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REPORT OF THE 1ST ASIAN FISHERIES ACOUSTICS SOCIETY
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ASIAN FISHERIES ACOUSTICS SOCIETY

Asian Fisheries Acoustics Society

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1. PREFACE

During the last decade, we had two International meetings on Fisheries Acoustics in Asia. The first meeting was held in Pusan, Korea in 1997, entitled "International Workshop on Acoustic Surveys of North Pacific Fisheries Resources", and the second meeting was held in Hakodate, Japan in 2000, entitled "International Symposium on Advanced Techniques of Sampling Gear and Acoustical Surveys for Estimation of Fish Abundance and Behavior", both in conjunction with the PICES (The North Pacific Marine Science Organization) annual meetings.

Since after the symposium, the number of researchers in Asia has been increased year by year, and the technologies on underwater acoustics have been highly developed in Asian countries. However, so far, the exchanging information and cooperative works on fisheries acoustics over the countries still look like quite few.

So in this meeting in Dalian, we independently establish the Asian Fisheries Acoustics Society (AFAS) based on past activities in order to promote further progress of science and technologies on Fisheries Acoustics in Asian countries.

Since there are many particular problems in Asian fisheries such like small quantities with numerous species, benthic animals, freshwater fish, and aquaculture, the AFAS aims to apply the acoustical technologies for those problems.

2. Executive Summary

The first meeting of Asian Fisheries Acoustics Society was held at the Dalian Fisheries University, Dalian, China from the 6th to the 8th of November 2007, hosted by Dr. Tang Yong. There were 70 participants from 4 countries. During the meeting, general presentations, discussions for special topics, board meeting and general meeting to establish the AFAS were held.

The statutes, the members of directors, and the action policy of AFAS proposed by the board meeting were approved by all attendants in the general meeting.

In the general presentations, a total of 23 papers were presented and discussed.

Also four discussions for special topics were held, the action policy of AFAS was discussed for the recommendations. Lastly the Chair man declared the establishment of AFAS and recommendations, the first AFAS meeting was closed.

3. Opening Session

Previous to the meeting, the inauguration was held chaired by Prof. Guosheng ZHANG (DFU). VIP guests and leaders were introduced. Prof. Yong CHEN, vice president of Dalian Fisheries University, the host of the meeting, gave a welcome address. Subsequently Prof. Kohji IIDA (HU) gave address as an organizer of the meeting. After the opening ceremony all participants were taken a commemorative picture.

4. Board Meeting

Previous to the general meeting, promoters are called by K. IIDA, the representative of promoters, to have a promoter's meeting. Agenda for the general meeting including the statutes, candidates of directors, action plan of AFAS were discussed.

5. General Meeting

Subsequently, the general meeting chaired by M. FURUSAWA was held in the presence of all attendants, elected K. IIDA as the chairman, nine board members and one advisor

of AFAS. Also the AFAS Statutes and the placement of board meeting (BM), science groups (SG), working groups (WG) were approved. Lastly the chairman K. IIDA declared the establishment of the AFAS, the general meeting was then closed.

5.1 Statutes of AFAS

The Statutes consists of 9 items. 1)Name of the society, 2)Objectives of the society, 3)Activities of the society, 4)the right and the duty of Membership, 5)kinds and election rules of Directors, 6)Management of the society, 7)kinds of Conference, 8)methods and contents of Publication, and 9)Secretariat are defined. (See Appendix 1)

5.2 Directors

Following members were elected as directors.
(1)Chairman: Kohji IIDA, Japan
(2)Board members:
Yasushi Nishimori, Japan.
Tohru Mukai, Japan.
Kazushi MIYASHITA, Japan.
Koki ABE, Japan.
Yoshinori MIYAMOTO, Japan.
Shenyong ZHAO, China.
Yong TANG, China.
Doojin HWANG, Korea.
Rajabidin HASSAN, Malaysia
(3)Advisor: Masahiko FURUSAWA, Japan.

5.3 Science Group (SG)

Placed science groups are follows:
1)Acoustic Technology(SGAT chaired by Y. NISHIMORI)
2)Theory and Target Strength(SGTS chaired by T. MUKAI)
3)Echo Survey(SGES chaired by K. MIYASHITA)
4)Acoustic Application(SGAA chaired by Y. MIYAMOTO)

5.4 Working group (WG)

If the member wants to organize working group on special interest, he/she must submit the proposal which includes (1)Name of WG, (2)Chairperson, (3)Members,(4)Purpose, and (5)Action plan, to the general meeting, then the WG is authorized in AFAS.
The chairperson of the WG must report their activities to the general meeting of AFAS.
Working groups start their activities following the recommendation of this meeting.

6. Science Reports

Total 23 papers are submitted, of which 5 papers are invited, 4 papers are for short presentation. These papers were allotted to 5 sessions.
1) Present States and Characteristics of Fisheries in Asia.
2) Technological Trends in Fisheries Acoustics in Asia.
3) Advanced Technologies in Fisheries Acoustics in Asia.
4) Practical Acoustic Fisheries Surveys in Asia.
5) Promising Technologies in Underwater Acoustics for Fisheries.

6.1 Topic 1: Present States and Characteristics of Asian Fisheries.

(Chaired by K. IIDA)

6.1.1 Jing Dong: Management and Utilization of Fishery Resources in China (Invited)

Liaoning Ocean and Fisheries Science Research Institute, Dalian 116023, P.R. China

China is one of the world's leading fishery countries. In the past twenty years, China has made rapid development in fishery industry. In 2005, the fisheries output in China was 51.02 million tons, accounting for 38% of the world's total, sum of the economic output value was RMB 760 billion Yuan. Of which, marine aquatic products output was 28.38 million tons, accounting for 55.6% of the national total. Marine fishing was 14.53 million tons (including 1.44 million t of the high sea fishing), accounting for 51.2% of the total marine aquatic products. In 2005 the average of everybody's aquatic products possessed 39 kilograms, exceeded 13 kilograms of world's average level. Marine fishery is playing very important function in improving people's food structure, enhancing nutrition level and healthy level. One of the most important reasons of our marine fishery's speedy and steady growth is due to the continuous innovation of fishery technology and resultful fishery management measures which provide powerful support for fishery's sustainable utilization.

6.1.2 Doojin HWANG: Overview of Fisheries in Korea(Invited)

College of Fisheries and Ocean Science, Chonnam National University
(No abstract)

6.1.3 Yasuaki Nakamura: Prospect of Fisheries, and its Research and Technological Development in Japan (Invited)

Dalian Fisheries University & Shanghai Fisheries University, China
Incorporated Administrative Agency: Fisheries Research Agency, Japan

As you know, we, Japanese people, have been using fish as food materials for thousands years, and our animal protein intakes still depend on aquatic products more than 40%. Japanese Fisheries have played important roles in providing stable food supply contributing to the promotion of healthy life and the rich diversity of the Japanese diet. In addition, fishing villages have provided a national relaxation forming inherent culture through its fishing activity with their beautiful natural environment in coastal regions.

Fishery products are very important in the Japanese diet, accounting for 20%of the whole protein(40% of the animal protein)taken in by citizens. Since they also have remarkable nutritional properties, it is necessary to secure stable supply of fishery production the long term. The total fish catch in Japan was more than ten million tons in the 1980's, and is the largest in the world （1972-1988. It amounted to twelve million tons in 1988. However fishery production in Japan has been on the decline since 1989. In recent years, the amount decreased to around six million tons.

The Japanese nation highly expecting sound and sustainable fishing practice under severe circumstance at present. Moreover, because of explosive increase of the world population, balance of supply and demand of food and energy is anticipated to become tightening in future. So, we are urged to strongly increase the capacity of fish production for protein sources, with long-term perspective. Stable food production, environmental conservation and sustainable use of resources are considered as significant challenges toward the 21st century.

Japan is one of the world's leading fishery producers. However, production has been decreasing in recent years due to depleting resources in surrounding waters and tightened international regulations concerning distant water fisheries. Therefore, it is

necessary need to take measures for conservation, management, and sustainable use of resources in Japan's coastal waters. In the 200 nautical miles era, the aims of the Japanese Government to sustain fisheries supply are, ①to rationalize managing structure of fisheries resources of our country in the surrounding waters areas, ②to establish feasible fisheries management based on abundance of its stocks, ③supply safe & secure, and high quality sea foods to meet nation's demand, and ④to encourage fisheries successors for brisk fisheries region.

