Engineering, Kinki University, JAPAN

takano@civileng.kindai.ac.jp

To measure Suspended Particulate Matter (SPM) concentration profile up to about 100 m in height, a small SPM sampler that can be hung on the mooring cable of the captive balloon was developed. The vertical profile of the temperature, the relative humidity, the wind velocity, and the number of SPM particles have been measured using the captive balloon and our new small SPM samplers installed nearby a highway in the city area. It was confirmed to obtain the time changes of the temperature, relative humidity, the wind velocity and the number of SPM particles profiles up to the the altitude of 50 m.
The number of SPM particles measured by the small SPM sampler have been compared with the SPM mass concentration measured by high volume air sampler simultaneously to examine the standardization of the measurement of SPM mass concentration. As a result, a good relation was confirmed between the number of SPM particles and the SPM mass concentration.

A65: Nocturnal drainages in the western Osaka Plain : Their occurrence conditions and relationships with those in the northern Osaka Plain

Masahiro TAMAI* and Shin-ichi OHTA**

* : Department of Civil Engineering, Osaka University
** : The West Japan Railway Conmany Ltd.

tamai@civil.eng.osaka-u.ac.jp

The Osaka Plain faces with the Ikoma and Kongo Mounts on the east and south. Our preceding study confirmed using 3 dimensional numerical simulations that nocturnal drainages break out on the west-facing slopes of the mounts and flow into the east part of the plain. Purposes of the present study are to examine their occurrence conditions and influences on nocturnal temperature distributions of the part by analyzing such observational data as the AMeDAS data. In addition, occurrence relationships between the nocturnal drainages of the east part and those of the north part and influences of the two on heatisland phenomena in the Osaka Plain are investigated. The result shows that the nocturnal drainages in the east part tend to occur in the condition that daily solar radiation is relatively large and both north-south and east-west components of geostrophic wind are about 5.0m/s.

A66: Performance of DHS Reactor Treatment of Toluene Gas

NAKAMURA Syoichiro*, TAMURA Eisuke**, TANIKAWA Daisuke*, NAGANO Akihiro**, YAMAGUCHI Takashi*

*:Department of Environmental Systems Engineering, Nagaoka University of Technology, JAPAN
**:Sanki Engineering Company Limited

[YAMAGUCHI Takashi] ecoya@vos.nagaokaut.ac.jp
[NAKAMURA Syoichiro] syoichiro@stn.nagaokaut.ac.jp

Volatile organic compounds (VOC) is emitted from contaminated air streams and causes adverse effect for environment and human health. In this study, a highly efficient treatment system for VOC was developed using down-flow hanging sponge (DHS) reactor. Toluene in the form of gas was fed to DHS reactor as a VOC source. DHS reactor achieved more than 80 % of carbon removal with 13 g-C･m-3･hr-1 as critical loading rate.

A67: Evaluation of relationships between HSI based species diversity and genetic diversity of riverine animals

NUKAZAWA Kei*, KAZAMA So*, WATANABE Kozo**

*:Graduate School of Engineering, Tohoku University, JAPAN
**:Graduate School of Science and Engineering, Ehime University, JAPAN

[NUKAZAWA Kei] nukazawa@kaigan.civil.tohoku.ac.jp

Relationships between species diversity calculated from Habitat Suitability Index (HSI) of aquatic animalms and genetic diversities of four species of aquatic insect (three caddisflies and one mayfly) were examined in the Natori River basin, middle of Miyagi prefecture Japan. The HSI has been evaluated for six riverine animals based on current velocity and water depth calculated from an existing distributed runoff model and geographical data (eg., landuse, slope, and urban ratio) by Kazama et al. (2007). As a result, three out of four genetic diversity indices of one caddisfly (Hydropsyche orientalis) showed significant positive correlation to the HSI based taxa richness. This result suggests a sharing influence of immigration on community and population levels is potentially high in the locations where many species can coinhabit. Accordingly, parallel effects of gene flow and habitat heterogeneity on species and genetic diversity through environmental filtering and local adaptation of genotypes of focal species would contribute to the enhancement of biodiversity.