Research and technological developments on the fisheries, which have taken initiative are also expected to play important roles for promotion of further development. To make fisheries research contribute to fisheries industry and economy in the 21st century, prompt correspondence of the research focus with the administrative guidance is required to resolve the problems as well as technological creativity based on the long-term perspectives.

The Japanese fisheries research is carried out by the Fisheries Research Agency(FRA : separated from Fisheries Agency, 2001,as a new, incorporated administrative agency), universities, prefectural fisheries experiment stations and private companies. FRA is endeavoring to be a mainstay addressing to research, study, technology improvement and development study for fisheries in the 21st century. Based on these activities, the FRA contributes to achieve the policy targets of securing the stable supply of fishery products and promoting the sound development of the fisheries industries, as stipulated by the Basic Plan for Fisheries Policy(in 2002 by the Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries).

FRA consists of Headquarters, nine(9) National Fisheries Institutes, National Salmon Resources Center, Marine Fisheries Research &development Center and sixteen(16) National Centers for Stock Enhancement, twelve(12) Fisheries Research Vessels and about one thousand (1,000) Officials、a wide range of research and development activities on fisheries standing on international arena, from basic research and application through practical use of them, fundamental and application studies for fisheries oceanography, fisheries resources, aquaculture & enhancement, fisheries engineering, fishing ground & environment conservation, fish processing, and fisheries management & economics.

FRA effects overall research and development ranging from development of technology for stock enhancement to research for exploring marine fisheries resources and rationalization of their usage, furthermore, conducting the hatching and releasing of salmon fry to maintain their population, in promoting and facilitating researches and studies in depth to respond to exact needs in field. Also the FRA promotes efficient and affective research and development, disseminates the results and encourages the practical use in their respective fields.

Here in this presentation, I would like to introduce several topics "Prospects of Fisheries, and its Research and Technological Development in Japan" on the following items.

1）Japanese fisheries with special reference to the present status and its promotion.
2）Framework of the fisheries research to promote fisheries development.
3）Recent achievements in fisheries research.
4）Concentration of research on fisheries with its problems and prospects.

6.2 Topic 2: Technological Trends in Fisheries Acoustics. (Chaired by Y. Tang and K. IIDA)

6.2.1 Masahiko FURUSAWA: Progress in Fisheries Acoustics (Invited)

Tokyo University of Marine Science and Technology, 4-5-7 Konan, Minato, Tokyo 108-8477, Japan

Keywords: Fisheries acoustics, Sonar equation, Target strength, Species identification

Fisheries acoustic technology a representative apparatus of which is a fisheries echo sounder has developed as "eyes" of fisheries. Fisheries resources are special resources which could not be sustained if their utilization was not properly governed. For the resources survey purpose, fisheries acoustics plays important roles. In this presentation, the progress in such fisheries acoustics is reviewed with special attention to author's and his colleague's works and to application in Asia. First, the brief outline and history of the fisheries acoustics are shown. Second, important items in the progress or author's work are introduced. Finally, future of fisheries acoustics especially in Asia is surveyed.

A sonar equation plays central roles in designing, evaluation, and utilization of echo sounders and sonars. Appropriate frequencies and detection ranges can be deduced from the equation. One of the components of the equation is the target strength (TS) of fish and it has long been investigated and measured. The study results of the fish TS by author's and other researcher's are introduced. The TSs for fish species abundant in Asian waters have not been well elucidated and should be further studied. The method and accuracy and precision of the acoustics survey which the author have learned from the experiments using culture nets and through the cooperative surveys of walleye pollock with US are described.

There are specific or important problems for acoustic surveys in Asia. Seas around Asia contain multi-species fish, therefore acoustic fish species identification has great importance. Surveys of freshwater fish should be necessary especially in China; we must know some special acoustic features of freshwater and its fish different from seawater. Asian countries generally do not have large scale research vessels, therefore a quantitative echo sounder with robust nature especially against ship noise should be developed. The most important is to make cooperative surveys and an evaluation system of fisheries resources in Asian waters by the acoustic method which is most appropriate because the method is scientific, standardized, efficient compared with other methods.

6.2.2 Xianyong ZHAO: Fisheries Acoustics in Chin – A Brief Review(Invited)

Yellow Sea Fisheries Research Institute Chinese Academic of Fisheries Science

(No abstract)

6.2.3 Tadanori Fujino: Japanese fisheries acoustic study in the past and the future: from the review of presentations given at the annual meeting of Japanese society of fisheries science from 1994 to 2007

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Keywords: Japan, fisheries acoustic

Presentations given at the Japanese society of fisheries science was reviewed from 1994 to 2007. Presentations were categorized into seven fields: Target strength (T.S.), acoustic survey (A.S.), new monitoring method using current technologies (N.M.), development of new technology (N.T.), verification of the measurement value (V.M.), improvement of accuracy (I.A.) and others (O). Species studied were examined too. One hundred seventy two presentations were conducted from 1994 to 2007. Number of presentations has been increasing from 5.7(Average of 1994-1996) to 22.3 (Average of

2005-2007) per meeting. The most major presentation category was TS (30%) followed by A.S. (27%), V.M. (15%), N.M. (15%), N.T. (8%), I.A. (4%) and O (1%). In total 23 species (fish 16, invertebrate 7) were studied. Major species studied were Walleye Pollock (*Theragra chalcogramma*), Isada krill (*Euphausia pacifica*) and Japanese anchovy (*Engraulis japonica*). They occupied 21%, 13% and 12% respectively among the studies focused on living organisms. The high proportion of Walleye Pollock was to answer the ABC (Available Biological Catch) under the TAC (Total Available Catch) system, which started with the ratification of "United Nations Convention on the Law of the Sea" in 1996. Isada krill is commercially important at some northern regions in Japan and it is also an important key species in the marine ecosystem. In the future we need to monitor more species that is important for local commercial fishing and key species that is important to understand the marine ecosystem.

6.2.4 Koki ABE[1], Kazuhiro SADAYASU[1], Kazuo AMAKASU[2], Kouichi SAWADA[1], Ken ISHII[1], Yoshimi TAKAO[1]: **Introduction of Target Strength Measurements at NRIFE in Recent Years**

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[2]*Tokyo University of Marine Science and Technology. 4-5-7 Konan, Minato, Tokyo, 108-8477, JAPAN*
Keywords: Target strength, Tethered method, Swimbladder, Soft X-ray, Theoretical model

Target strength (TS) measurements of juvenile walleye pollock, Japanese anchovy, horse mackerel, grunt, and rockfish have been carried out in a fresh water tank of National Research Institute of Fisheries Engineering (NRIFE). These species are important for commercial fisheries or marine ecosystem, so knowledge of TS are needed for developing of acoustical survey in classification of schools, estimation of fish length, and observation of fish behavior. The tank is 15 m long, 10 m wide, and 10 m deep, and it has such four frequencies as 38 kHz, 70 kHz, 120 kHz, and 200 kHz. TS of large target or the fish that has a swimbladder is measured mainly in this tank. Four transducers are aligned on the motor-driven steel base mounted on the floor of the tank. TS is measured by the tethered method, and a target is suspended above the selected transducer and tilted relative to the beam axis by a computer-controlled rotating system. The tilt angle can be incremented by 1□□, ranging from –50□□ to 50□□ (positive angles correspond to the head towards the source transducer). During TS measurement a prudent attention is paid for the handling of samples. Live samples are transported to NRIFE any samples are not exposed to air until the end of the TS measurement. Swimbladder shape of each sample is observed using a soft X-ray imaging device, before and after the TS measurement. Before the TS measurement a live sample is anesthetized in the water and the swimbladder shape and the whole body shape are X-ray photographed. Target strength pattern of each sample is calculated based on the swimbladder and body shapes. Agreement is found between measurements and calculations. We are trying to construct a TS database of important species.

6.3 Topic 3: Advanced Technologies in Fisheries Acoustics. (Chaired by D. HWANG and K. IIDA)

6.3.1 Yuriko Ohnishi, Takanobu Sato: **Developments of a Split Beam Echo Sounder FCV-30**

Furuno Electric Company, LTD., Nishinomiya, Japan

Keywords: fish size assessment, split beam, beam stabilization, heave compensation

Recently fishermen has began to require the fish species and size assessment function in Echo Sounder. They would like to select the fish school before the catch not only for their efficient catch also for saving their fishery resources. In this background 38kHz Split Beam Echo Sounder FCV-30 was developed. The FCV-30 is a high-performance echo sounder designed for variety of fishing applications. This echo sounder employs two new innovate techniques. One is "Multi-Beam" that facilitates multi directional and long-range fish detection. The other is "Split-Beam" which is commonly used in fish resource surveys. Leading-edge array technologies or processing technologies such as Beam Stabilization, Heave Compensation makes the FCV-30 unparalleled in this class of sounder.

6.3.2 Mitsuhiro Inouchi, Yasushi Nishimori: **Development of a new general echo sounder FCV-620 with the fish size assessment funciton.**
Furuno Electric Company, LTD., Nishinomiya, Japan
Keywords: fish size assessment

The fish size assessment function has been applied to high class echo sounder so far. Such sounders are difficult to be equipped with small fishing vessels because of the size of units and economical situation.
In this background a general type echo sounder FCV-620 was developed for small fishing boats or pleasure boats, having 50/200 kHz transducer and the fish size assessment function. The evaluation result in the fishing field and how fishermen utilize this echo sounder will be presented.

6.3.3 Mengru XU[1], Kohji IIDA[2]: **Determination of Fish Direction Using Double Acoustic Beams**
[1]*College of Ocean Engineering, Dalian Fisheries University, China*
[2] *Faculty of Fisheries Sciences, Hokkaido University, Japan*
Keywords: the acoustic dual beam, position measurement, directive, cross angle

The paper intends to build the hardware and software of the double acoustic beams fish detector, with the object of estimating the distance and position of the target by way of the double acoustic beams method, carries out the position measurement experiment of the standard reflection ball in the aquarium(3m×3m×12m) on June and July, 2006. After that it gets the ratio directive function A/B(dB)with the method of echo strength of transducer and then analyzes the got data. It compares the data with the theoretical one to calculate the estimated precision of position angle. We can conclude if the cross angle is much bigger, t the frequency is much higher and the straight line of he ratio directive function is more inclined, the sphere which is can be measured will be much more smaller. Under the former condition, it is hard to measure the position of the angle. With the help of theoretical calculation, it concludes that the most appropriate condition is the experiment with 400KHz frequency and 5°cross angle. Under this situation, the ratio directive function would be the straight line whose inclined ration is 1.8(dB/deg) from 8°to +3°.

6.3.4 Kohji Iida[1], Yong Tang[2], Tohru Mukai[1], and Yasushi Nishimori[3]: **Fish Abundance Estimation by Quantitative Multi-beam Sonar**

[1]*Faculty of Fisheries Sciences, Hokkaido University, Japan*
[2]*Dalian Fisheries University, Dalian, China*
[3]*Furuno Electric Company, LTD., Nishinomiya, Japan*
Keywords: quantitative sonar, multi-beam sonar, acoustic survey, school count, echo integration

An echosounder provides the information about vertical distribution of fish school along the ship course. However it has some problems such like small sampling volume, and the fish avoidance from the vessel. On the other hand, the scanning sonar provides a horizontal distribution of fish school with long range. Especially recently developed multi-beam sonar provides a 3-dimensional distribution of fish school.
There are four possible methods to estimate fish school abundance using sonar, namely, School counting, Area estimation, Volume estimation, and Echo integration. However all of those methods involve some problems and difficulties. For example, there is an ambiguity of fish school definition in school counting method, non-linearity between fish abundance and fish school area or fish school volume in those two methods, and the uncertainty of target strength of fish in echo integration method. However, in spite of those difficulties, the volume estimation method and echo integration methods are reasonably reliable method to estimate fish abundance using sonar.
This paper discusses about the principles and the applications for fisheries survey using multi-beam sonar.

6.3.5 Kozo Tokuyama[1], Yasush[1] Nishimori[1], Emi Okazaki[1], Koji Iida[2]: Development of low frequency and middle frequency Scanning Sonars and their application for scientific survey

[1]*Furuno Electric Company, LTD., Nishinomiya, Japan*
[2]*Faculty of Fisheries Sciences, Hokkaido University, Japan*
Keywords: scanning sonar, quantitative sonar, low frequency sonar, middle frequency sonar

The acoustic survey of fishery resources using Scanning Sonar is more effective compared to the Echo Sounder survey thanks of the capability of wide range detection. We had developed low frequency Scanning Sonar FSV-30 for fishery use and evolved it to the quantitative scientific Sonar which enabling the survey of fishery abundance. Recently the new middle frequency Scanning Sonar FSV-84 was developed. The middle frequency Sonar is designed to get higher resolution image than low frequency Sonar, contributing the skipper's estimation of species and abundance of fish schools. Therefore the accuracy improvement of the survey is expected by using middle frequency sonar. The field evaluation result in the fishing ground of FSV-84 and the plan for scientific application will be presented.

6.4 Topic 4: Practical Acoustic Fisheries Surveys. (Chaired by Y. NAKAMURA and K. IIDA)

6.4.1 Doojin HWANG[1], Eunho KIM[1], Sunbeom JUNG[1], Ilsu CHOI[1], Wonseok YANG[2], Jooil KIM[2], Taegyun Oh[2], Youngsu AN[3], Sandra PARKER STETTER[4] and John HORNE[4]: Comparison of Geostatistic and Traditional Acoustic Estimates of Anchovy Biomass in Tongyoung Fishing Grounds In 2006

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Acoustic technologies are commonly used to estimate biomass and distribution of fisheries resources in coastal areas and the open ocean. In the southern part of the Sea of Korea, where the pelagic species of anchovy, mackerel and sardine spawn and migrate, catches of these 3 species comprised 50% of the total abundance in Korean waters. Acoustic surveys were conducted on 15-18, June and 27-30, July in 2006 around the Tongyoung, Geojae, and Namhae anchovy fishing ground using a dual beam echosounder (DT-5000, 200kHz Biosonics). Information was obtained on zooplankton, and adult and juvenile anchovy distribution (depth and position). We calculate and compare anchovy biomass using simple summation and geostatistic methods to examine advantages and constraints of the two techniques. In this study, all backscatter is attributed to anchovy. We assumed that the average target strength of anchovy were -65dB and -70dB and that's average body weight were 5g and 3g. Anchovy biomass in June were estimated to be 0.207 million ton by the traditional method and 0.116 million ton by the geostatistic method. In July, anchovy biomass was estimated to be 0.414 million ton at pelagic and 0.021 million ton at bottom by the traditional method and 0.632 million ton at pelagic and 0.028 million ton at bottom by the geostatistic method. In anchovy biomass estimates comparison traditional acoustic method with geostatsitic method, the biomass is similar with two biomass estimates method. But standard deviation are very different both methods. The stand deviation of traditional biomass estimates are 4,457 ton, 6,323 ton and 589 ton. On the other hand geostatistic based biomass estimates are 1,802 ton, 3,730 ton and 147 ton. The standard deviation of traditional biomass estimates are larger than geostatistic based biomass estimates.

6.4.2 Raja Bidin b Raja Hassan[1], Adil b Mohd[2], Nadzri b Seman[1]: Pelagic Fish Stock Assessment Using FQ80 System in Malaysia

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[2]*Research Management Centre, University of Technology Malaysia, Skudai Johor Baru Malaysia*
Keywords: Acoustic survey, pelagic fishery, fish density, biomass estimation

An acoustic survey in the waters of Kedah, Penang, Perak and Selangor were carried out from 23rd February to 13th March 2006 as one of the project components to evaluate pelagic resources in the West Coast of Peninsular Malaysia. The survey was conducted by using the vessel MV SEAFDEC 2 equipped with a scientific echo sounder FQ80. The survey runs simultaneously with other research components including physical and biological oceanography and fish larvae. The total areas of 27,838 km2 were surveyed comprising coastal and offshore waters. Raw data of back scattering strength from 81 transects were recorded by FQ80 data analyzer. Data were analyzed using the built-in FQ80 Data Analyzer software and EXCEL. Quantitative assessment for biomass estimation was carried out using average fish density for each transect. Calculation of fish density was based on dominant pelagic species for each transect. The total pelagic biomass was estimated about 209,798 metric tones not including another 11.9% of the whole survey area in 1998.