A68: Relationship between Habitat Structure and Genetic Diversity of Aquatic Insect Ephemera strigata Populations in Rivers

Sakiko YAEGASHI1, Kozo WATANABE2, Shinji TAKAHASHI1, Kento NAGAMINE1 and Tatsuo OMURA1

1Dept. of Civil and Environmental Engineering, Tohoku University
2Dept. of Civil and Environmental Engineering, Ehime University

yaegashi@water.civil.tohoku.ac.jp

Spatial environmental heterogeneity may favorably sustain genetic diversity of wild populations through adaptive divergence. We empirically examined the relationship between habitat structure and genetic diversity of stream mayfly Ephemera strigata populations at riverine reach scale. The habitat structure was delineated by a high precision GPS among 11 riverine sites in the Natori River, Miyagi Japan and genetic diversity was quantified at nine loci presumably under selection identified through a genome wide scan of 319 AFLP loci. Out of the nine adaptive loci, two had a strong association with the index of habitat structure, indicating a significant variation of allele frequency and genetic diversity along a gradient of the percentage of the total area of lentic habitats (i.e., backwater and isolated pool, range = 0.0 – 11.2 %). Particular environmental features reserved in these lentic habitats such as low current and high amount of deposited organic matters may enhance local adaptation of specific enotypes, leading to higher adaptive genetic variation within reaches. Our result highly suggests the importance of conservation of lentic habitats in river to sustaining genetic diversity of aquatic organisms.

A69: Proposal of an evaluation procedure for vegetation of emersed botanical communities by species prioritization and application for reed plantation projects around Lake Biwa

Saori MIZUTANI*, Shuhei TANAKA**, Shigeo FUJII**,Nagafumi YAMAZAKI*, Daisuke IKEDA*, Akihiro KUNIMASA*, Masahiro KAMADA**
and Hiroaki NISHIKAWA***

*:Dept. of Urban and Environmental Engineering, Kyoto University
**:Graduate School of Global Environmental Studies, Kyoto University
***:Lago Corporation

mizutani@eden.env.kyoto-u.ac.jp

Diversity indices like Shannon-Index cannot distinguish between native species and alien species which have a risk of damage to native ecosystems. This study aims to propose an evaluation procedure for vegetaion and apply to reed plantation projects around Lake Biwa. This evaluation procedure makes endangered species prior to alien species. This procedure was applied to vegetation of 132 plant communities on Lake Biwa shore and those ground level. Vegetation surveys were carried out from 2008 to 2010 and ground level surveys were conducted from 2008 to 2011. Main findings are as follows: 1) A new evaluation procedure for vegetation by prioritization was developed in emersed botanical communities. 2) The number of species observed in reed plantation fields was 39% of all species observed around Lake Biwa. 3) Ground level distribution of reed plantation fields were absolutely different from those of natural emersed plant communities.

A70: Caluculation of the isotopic fractionation of fatty acid-specific stable carbon isotope ratio by feeding experiment using zebrafish,Danio rerio

OGINO Masahiro*, FUJIBAYASHI Megumu*, OSADA Yuki**, AIKAWA Yoshio* and NISHIMURA Osamu*

*Graduate School of Engineering, Tohoku University, JAPAN
**Kesennuma Regional Promotion Office, Miyagi prefecture, JAPAN

[OGINO Masahiro] mogino@eco.civil.tohoku.ac.jp
[NISHIMURA Osamu] osamura@eco.civil.tohoku.ac.jp

Stable isotope ratio of essential fatty acids (EFA) is expected to be a useful tool for analyzing food web, however the isotopic fractionation between animals and food source in each EFA has not been revealed yet. In order to obtain those coefficients, a 100-day feeding experiment was conducted on zebrafish (Danio rerio) by using a commercial food source. From the results, it was revealed that each isotope ratio of 18:2n-6, 20:5n-3 and 22:6n-3 of zebrafish was approaching asymptotically to those of food source during experiment at 100-day and there were no significant difference between zebrafish and food source. However, stable isotope ratio of 20:4n-6 in zebrafish showed wide range of fractionation among each individual. This result was considered that metabolism of 20:4n-6 from 18:2n-6. These results indicate isotope ratio of EFA is useful tool to infer assimilated food sources.

A71: Analysis of Ecosystem Impact Statement for Biomanipulation Using the Microcosm

Hideaki HAYASHI*, Kazuhito MURAKAMI* and Akiko INOUE-KOHAMA**

*:Department of Life and Environmental Sciences, Chiba Institute of Technology
**:Department of Environmental Energy, Tohoku Institute of Technology

[Hideaki HAYASHI] s0723206XU@it-chiba.ac.jp
[Kazuhito MURAKAMI] kaz_murakami@sky.it-chiba.ac.jp

In late years, biomanipulation technology attracts attention as one of the methods to purify the quality of the water. The biomanipulation is methods to introduce a creature, but this method has a danger to collapse existing ecosystems. Therefore the environmental assessment to perform biomanipulation is important. This experiment was carried out to investigate the basic ecosystemic impact statement of the water quality improvement of the biomanipulation. It performed the basic environmental assessment which focused its attention on an ecosystem function as P/R ratio using microcosm. The microcosm system was made from producer, predator and decomposer. The producer is micro alga. The predator is micro animal which are ciliata, rotifer and oligochaeta. The decomposer is bacteria taking in organic matter. In this experiment, Aeolosoma hemprichi (top predator) and Cyclidium glaucoma (primary predator) were introduced into microcosm as the introduced species for bioremediation. As results, Chlorella sp. and Scenedesmus sp. decreased in the flask which introduced Aeolosoma hemprichi as the top predator. But, they didn't decrease in the flask which introduced Cyclidium glaucoma. The top predator may keep a proper population of the micro alga. In the case of top predator introduction, a possibility that could solve water-bloom was demonstrated.

A72: Relashionship between trichloramine formation potential by chlorination and water quality parameters

Reina NAKAMURA1,2, Naoya KOBASHIGAWA1,3, Koji KOSAKA1, Yuji HISAMOTO4, Shinya ECHIGO5, Mari ASAMI1 and Michihiro AKIBA6

1 Area on Water Management, Dept. of Environmental Health, National Institute of Public Health
2 Yokohama Waterworks Bureau
3 Water Supply Division, Health Service Bureau, Ministry of Health, Labour and Welfare
4 Graduate School of Engineering, Kyoto University
5 Graduate School of Global Environmental Studies, Kyoto University
6 National Institute of Public Health

[Reina NAKAMURA] re04-nakamura@city.yokohama.jp
[Koji KOSAKA] kosaka@niph.go.jp

Formation potentials of trichloramine (NCl3), one of the major chlorinous odor compounds, in 15 raw waters were evaluated. Effects of co-existing compounds on NCl3 formation by chlorination were also examined. NCl3 formation potentials in 15 raw waters were 6-140 μg Cl2/L. The NCl3 formation potentials were correlated with ammonia concentration in raw water. NCl3 formation potentials in ammonium solution were higher than those in raw waters when ammonia concentrations in the sample solutions were same. NCl3 formation potentials of ammonium and glycine solutions decreased in the presence of natural organic matter (NOM). Thus, it was found that NOM reduced NCl3 formation in chlorination. Among 5 NOMs used, the effects of the Pony Lake fulvic acid (PLFA) on NCl3 formation was smaller than those of other 4 NOMs. This was because PLFA had the portions of the NCl3 precursors by chlorination. NCl3 formation potentials of ammonium and glycine solutions decreased in the presence of bromide ion. However, for ammonium solution, the effects of bromide ion was not observed when NOM was also co-exsited. In case of glycine solution, the effects of 20 and 50 ug/L of bromide ion was not observed, but those of 200 μg/L of bromide ion was observed when NOM was also co-exsited. The effects of bromide ion was not observed when bromide ion was added to raw waters.