6.4.3 Tohru MUKAI[1], Miyuki HIROSE[2], Doo-Jin HWANG[3], and Kohji IIDA[1]: **The Challenges of Acoustically Estimating the Distribution and Abundance of Giant Jellyfish *Nemopilema nomurai***

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[2]*Graduate School of Fisheries Sciences, Hokkaido University (Pres. Addr.: Japan Sea National Fisheries Research Institute, Fisheries Research Agency, Chuou, Niigata, 951-8121, Japan)*
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Keywords: echo sounder, jellyfish, target strength, frequency characteristics, ex situ and in situ

Recently, massive agglomerations of giant jellyfish have been observed very frequently near the Japanese coast. This phenomenon could damage local fisheries, so prevention measures are urgently required. Information about the species' widespread distribution and abundance is vital to predict the appearance of these huge groups of giant jellyfish. Acoustic techniques are frequently employed to gather this kind of information. If this type of technique is applicable to giant jellyfish, it should reveal their three-dimensional distribution over a broad area within a short period of time. Monitoring an organism using acoustic techniques requires a good understanding of the organism's acoustic characteristics, but no previous studies have investigated the acoustic characteristics of giant jellyfish. The final goal of this study was to apply acoustic techniques to monitor giant jellyfish; this required, initially, investigating their acoustic scattering properties and determining how acoustic techniques could be applied to estimate their distribution and abundance.
From 2003 to 2007, the acoustic scattering properties of giant jellyfish were investigated by conducting ex situ measurements in a sea-water tank using a tethered method, theoretical estimations using an acoustic scattering model, and in situ field surveys using a quantitative echo sounder. Three frequencies were used when surveying the giant jellyfish: 38, 120, and 200 kHz.
The results showed that giant jellyfish have relatively low target strength (TS), as compared to fish and other organisms, and that this is greatly affected by changes in their morphology and swimming profile. Furthermore, ex situ measurements in the sea-water tank, and theoretical approximations using acoustic models, revealed that their TS reaches a maximum at 120 kHz, and becomes progressively lower at frequencies of 200 kHz and 38 kHz, respectively. Furthermore, field surveys revealed that echogram responses of giant jellyfish become spotty at frequencies of 38, 120, and 200 kHz. It is plausible that we will be able to use these characteristics to differentiate giant jellyfish from other organisms and, in so doing, shed light on some of their characteristics, such as vertical distribution, diurnal behavior, etc. We plan to conduct more studies to explain other characteristics, including their swimming action and their symbiotic relationship with fish, among other features. In the future, if suitable periods and times for acoustic surveying were selected, we will enable a practical application of acoustic monitoring to giant jellyfish.

6.4.4 Yong TANG[1], Yongzhen LI[2], Guobao CHEN[2], Zhongze ZHANG[1], Chuancai XU[1] and Kouji IIDA[3]: **Investigation of White Fish Coregonus peled Using EY60 in China's Salimu Lake**

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[2]*South Sea Fisheries Research Institute Chinese Academic of Fisheries Science, 231 Xingang-xilu Guangzhou, China*
[3]*Hokkaido University, Faculty of Fisheries Science, Hakodate, Japan*
Keywords: White fish, Salimu Lake, distribution, fresh water fish

The Salimu Lake is located in northwest of Xinjiang, which in northwest area of China. The altitude of lake is 2070m; the area is 453km2; the maximum depth is 100m. After the subfrigid zoon white fish Coregonus peled was introduced into the Salimu Lake from Russia in 1998, the releasing and propagation have been conducted. The Salimu fishing became a new important local economies domain. However, the fish catch has decreased quickly abruptly since May.2007, although the amounts of releasing increased annually. This has affected severity the development of relative domain. So, for proving up the abundance and distribution of white fish, the integrations were carried out by using the acoustical method. In first step, a commercial echo sounder (FCV551, 200kHz, FURUNO) was used to observed the distribution of white fish in Jul. 28 2007 and the EY60 quantitive echo sounder (120kHz, Simrad) was used to investigate the lake along the survey line in Aug. 31 2007. The calibration was tried to carry out with the cooper sphere attached EY60 in lake. On offline data processing, the data was analyzed by using Echoview software. The horizontal and vertical distribution of white fish and other aquatic in lake and the characteristic in day and night were obtained. Also, the biologic abundance was being analyzed at first step. The preliminary result showed that the fisheries abundance could be estimated by using EY60 in fresh water, although there are some of problems need to be solved in further work, e.g. the target strength (TS) of white fish and other aquatic animals, developing a simple gear for sampling fish and difference frequency technology application.

6.5 Topic 5: Promising Technologies in Underwater Acoustics for Fisheries. (Chaired by K. ABE and K. IIDA)

6.5.1 Kohji Iida[1], Rika Takahashi[1], Tohru Mukai[1], Yong Tang[2], and Masanori Sato[3]: Application of Underwater Ultrasonic Camera for Fisheries

[1]*Hokkaido Univ., 3-1-1 Minato, Hakodate, Hokkaido 0418611 Japan*
[2]*Dalian Fish. Univ., 52 Heishijiao-jie Shahekou, Dalian 116023 China*
[3]*Honda Electronics Co., Ltd., 20 Oyamazuka, Oiwa-cho, Toyohashi, Aichi 4413193 Japan*
Keywords: ultrasonography, acoustic camera, ultrasonic camera, gender identification

An ultrasonic camera is originally used for medical diagnosis of human body. However it is also useful for both scientific and commercial fisheries. This paper discussed about several applications of underwater ultrasonic camera for fisheries.
One is the observation of marine animals. An ultrasonic camera enclosed in a pressure-resistant case was constructed to observe underwater animals. This enabled the measurement of the size, shape, and behavior of living marine animals including internal organs in the detection range up to 240 cm. Observations were conducted for captive animals in a water tank and for natural animals in a field. The captive animals, including fish, squid and jellyfish were observed, and a three-dimensional internal structure of animals was reconstructed using multiple acoustical images. In a field experiment, the shape, size, and swimming behavior of wild animals were observed.
The other one is the application for the quality inspection for fresh fish. There are few species that have high commercial value in their gonads. For example, ovaries in salmon, cod, walleye pollock, beluga, and spermaries in cod are especially welcomed

among people as favorite foods. However it is not easy to judge the gender of fresh fish by appearances. Therefore the non-destructive methods using acoustics to determine sex and maturity quickly are useful. Methods to identify fish gender and to estimate size and maturity of fish gonads non-destructively using acoustics are discussed.
The possibilities and limitations of the underwater ultrasonic camera for fishery applications are discussed.

6.5.2 Yoshinori MIYAMOTO[1], Masahiko FURUSAWA[1], Shintaro ARATA[2], Katuji MIWA[2], Keiichi UCHIDA[1], Toshikazu MOTOYOSHI[3] and Toshiharu KAKIHARA[1]: **3-D SBL Digital Underwater Positioning System using GNSS Compass**
[1] *Tokyo University of Marine Science and Technology, 4-5-7 Konan, Minato, Tokyo 108-8477, Japan*
[2] *Koden Electronics Co., LTD., 2-13-24 Tamagawa, Ota, Tokyo 146-0095, Japan*
[3] *The Graduate School of Tokyo University of Marine Science and Technology, 4-5-7 Konan, Minato, Tokyo 108-8477, Japan*
Keywords: Underwater positioning; pinger; digital signal processing; GNSS compass

A highly digitized underwater positioning system using the SBL method was developed. This system can measure highly accurate 3-dimensional positions of marine organisms equipped with an ultrasonic transmitter (pinger).
This system is combined with a GNSS (GPS) compass which measures the bearing, the location (latitude and longitude), and the commotion (rolling angle and pitching angle) of a boat or a buoy.
Then the pinger positions are compensated for the commotion and are translated into the underwater absolute positions. The four arbitrary frequencies of the pingers are received by four wide band hydrophones. The received signals are immediately AD converted in high-speed and processed by the quadrature detection and the digital filtering with a bandwidth of 3kHz using FPGA.
Finally, the receiving time differences are measured by the cross correlation realizing a resolution of 0.01msec. A position measurement experiment was performed in a water tank (length 15m, width 10m, depth 10m) changing the position of a pinger and it is confirmed that almost the expected accuracy could be realized. Moreover, this system was installed in a boat and the absolute positions of a fish were pursued to confirm the practicality.

6.5.3 Aki MIYAGI[1], Yoshinori MIYAMOTO[2], Tomohito IMAIZUMI[1], Keiichi UCHIDA[2], Toshiharu KAKIHARA[2], and Ryo YAMAGUCHI[3]: **Receiving Range of The Stationary Ultrasonic Biotelemetry Receiver in The Temperate and Tropical Ocean**
[1]*The Graduate School of Tokyo University of Marine Science and Technology, 4-5-7,Konan,Minato-ku,Tokyo,108-8477,Japan*
[2]*Tokyo University of Marine Science and Technology, 4-5-7,Konan,Minato-ku,Tokyo,108-8477,Japan*
[3]*The under-graduate students of Tokyo University of Marine Science and Technology, 4-5-7,Konan,Minato-ku,Tokyo,108-8477,Japan*
Keywords: Ultrasonic, Biotelemetry, Pinger, ambient noise level, receiving range

The stationary ultrasonic receiver (VR2 made by the Canada VEMCO Co.) of the ultrasonic biotelemetry is utilized in the research of many marine organisms behaviors. This receiver is single channel receiver (69kHz) capable of identifying the coded transmitters (pingers). It records the identification number, sensor data (if any) and

time stamp from pingers as the animal being studied travels within receiver range. The receiving distance is possible to the simulation on a maker's Web. However, the detailed specification of this receiver is not shown. In many cases, the researcher has determined receiving distance by survey.
The investigation by the ultrasonic biotelemetry currently performed in Asia is shallow ocean space where water temperature is high. Furthermore, there is also much underwater noise, such as Pistol shrimp (*Alpheus lobidens*), in this ocean space. Therefore, differing from the receiving range that a maker recommends is assumed.
Then, the maximum detection distance of VR2 was measured in the tank. From that result, the simulation that shows the detection range of this receiver quantitatively was performed. Moreover, the receiving range was measured in real ocean space, and change by oceanic condition was verified.
Consequently, receiving distance brought a result shorter than a maker's simulation. Also, the receiving distance was sharply changed by wind and weather.

6.5.4 Yang DAI, Wei FAN: Review on tagging techniques and Current status of Pop-up Tag

East Sea Fisheries Research Institute Chinese Academic of Fisheries Science

The tagging technique is very useful on study of the fishery resource. Along with the technical progressing, many high technologies have been applied to modern tagging techniques, however, this high-tech tagging techniques is not been widely used in China. In this article, several types of conventional tagging technique are reviewed roughly, and then, the principle of Pop-up Tag, one type of high-tech tagging techniques and which is developed in the last 10 years, is introduced. To improve the application of the Pop-up Tag, two main Pop-up Tag factories and the characteristic of they produces are introduced in detail.

6.5.5 Yongzhen LI: Acoustic assessment of five groups commercial fish in the northern waters of South China Sea

South Sea Fisheries Research Institute Chinese Academic of Fisheries Science

A fishery acoustic survey was conducted in the northern waters of South China Sea by calibrated Simrad EK500 echosounder on board R/V “Beidou” in spring (April to June), summer (July to September), autumn (October to December) and winter (December to February) from December 1997 to June 1999. Based on the data, this article assessed the stocks of 23 species of 5 commercial taxonomical groups——*Trichiuridae* were assessed, *Decapterus maruadsi*, *Trachurus japonicus*, *Nemipterus* and *Priacanthidae*. The results show that stocks of Trichiuridae, Decapterus maruadsi, Trachurus *japonicus*, *Nemipterus* and *Priacanthidae* were 5.04×105 t, 1.63×105 t, 1.04×105 t, 9.8×104 t and 9.2×104 t, respectively, in the north waters of South China. In addition, regional distribution and seasonal variation of stock densities of the species were still analyzed.

6.5.6 Guobao CHEN: Acoustic assessment of non-commercial small-size fish resources in the northern waters of South China Sea

South Sea Fisheries Research Institute Chinese Academic of Fisheries Science

Based on fishery resources survey data collected in the northern waters of South China

Sea using a calibrated Simrad EK500 echosounder on board R/V "Beidou" from December 1997 to June 1999, this article assessed the stocks of 58 species of 5 non-commercial small-size taxonomical groups—*Apogonidae*, *Leiognathus*, *Myctophidae*, *Champsodon* and *Bregmacerotidae* in the waters. The results show that they have relatively abundant stocks in the northern waters of South China Sea, the average values being 18.5×104 t, 26.1×104 t, 22.3×104 t, 17.6×104 t and 4.5×104 t in Spring, Summer, Autumn and Winter respectively. In addition, the article also analyzed the regional distribution and seasonal variation of the stock densities of the species.

6.5.7 Tan xichang[1,3], Li xinghui[1], Chang jianbo[2], Tao jiangping[2,3]: Some applications of using EY60 echo-sounder for fish research in China's inland waters
[1]*Pearl River Fishery Research Institute, CAFS, Guangzhou 510380*
[2]*Institute of Hydroecology, Ministry of Water Resources & Chinese Academy of Science, Wuhan,430079,*
[3]*Institute of Hydrobiology,Chinese Academy of Science, Wuhan,430072*
Keywords: hydroacoustic, inland waters, fish research, China

Using Simrad EY60 split-beam echo-sounder, the distribution and abundance of fish in several China's inland waters (Yangtze River, Pearl River, Qinghai Lake and Three Gorge Reservoir) was studied between 2005 and 2007. The result showed that hydroacoustic survey can provide some necessary information for fish protect and river ecology management in inland waters of China. In Yangtze River, Chinese Sturgeon was observed in spawning ground under the Gezhouba Dam, this fish is dangerous for the population of breed stocks is decreasing; In Pearl River, spawning aggregation of *Megalobrama hoffmanni* were obviously observed and the different of behavior of fish population between two spawning grounds was described; In Qinhai Lake, the fish was observed mainly distributing near the delta of tributary; and in Three Gorge Reservoir, fish was mainly distributed adjacent to tributary mouths. At the same time, we recognize that more work should be done about species identification, TS-length relation, GIS system.

7. Discussion

There are 4 discussion times in the meeting. Language is assumed in English, but the mother languages of the members are also available. The secretary records the contents of discussion for compiling the record book. The themes of discussion are as follows.

7.1 Theme 1: What are the characteristics of Asian Fisheries?

(1)Make clear that the characteristics and the differences of fisheries in Asia comparing to Europe and North America.

- Many fish species, smaller fishing ground than Europe, Many fishing method, Korean people likes raw fish, etc.
- Multi-species
- Catch and Fishing effect were increasing during 1975 to 2000.
- After stepping into the 21st century, the increase of output keeps stable because a series of management measures were carried out under national and local government, such as law, fishery resources restoration systems, nature preservation zone, artificial reef, stock enhancement etc.
- It is different in fishing species, small sized. A low valued fish have become main components in china and china managed fishery resources ell eitively,

but TAC system was not be carried out.

- Fish species is mixed in Asia
- Difficult to separate of each fish species.
- It is very difficult to estimate of stock.
- Uncontrolled fisheries are competitive.
- Multi species in tropical waters.
- Swell schooling behavior
- Asian country has poor ability to manage the fishery resources compared to Europe and North America. There is a high species diversity, people utilize many species.

(2)Compare the characteristics of fisheries in Asia by country, by species, by fishing method, by fishing scale, freshwater/seawater, etc.

Item	Characteristics
Region	KOREA
Species	Anchovy, mackerel, sardine, squid, saury
Fishing method	Trawl, Purse seine, Fish pot, Jigging, Gill net
Fishing scale	Lange scale (Trawl, purse seine, etc), small scale (Gill net, Fish pot)
Freshwater/Seawater	Salmon, carp, crustacean, eel

Item	Characteristics
Region	CHINA
Species	little yellow croaker, Spanish mackerel, chub mackerel harvest fish, flatfishes, fleshy, anchovy, scaled sardine, gizzard-shad, common squid.
Fishing method	Trawl, purse seine, drift net. set.net, angling
Fishing scale	Catch and fishing effort ware increasing during 1975 to 2000, marine aquatic out put was 28 to 38 MT in 2005. marine fishing was 14.53MT
Freshwater/Seawater	Carp, grass carp, mullet, chub, herring

Item	Characteristics
Region	JAPAN
Species	spot lined sardine, Japanese horse mackerel, chub mackerel, blue mackerel, Pacific saury, Alaska pollock, Japanese common squid, stay club, walleye pollack, Japanese sardine, Japanese anchovy, Japanese common squid, eel, tuna, skip jack.
Fishing method	purse seine, sub & mid trawl net, stick-held dip net long line, set net, trawl, squid jigging.
Fishing scale	Coastal fishery : small, mid>small size
Freshwater/Seawater	Freshwater : mainly aquafarming. eel, rainbow trout, ayu Seawater : aquafarming and fishing.. red bream, young yellow tail, abalone, laver, pearl, oyster 8 common scallop
Notice	We must consider the conflict between fish catch in the world and whales predatory for sustainable yield in future corresponded increasing world population.