A73: Effects of Aeration Treatment in Distributing Reservoir of Water Purification Plant on Trihalomethane Reduction

WADA Yasuhiro*,**, YAMAMOTO Tomohiro**, OKAMOTO Masami**, EGUSA Nobuyuki*** and HIRATA Tatemasa****

*:Guraduate School of Wakayama University, JAPAN
**:Waterworks Department, Wakayama City, JAPAN
***:Dept. of Environmental Systems, Wakayama University, JAPAN
****:Executive Director, Wakayama University, JAPAN

[WADA Yasuhiro] yasuhiro.wada@city.wakayama.lg.jp

The Takihata water purification plant started in August 2003. Trihalomethane concentration in drinking water has been the major issue since the start of the plant operation. Therefore, demonstration experiments were conducted in order to investigate the reduction of the trihalomethane concentration by aeration in a distributing reservoir of the plant. The experimental results showed that the trihalomethane concentration decreased exponentially with increased amount of aeration. Meanwhile, the aeration can not remove organic substances in clear water and so the trihalomethane concentration increases again in a water distribution network. This means that it is important to manage the concentration at the end of the network. Therefore, an estimating equation for the concentration in the network was developped using monitoring data. Model analysis using the estimating equation suggested that the aeration in the distributing reservoir enabled a water supply of good quality in the Takihata waterworks system.

A74: Sorption and Biodegradation of N-nitrosamines and their Precursors by Soils

Shunsuke TOKUHARA*, Michio MURAKAMI**, Koji KOSAKA***, Kumiko OGUMA*, Hiroshi SAKAI*, Satoshi TAKIZAWA*

*:Department of Urban Engineering, The University of Tokyo
**:"Wisdom of Water"(Suntory) Corporate Sponsored Research Program Organization for Interdisciplinary Research Projects, The University of Tokyo
***:Department of Water Supply Engineering, National Institute of Public Health

[Shunsuke TOKUHARA] tokuhara@env.t.u-tokyo.ac.jp [Michio MURAKAMI] michio@env.t.u-tokyo.ac.jp

N-nitrosamines including N-nitrosodimethylamine (NDMA) and N-nitrosomorpholine (NMOR) are known as disinfection byproducts, and suspected human carcinogen; however, the knowledge about their behavior and fate in soils is limited. In this study, biodegradation, adsorption and desorption of NDMA, NMOR, and their precursors by soils were evaluated, by shaking water samples with soil samples in aerobic condition. NDMA, NMOR, and their precursors were desorbed from soils. NDMA was easily degraded by the microorganisms in soils, while NMOR was persistent. NDMA and NMOR were not adsorbed onto soils. The precursors of NDMA were partly removed by soils owing to degradation and/or adsorption, but some parts of them persistently remained in water samples.

A75: Amino Acids in Drinking Water Oxidation Processes: Effects to Chlorinous Odor

HISAMOTO Yusuke*, ECHIGO Shinya** ,ITOH, Sadahiko**

*: METAWATER Co., Ltd.
**: Graduate School of Global Environmental Studies, Kyoto University

[ECHIGO Shinya] echigo@urban.env.kyoto-u.ac.jp

Chlorinous odor produced during drinking water chlorination is one of the major factors governing the customer satisfaction on drinking water quality.While free amino acids are known to produce chlorinous odor compounds, little information is available on the importance of combined amino acid. It was found that dipeptide can be a major source of chlorinous odor at high concentration, but, unlike free amino acids, the major odor compound produced was not trichloramine. Also, it was shown that some combined amino acids are transformed to free amino acids in oxidation processes (ozonation and advanced oxidation processes).

A76: Life Extension and Renewal Measures of Sewer Systems in Population Decline Areas

Yoshihiko HOSOI*, Takanori MASUDA* ,Satoshi AKAO*, Hideki NADA**, Daisuke TAKADA*

*Dept. of Management of Social Systems and Civil Engineering , Tottori University
**Sakaiminato City Office

hosoiy@sse.tottori-u.ac.jp

The minimization of life cycle cost is important subject of social infrastructure management. The life extension by preventive maintenance is generally carried out. In population decline ares, it is not necessary proper measures. The life extension lead to renewal of facilities with smaller scale which adapt to decreased population. In contrast it means to continue to use current excessively large facilities which require large maintenance cost. On top of that, per capita cost becomes high due to population decline as renwal investment is postponed. These issues were examined through a case study.

A77: Evaluation of Reclaimed Water Introduction for Water Quality Improvement of Edo Castle Outer Moat

Tasuku YOSHIOKA*, Kiyo KURISU**, Keisuke HANAKI*

*Dept. of Urban Engineering, The University of Tokyo
**Research Center for Advanced Science and Technology

[YOSHIOKA Tasuku] tasuku@env.t.u-tokyo.ac.jp

To improve the smell and landscape problems caused by algae growth in Edo Castle Outer Moat (Sotobori), several countermeasures were developed and the effects on the water quality and life cycle costs were evaluated. For the scenario development, previous case studies and existing water sources in Tokyo were reviewed. Besides, the water balance and pollutant loadings were estimated. Based on the data, six countermeasure scenarios were developed and the water quality was simulated using the Ecosystem Model. The result showed that 9,461 m3/d water introduction can avoid the algae growth in summer. The life cycle cost of the best scenario where a sattelite wastewater treatment plant is built in the Sotobori Ground was estimated at 2.0×102 million yen/y. This value can be comparable to the other existing moat-improvement projects.

A78: Consideration about Effective Landuse of the Contaminated Site by Questionnaire

Hiroyuki TANAKA1,2, Toshiki SHIMOIKE3, Suguru MIMURA4, Kazuhiro MATSUKAWA5, Sizuo SATORI6, Kazuhiro NOGUCHI7 and Akira EBINA8

1Grad. of Life and Environmental Sciences, Tsukuba University
2KONOIKE CONSTRUCTION CO.,LTD.
3KOKUSAI ENVIRONMENTAL SOLUTIONS CO., LTD.
4SEIBU CONSTRUCTION CO. LTD.
5seiyu kogyo
6Myanmar Economic &Management Institute
7Techno International Trading Co.
8GIBRALTAR LIFE INSURANCE CO. LTD.

tanaka_hy@konoike.co.jp

For the solution to brownfield problem by soil contamination concerned about clealy exist in future in Japan, We carried out a questionnaire about the effective landuse of the contaminated site.This study is a qualitative evaluation as an Internet survey by the convenience sampling, and examination about problems necessary to the effective landuse of the contaminated site.
As the landuse of contaminated site, a parking, a warehouse, and a office are most, but residence is little. For the second, it is suggested that risk perception about soil contaminated site is not enough. In addition, the respondents who knew the risk management for contaminated sites in overseas do not deny the solution for contaminated site by the risk communication. Therefore, I think that we need reconsideration for the education about the risk of the soil contamination.

A79: Environmental Purchase Behaviors after The Great East Japan Earthquake And Classifying Respondent by Practice Reasons

Hiroshi USHIO*, Kiyo KURISU**, Ai HIRAMATSU*, Keisuke HANAKI*

*:Graduate School of Engineering, The University of Tokyo, JAPAN
**:Research Center of Advanced Science and Technology, The University of Tokyo, JAPAN

ushio@env.t.u-tokyo.ac.jp

The environmental purchase behaviors were analyzed through a questionnaire survey under the electricity shortage condition caused by the Great East Japan Earthquake. Besides, people were categorized based on the reasons why they do or do not conduct the behaviors. The questionnaire survey was conducted in Kanto area, Osaka city, and Hiroshima city. The relationships between the behaviors and the socio-demographics were also evaluated. It was revealed that power-saving equipments were widely purchased after the earthquake. For most of the equipments, women and elder people showed higher purchase levels, whereas people who live in urban areas like Tokyo and Osaka showed lower levels. The respondents were categorized into 7 groups and the respondents who are highly concerned with environmental issues showed the highest behavior level. On the other hand, the people who value the economic aspects and the people who conduct the behaviors based on their customs showed fluctuated results. For the low behavior level respondents, two groups were identified: no-feasibility group and the others .