	Fish catch world：90 million tons amount of whale's predatory：3～500 million tans. *by comparison whale's it 3～5 times than catch

Item	Characteristics
Region	MALAYSIA
Species	Pelagic and Demersal species, multi species mainly dominated by Mackerels, Roundscad and Sea breams
Fishing method	Purse seine, trawl, handline and traps
Fishing scale	Small scale fisheries, medium and Commercial fisheries
Freshwater/Seawater	Pond culture, Cage culture, Open sea cage culture, sea weeds culture. Good potential for higher production ~ 600,000 mt/ year

7.2 Theme 2: What kinds of Fisheries Acoustics are studying in Asia?

(1) List up and evaluate the acoustic works which are going on in Asia.

KOREA

Organization	Name/Group	Activity
University	PKNU	Principles, TS measurement.
Ditto	CNNU	TS measurement, echo survey, Jellyfish, artificial reef
ditto	CJNU	no information
ditto	GSNU	no information
National Institute	KORDI	Acoustic survey, TS measurement
ditto	NFRDI	Acoustic survey, Jellyfish
ditto		

JAPAN

Organization	Name/Group	Activity
University	Tokyo UMST	Antarctic krill TS and survey, Plankton acoustics, multi-frequency inversion, Biotelemetry
ditto	Hokkaido U.	Acoustic survey, TS measurement, jellyfish, biotelemetry, sonar, acoustic camera, acoustic instrument.
ditto	Fishery U.	Acoustic survey, sonar, artificial fish reef
ditto	U. Tokyo	Ecosystem
ditto	Kagoshima U.	Animal observation
National Institute	NRI FE	Fish and plankton TS, echo survey, sonar, underwater vehicle, Jellyfish, bioacoustics.
ditto	NRI Hokkaido	Echo survey, walleye Pollock
ditto	NRI Tohoku	Echo survey, common squid, demersal fish, trawl.
ditto	NRI Japan Sea	Jellyfish
ditto	NRI Far Seas	Echo survey, southern blue-fin tuna, cetacean
ditto	NRI Seikai	Acoustic survey, sardine, Japanese mackerel
Prefecture Institute	Hokkaido	Acoustic survey, walleye Pollock

ditto	Aomori	Acoustic survey, common squid, artificial reefs
ditto	Tottori	Acoustic survey, horse mackerel, Japanese mackerel
ditto	Ibaraki	Sonar survey, sardine, mackerel, horse mackerel, anchovy
Corporation	Furuno Elec. Co	Manufacture Echo sounder, multi-beam sonar, calibration, theoretical analysis
ditto	Kaijo Sonic Co	Manufacture Echo sounder, multi-beam sonar
ditto	Nippon Kiyo Co	Distribute import instrument, user support

CHINA

Organization	Name/Group	Activity
University	DLFU	Interest field for application of acoustics as, 1) Stock assessment of marine product. 2) Evaluation of efficiency of loosing by stock enhancement.
ditto	Ocean U. China	No information.
ditto	SHFU	No information.
National Institute	YSFRI	Acoustic survey, hair tail, TS measurement
ditto	ECSFRI	No information

(2)Collect the information related to Fisheries Acoustics. i.e. government agency, educational institution, research institution, survey vessels, facilities, researchers, research organizations, and research themes.(omitted)

7.3 Theme 3: How do we proceed the Asian Fisheries Acoustics?

(1) Where and what kinds of acoustic technologies are required to contribute?

- Robust echo sounder
- Species classification
- Unify technologies (software and hardware) to research of fish resources.
- Develop a effective way to monitor small pelagic fishes. Small pelagic fish has a large proportion to the total catch in all countries and it's biomass fluctuation is most case correlated to change of the ecosystem. For fisheries importance and ecological monitoring importance, it is good to work on improve the monitoring of small pelagic fish for the first step.
- Size estimation, separation, ecological characteristics, deepwater, diurnal migration, acoustic age decomposition.
- Species recognition, multi species estimation, Survey protocol, TS estimation techniques.
- High resolution, good image quality equipment for shallow water, species identification by wide-band system.
- Cheaper data processing software, echo verification, sampling technologies, TS measurement.

(2) What is the most suitable method of acoustic fish resource survey in Asia?

- Based on the old acoustic method will be the standard in Asia.
- Quantitative echo sounder or sonar with multi-beam and multi-frequency system.
- Sonar for pelagic fish, low price equipments like two frequencies echo-sounder.
- Based on the traditional acoustic method will be the standard method in Asia.

(3) Discuss about significance and possibility of relevant technologies for fisheries using underwater acoustics.

- Biotelemetry using the ultrasonic transmitter pinger for fish behavior analysis.
- Fishing gear shape in the sea by underwater positioning system.
- Turtle excluder device from gill net fishery using underwater acoustics.

7.4 Theme 4: Recommendations for Fisheries Acoustics scientists in Asia.

(1) What is the most important and urgent issue in the fisheries acoustics in Asia?

- Species: commercial fish, TAC, ABC species/ Place: coast area/ Method: Firstly use conventional technology and techniques to record to the database, then find the problems from the database to use new technologies./ instrumentation: use conventional system and make free software.
- There are high importance in fishery and urgent need for monitoring the stock abundance in each Asian country. However people working on the fisheries acoustics are still few especially in China and Korea. Appeal and the understanding of the effectiveness to the government is our urgent task. For this purpose, Japanese scientists should show the results, what the acoustic survey contribute to the stock assessment. In referring the substantial topics, monitoring of chub and blue mackerel, anchovy, horse mackerel and round herring are important. We should develop methods to identify these species. As the freshwater species is highly important and is considered there is huge population in China, freshwater acoustics must be the important topic.
- I hope discuss about acoustic technology between acoustic user and acoustic researcher about, 1. TAC & Tuna(whale), 2. Sea water, 3. newest technology, and 4. hardware / software.
- Species identification and echo verification, TS measurement database (compilations of TS measurement from Asian countries)

8. Recommendations

(1) We establish the Asian Fisheries Acoustics Society (AFAS) to promote further progress of science and technologies on Fisheries Acoustics in Asia.
(2) To achieve the objectives of the society, we set up the Statutes, Science groups and Working groups.
(3) We have a general meeting every year in Asia to share the information about Fisheries Acoustics.

APPENDIX 1.

Asian Fisheries Acoustics Society
AFAS Statutes

1. Name

The name of this society is Asian Fisheries Acoustics Society.

2. Objective

The Asian Fisheries Acoustics Society promotes the progress and the popularization of science and technologies on Fisheries Acoustics in Asia.

3. Activities

The Asian Fisheries Acoustics Society has the following programs.

(1) It organizes the science meeting to discuss on Fisheries Acoustics.
(2) It researches the specific theme on Fisheries Acoustics in Asia.
(3) It contributes the education and training about Fisheries Acoustics in Asia.
(4) It supports the cooperative works for acoustic surveys and experiments in Asia.
(5) It emits the profitable information about Fisheries Acoustics for members.

4. Membership

(1) Any researchers who are interested in Fisheries Acoustics in Asia, or who support the AFAS activities can become regular members of AFAS.
(2) A person who wants to join the membership should propose the application to AFAS secretariat with personal information (i.e., name, affiliation, address, TEL/FAX, Email)

5. Directors

(1) Chairman(1 person), board members(15 persons), Scientific advisers(2 persons), and secretary(1 person) are placed in this society.
(2) Chairman is elected by the regular member's vote in the general meeting based on the recommendation by the board of directors.
(3) Board members are elected by the current board of directors.
(4) Scientific Advisers and Secretary are invited by the board.
(5) Director's term of office is two years. However, it is possible to be reappointed.

6. Management

(1) This society is managed under voluntary donation by members and supporters.
(2) This society does not collect membership fee from members.
(3) The fiscal year of this society is assumed from April 1 every year to March 31 next year.

7. Conference

(1) Conferences consist of the general meeting, directors meeting, and the meetings of science committee (SC), studying group (SG), and working group (WG).
(2) The general meeting is held once in a year in Asian country.
(3) The member can make research presentation and discussion at the annual meeting.

8. Publication

This society publishes the report book after the annual meeting as soon as possible.

9. Secretariat

The secretariat has its office in the chairman's affiliation.

Enacted in November 6, 2007

APPENDIX 2.

The First Meeting of Asian Fisheries Acoustic Society
AFAS 2007

Place: Multi-Function Chamber, Dalian Fisheries University
Date: November 6-8, 2007
地点：大连水产学院图书馆多功能厅

Registration: Nov.6th 8:00 ~ 9：00
报到地址：大连水产学院图书馆大厅
报到时间：11 月 6 日 8:00 ~ 9：00

PROGRAM

11 月 6 日 第一天上午会议
Nov.6th AM Meeting

Inauguration
开幕式

主持 (Chair): 张国胜，大连水产学院海洋工程学院院长
Guosheng Zhang, Dean, College of Ocean Engineering, Dalian Fisheries University

9:00 - 9:30
1. 领导来宾介绍
Introduction of VIP guests and leaders
2. 大连水产学院 校领导 致欢迎词
Welcome Address by the Leader of Dalian Fisheries University
3. 議长致开幕词
饭田浩二,日本北海道大学教授
Chairman’s inauguration address
Kohji IIDA, Professor, Hokkaido University
4. 纪念合影
Souvenir picture

SESSION I
Present State and Characteristics of Asian Fisheries
亚洲渔业资源特征介绍

主持 (Chair): 飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaido University

10:00 – 10:30 董婧，辽宁省海洋水产科学研究院
Jing DONG, Liaoning Ocean and Fisheries Science Research Institute
Management and Utilization of Fishery Resources in China(Invited)

10:30 – 11:00 黄斗凑，韩国忠南国立大学校水产海洋科学学院
Doojin HWANG, College of Fisheries and Ocean Science, Chonnam National University
Overview of Fisheries in Korea(Invited)

11:00 – 11:30 中村保昭，大连水产学院/上海水产大学/日本水产综合研究中心

Yasuaki NAKAMURA, Dalian Fisheries University/ Shanghai Fisheries University/ Fisheries Research Agency, Japan
Prospective of Fisheries, and its Research and Technological Development in Japan(Invited)

11:30 - 12:00 讨论 (Discussion)

12:00– 13:30 **会议午餐 (Lunch)**

11 月 6 日 第一天下午会议
Nov.6th PM Meeting

13:30 - 14:30 **General Meeting of Asian Fisheries Acoustic Society**
AFAS 总会

主持 (Chair) : 古澤昌彦，日本东京海洋大学
Masahiko FURUSAWA, Tokyo University of Marine Science and Technology

14:30 – 14:45 **休息 (Service)**

Session II
Technological Trends in Fisheries Acoustics
渔业水声技术动向

主持 (Chair) : 汤勇，大连水产学院海洋工程学院
Yong TANG, College of Ocean Engineering, Dalian Fisheries University
飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaido University

14:45 – 15:10 古澤昌彦，日本东京海洋大学
Masahiko FURUSAWA, Tokyo University of Marine Science and Technology
Progress in Fisheries Acoustics(Invited)

15:10 – 15:35 赵宪勇，中国水产科学院黄海水产研究所
Xianyong ZHAO, Yellow Sea Fisheries Research Institute Chinese Academic of Fisheries Science
Fisheries Acoustics in Chin – A Review(Invited)

15:30 – 15:50 藤野敬忠，日本北海道大学北方生态地域科学中心
Tadanori FUJINO, Field Science Center for Northern Biosphere, Hokkaido University
Fisheries Acoustic Study in Japan in the Past and the Future
-from the review of presentations given at the annual meeting of Japanese Society of Fisheries Science from 1994 to 2007-

15:50 – 16:10 安部幸树，日本水产综合研究中心水产工学研究所
Koki ABE, National Research Institute of Fisheries Engineering, Fisheries Research Agency
Introduction of Target Strength Measurements at NRIFE in Recent Years

16:10 – 17:00 讨论 (Discussion)

17:30 – 19:30　会议晚宴 **(Conference Dinner)**

11 月 **7** 日 第二天上午会议
Nov.7th AM Meeting

Session III
Advanced Technologies in Fisheries Acoustics
漁业水声的最新技术

主持 (Chair) :　黄斗凑，韩国忠南国立大学校水产海洋科学学院
Doojin HWANG, College of Fisheries and Ocean Science, Chonnam National University
飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaido University

9:00 – 9:20　大西由利子，日本古野电气株式会社
Yuriko Ohnishi, Furuno Electric Company, LTD
Developments of a Split Beam Echo Sounder FCV-30

9:20 – 9:40　西森靖，日本古野电气株式会社
Yasushi NISHIMORI, Furuno Electric Company, LTD
Development of a new general echo sounder FCV-620 with the fish size assessment function

9:40 – 11:00　徐梦儒，大连水产学院海洋工程学院
Mengru XU, College of Ocean Engineering, Dalian Fisheries University
Determination of fish direction using double acoustic beams

11:00 – 11:20　飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaido University
Fish Abundance Estimation by Quantitative Multi-beam Sonar

11:20 – 11:40　德山浩三，日本古野电气株式会社
Kozo TOKUYAMA, Furuno Electric Company, LTD
Development of low frequency and middle frequency Scanning Sonars and their application for scientific survey

11:40 – 11:30　小组讨论 (Group Discussion)

11:30 – 12:00　总体讨论 (General Discussion)

12:00 – 13:30　会议午餐 **(Lunch)**

11 月 **7** 日 第二天下午会议
Nov.7th PM Meeting

Session IV
Practical Acoustic Fisheries Survey
音響水産資源調査の実際

主持 (Chair) :　赵宪勇，中国水产科学院黄海水产研究所

Xianyong ZHAO, Yellow Sea Fisheries Research Institute Chinese Academic of
飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaidao University

13:30 － 13:50　黄斗凑，韩国忠南国立大学校水产海洋科学学院
Doojin HWANG, College of Fisheries and Ocean Science, Chonnam National University
Comparison of Geostatistic and Traditional Acoustic Estimates of Anchovy Biomass in Tongyoung Fishing Grounds In 2006

13:50 － 14:10　**Raja Bidin b Raja HASSAN**, Marine Fishery Resources Development and Management Department, Department of Fisheries Malaysia
Pelagic Fish Stock Assessment Using FQ80 System in Malaysia

14:10 － 14:30　向井徹，日本北海道大学水产学部
Tohru MUKAI, Faculty of Fisheries Sciences, Hokkaido University
The Challenges of Acoustically Estimating the Distribution and Abundance of Giant Jellyfish *Nemopilema nomurai*

14:30 － 14:50　汤勇，大连水产学院海洋工程学院
Yong TANG, College of Ocean Engineering, Dalian Fisheries University
Investigation of White fish *Coregonus peled* Using EY60 in Salimu Lake of China

14:50 － 15:10　休息 (Service)

Session V
Promising Technologies in Underwater Acoustics for Fisheries
水中音響の水産分野への応用

主持 (Chair) :　安部幸树，日本水产综合研究中心水产工学研究所
Koki ABE, National Research Institute of Fisheries Engineering, Fisheries Research Agency
飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaido University

15:10 － 15:30　飯田浩二，日本北海道大学水产学部
Kohji IIDA, Faculty of Fisheries Sciences, Hokkaidao University
Application of Underwater Ultrasonic Camera for Fisheries

15:30 － 15:50　宫本佳则，日本东京海洋大学
Yoshinori MIYAMOTO, Tokyo University of Marine Science and Technology
3-D SBL Digital Underwater Positioning System using GNSS Compass

15:50 － 16:10　宫城亜紀，日本东京海洋大学
AKI MIYAGI, Tokyo University of Marine Science and Technology
Receiving Range of the Stationary Ultrasonic Biotelemetry Receiverin the Temperate and Tropical Ocean

（Short Presentation）
16:10 － 16:20 戴阳，中国水产科学院东海水产研究所
Yang DAI, East Sea Fisheries Research Institute Chinese Academic of Fisheries Science
Review on tagging techniques and Current status of Pop-up Tag

16:20 － 16:30　李永振，中国水产科学院南海水产研究所

Yongzhen LI, South Sea Fisheries Research Institute Chinese Academic of Fisheries Science
Acoustic assessment of five groups commercial fish in the northern waters of South China Sea

16:30 – 16:40 陈国宝，中国水产科学院南海水产研究所
Guobao CHEN, South Sea Fisheries Research Institute Chinese Academic of Fisheries Science
Acoustic assessment of non-commercial small-size fish resources in the northern waters of South China Sea

16:40 – 16:50 Xichang TAN

16:50 – 17:20 General Discussion(总体讨论)

17:20 - 17:30 Closing Ceremony(闭会式)

18:00 – 20:00 **会议晚宴 (Conference Dinner)**

11 月 8 日 第三天 参观大连渔业博览会
Nov.8th Visit the Exhibition of Asian Fisheries

APPENDIX 3.

DISCUSSION 1 (1stAM)
What are the characteristics of Asian Fisheries?

(1) Let's make clear that the characteristics and the differences of fisheries in Asia comparing to Europe and North America.