A80: Mechanism of garbages floating to the Iriomote Island

Yoshinori TOZI1, Kei KUSHIRO2, Akinori SUMITA2

1:The Secretariat of Taketomi Town Council
2:Laboratory of Aquatic Science Consultant Corporation

[Kei KUSHIRO] kushiro@lasc.co.jp

Garbages from the surrounding countries including East Asia float to the Iriomote Island where the nature indigenous to the subtropical zone flourishes. This research studied situations of garbages drifting to the Iriomote Island by focusing on the current, the dirction of the shore, determination of origin of PET bottles and the direction of wind. As a result, it showed that the drift of garbages depends on wind
direction along the northern seashore of the Iriomote Island and on wind direction as well as current along the southern seashore. Knowledge obtained through this reseach is useful for effective measures of garbages not only in the Iriomote Island but also in other areas.

A81: Agricultural recycling of organic waste in the Nhue-Day river basin, Vietnam based on Phousphorus balance

Toshiya KOMAI*, Hidenori HARADA*, Shigeo FUJII*, Nguyen Pham Hong LIEN*, Huynh Trung HAI**

*:Graduate School of Global Environmental Studies, Kyoto University, JAPAN
**:Institute for Environmental Science and Technology, Hanoi University of Science and Technology,VIETNAM

[Hidenori HARADA] harada.hidenori.8v@kyoto-u.ac.jp

The purposes of this research was to investigate phosphorus balance focusing on agricultural recycling of organic waste in the Nhue–Day river basin. A field survey on 300 households on the management of organic waste in agriculture and stockbreeding were implemented. Then phosphorus balance during 1980 – 2010 were constructed for this study area.
It was found that amount of phosphorus of organic waste had increased from 16,395 ton–P/year to 44,363 ton–P/year during 1980 – 2010 in the Nhue–Day river basin. Amount of phosphorus of unused organic waste was calculated to be 21,663 t–P/year, whereas chemical fertilizer consumption was estimated to be 26,536 t–P/year in 2010. Comparing these number, if chemical fertilizer was alternated by organic wastes, agriculture in this basin had a potential to receive organic wastes generated in the basin, in terms of phosphorus balance.

A82: Waste and wastewater management and its impacts in a sub–urban community in Hanoi, Vietnam: A nitrogen and phosphorus flow analysis

Pham Huong GIANG1, Hidenori HARADA1, Shigeo FUJII1, Nguyen Pham Hong Lien1, Huynh Trung HAI2, Shuhei TANAKA1, and Chinagarn KUNACHEVA1

1 Graduate School of Global Environmental Studies, Kyoto University (Yosida–honmachi, Sakyo–ku, Kyoto, Japan, 606–8501) 2 School of Environmental Science and Technology, Hanoi University of Science and Technology (1 Dai Co Viet Street, Hanoi, Vietnam)

giang@eden.env.kyoto–u.ac.jp

Hanoi, the capital of Vietnam, is facing rapid modernization, leading to the improper management of waste and wastewater. The purpose of this study was to evaluate the impacts of waste and wastewater management on water environment, in terms of nitrogen and phosphorus flows. Trai hamlet, located in the south part of Hanoi, was selected as a research community. A waste and wastewater stream survey was implemented by a door–to–door interview for 100 households. A material flow model of nitrogen and phosphorus was developed with focus on sub–urban waste and wastewater management. Then, the model was applied for the study area. The results showed that the component receiving the largest amount of nutrients was paddy field, 435.1 kg–N/ha/year and 89.8 kg–P/ha/year, in which 40% of N and 65% of P were derived from chemical fertilizer. Although waste and wastewater recycling is widely implemented, the management of pig liquid waste is a serious problem in this area since 100% of them were discharged directly to the water bodies. The total nutrient loads to the water bodies in 2010 was 187.3 kg–N/ha/year and 13.4 kg–P/ha/year, of which paddy field accounted for 70% of nitrogen and fish pond did for 60% of phosphorus.

A83: Changes and Current State of Nutrient loads in the Osaka Bay Basin

Shuzo NISHIDA*, Ryota KAWASUMI*, Yusuke NAKATANI** and Yudai MURAKAMI***

*:Dept. of Civil Engineering, Osaka University
**:Dept. of Environment Systems, University of Tokyo
***:Former Dept. of Civil Engineering, Osaka University

[Shuzo NISHIDA] nishida@civil.eng.osaka–u.ac.jp

Although Osaka Bay was heavily eutrophicated during the period of high economic growth, water qualities in Osaka Bay has been improved by measures for conservation of water environment, such as an introduction of total load control and development of sewerage systems. In the bay head, however red tide and blue tide has occurred frequently to the present day. To obtain a closer estimate of a amount of inflow loads, field surveys including rainy day surveys were carried out in rivers and sewerage treatment plants, and the impacts of flood and the combined sewer overflow (CSO) on the inflow of nutrient loads were clarified. The inflow load from the Neya River sub–basin showed largest amount, about 40 % of total inflow load for nutrients. Inflow load due to floods and CSOs, especially NH4–N load, has a significant impact on nutrient cycle in Osaka Bay.

A84: Numerical prediction of runoff load of suspended solids under a rainfall condition by lumped model

NISHIDA Wataru*, IWAO Ryotaro*

*:Graduate School of Engineering, Nagasaki University, Japan

[NISHIDA Wataru] nisida@civil.nagasaki–u.ac.jp

For the water quality management toward a closed water area, reduction of pollutant load from source distributed over its watershed is recently becoming important. In this study, to predict and estimate the amount of pollutant runoff under a rainfall condition, lumped model was developed and applied to four rivers which are flowing into Isahaya regulation pond. In this model, the process on rainfall–runoff was computed by the runoff function method, and the pollutant runoff was calculated using specific discharge. In the model application, temporal variation of suspended solids (SS) was predicted. From the comparison between observed and calculated results, it is shown that the temporal variations of flood discharge and runoff load of SS were estimated by the developed model with acceptable error.

A85: Calculation of runoff pollution load from the upland field

Yu SUKEKAWA1, Kuriko YOKOTA2, Takanobu INOUE2, Yoko OKUBO2, Yoshitaka MATSUMOTO2

1:Dept. of Architecture and Civil Engineering, Graduate school of Engineering, Toyohashi University of Technology
2:Dept. of Architecture and Civil Engineering, Toyohashi University of Technology

[Takanobu INOUE] inoue@ace.tut.ac.jp

The nutrient salt concentrations of inner bays or lakes are still not decreasing. The nutrient loads from non–point sources are large, however, the actual contribution of the loads to inner bays and lakes is not clarified. In this study the nutrients loads from the upland fields were evaluated by conducting river investigations and a specific load dose was calculated using the obtained data. 70% of annual precipitation has recorded between May and September and red tides were occurred in the Mikawa Bay in this term. Since the primitive unit of pollution load of upland fields established by the Ministry of Environment are based on the investigations in case of fine weather condition, TN and TP load ratios are 6.58kg/km2/day and 0.09kg/km2/day, respectively. The TN and TP load rations obtained using the data collected during rain events in this study were 2.94 and 1.0 in which the ratio of P was quite high.

A86: Runoff characteristics of pesticides for the R. Katsura, the R. Uji and the R. Kidu

Hironori KAWAMURA *
Senichi EBISE **

* Graduate school of Engineering, Setsunan University
** Faculty of Science and Engineering, Setsunan University

kawamura@kyowa–inc.co.jp

We observed every three days to estimate runoff of pesticides in 2007 and 2008 for the R. Katsura, R. Uji and R. Kidu which merges and then become the R. Yodo, which is the main source of water supply in Kinki area. The runoff behaviors of pesticides and those runoff loadings were made clear, and the runoff rate of pesticides and the detected indicator value of the total runoff estimation method were estimated. The runoff of Bromobutide, Simetryn and Pyroquilon were observed in long period. The detected indicator value was lower than the standard one. The runoff rates of Bromobutide and Simetryn were lower than 10 %, and that of Dimethametryn was higher than those.