(2) Compare the characteristics of fisheries in Asia by country, by species, by fishing method, by fishing scale, freshwater/seawater, etc.

Item	Characteristics
Country/Region	
Species	
Fishing method	
Fishing scale	
Freshwater/Seawater	

DISCUSSION 2 (1st PM)

What kinds of Fisheries Acoustics are studying in Asia?

(1) List up and evaluate the acoustic works which are going on in Asia.

Country	Name/Group	Activity

(2) Collect the information related to Fisheries Acoustics. i.e. government agency, educational institution, research institution, survey vessels, facilities, researchers, research organizations, and research themes.

Name of Institution	Category (1)Government (2)Institute (3)University	Facilities (1)Vessel (2)Echo-sounder (3)Water tank	Nr. of Staff	Research theme (briefly)

DISCUSSION 3 (2nd AM)

How do we proceed the Asian Fisheries Acoustics?

(1) Where and what kinds of acoustic technologies are required in Asian countries?

(2) What is the most suitable method of acoustic fish resource survey in Asia?

(3) Are there any significances and possibilities of relevant technologies for fisheries using underwater acoustics?

DISCUSSION 4 (2nd PM)

Recommendations for Fisheries Acoustics scientists in Asia.

(1) What is the most important and urgent issue in the fisheries acoustics in Asia?

APPENDIX 4.

APPLICATION FOR ADMISSION TO **AFAS**

I apply membership to Asian Fisheries Acoustic Society as follows.

Name	
Affiliation	
Address	
TEL/FAX	
E-mail	

If you know a person who is expected to join AFAS, please recommend him/her.

Name	
Country/ Affiliation	
E-mail	

Name	
Country/ Affiliation	
E-mail	

Name	
Country/ Affiliation	
E-mail	

Name	
Country/ Affiliation	
E-mail	

APPENDIX 5.

Proposal for Working Group in AFAS

I propose to organize special interest working group as follows.

(ex.)

Name of WG	Freshwater Fisheries Acoustics(WGFW)
Chair person	Tang YONG (China)
Members	Rajabidin Hassan(Malaysia), ….
Purpose	Development of survey method to estimate fish resource in lake
Action Plan	Development of shallow water echosounder, TS measurement for freshwater fish, Resource survey for carps in Lake Liaoniang.

Name of WG	
Chair person	
Members	
Purpose	
Action Plan	

APPENDIX 6.

List of Participants

Member list of AFAS2007 2007-11-10 Dalian, Chian

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APPENDIX 7.

List of Directors (2007-2008)

Members of AFAS Directors (2007–2008) 2008.8.27

Name	Affiliation	Country /Region	Role	E-mail	Remarks
Kohji IIDA	Hokkaido University, Faculty of Fisheries	Japan	Cahirman	iidacs@fish.hokudai.ac.jp	
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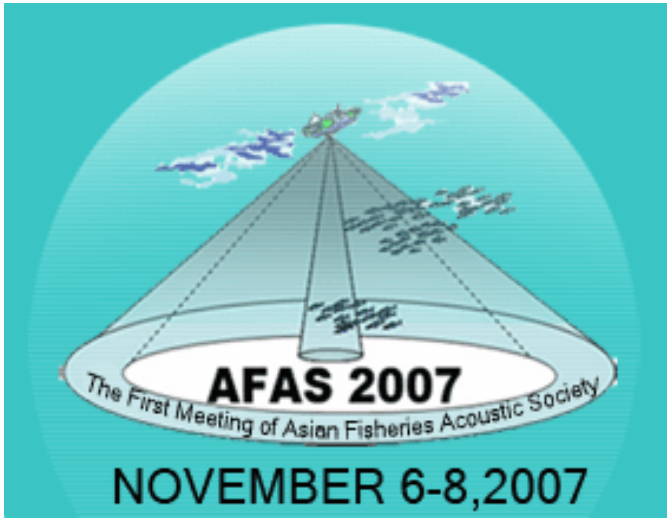
Masahiko FURUSAWA	Tokyo University of Marine Science and Technology	Japan	Advisor	frsw@fine.ocn.ne.jp	

Final Announcement and Call for Papers

The First meeting of Asian Fisheries Acoustics Society (AFAS 2007)



DALIAN,CHINA
NOVEMBER 6-8,2007

Sponsored by
Dalian Fisheries University

Overview

International meetings on Fisheries Acoustics in Asian countries were held two times over the last decade. The first meeting was held in Pusan, Korea in 1997, entitled "International Workshop on Acoustic Surveys of North Pacific Fisheries Resources", and the second meeting was held in Hakodate, Japan in 2000, entitled "International Symposium on Advanced Techniques of Sampling Gear and Acoustical Surveys for Estimation of Fish Abundance and Behavior", both in conjunction with the PICES (The North Pacific Marine Science Organization) annual meetings.

The coming third meeting is held in Dalian, China. In this meeting, we independently establish the Asian Fisheries Acoustics Society (AFAS) based on past activities in order to promote further progress of science and technologies on Fisheries Acoustics in Asian countries.

Since there are many particular problems in Asian fisheries such like small quantities with numerous species, benthic animals, freshwater fish, and aquaculture, the AFAS aims to apply the acoustical technologies for those problems. Subsequently, the AFAS meeting will be held every year in somewhere in Asia.

Date and Venue

The meeting will be held **November 6-8, 2007** in **Dalian Fisheries University**, Dalian, China

Organizing Committee

Dr. Yong Tang(Chairperson), Dalian Fisheries University, China
Dr. Guosheng Zhang, Dalian Fisheries University, China
Dr. Xianyong Zhao, Yellow Sea Fisheries Research Institute, China
Dr. Masahiko Furusawa, Tokyo University of Marine Science and Technology, Japan
Dr. Kohji Iida, Hokkaido University, Japan
Dr. Doojin Hwang, Chong-Nam University, Korea

Issues of Discussions

The first meeting of Asian Fisheries Acoustics Society discusses the following issues.
1. The establishment of Asian Fisheries Acoustics Society.
2. Present states and problems in the research on fisheries acoustics in Asian countries.
3. Recommendation of the research topics required in Asian fisheries acoustics.

The Keywords

The keywords of this meeting are follows.
Pelagic fish, Demersal fish, Freshwater fish, Benthic animals, Seaweeds, Aquaculture, Resource assessment, Fish behavior, Behavior control.

Call for Papers

Contributed papers are welcome on all relevant topics in sampling gears and acoustical techniques for stock assessment or ecological research. Contributed papers will be selected for oral or poster presentations. The language of the symposium is English. The session includes invited lectures, oral presentations, and poster presentations. The time allotted for oral presentations including discussion is 20 minutes. The maximum size for poster presentations is 120×90 cm.

Registration

All interested persons are free to attend the symposium. Participants should send the REPLY FORM on the back of this sheet to the symposium secretariat by Fax or E-mail by September 30, 2007.

Reply Form

Please make one registration per one person.
(a) Full name (first, middle and last: last name in

capital letter);
(d) Postal (mailing) address;
(b) Name of the organization that you belong to;
(c) Your Post, and Position or Title;
(e) E-mail address;
(f) Telephone number including country code;
(g) FAX number including country code;
(h) If you want to reserve a room at hotel by the symposium secretariat; (for details, refer to 'ACCOMMODATIONS' Section);

Registration Fees

Only on-site (walk-in) registration fee: RMB 800; JP ￥ 13000; US$ 110

Accommodation

Reservation hotel by the symposium secretariat:
XinBanDao Hotel (Three Stars)
It relatively close to the University (4 minutes by taxi depending on the traffic and it will cost about RMB 8 for one way)
For other accommodation, please make reservations by yourself.

Abstract Submission

Abstracts should be submitted to the secretariat by E-mail with Fax (or Ordinary mail). The deadline for receipt of abstract is September 30, 2007.

Abstract Format

Size: One page of A4 size paper.
Margin: Top 30 mm, bottom / left / right 25 mm.
Font: Times New Roman.
Title: 13 point font size, bold and align center.
Author(s), Affiliation(s), and Address(es): 9 point, align center.
Text: 11 point, single space and fully justified.
Keywords: 11 point in one line volume at maximum.

About Dalian

It is a city full of charms and well-known as "Home of Track and Field" and "City of Fashion". This charming city with its blue sea, clear sky, delicious seafood, green grass and kind people is sure to provide you with a good travel experience. Visiting scenic spots, places of historic interests and wonders will keep you busy during the day. At night, soaking yourself in the beautiful night scenery, strolling along seaside, with wind gently sweeping your face, tasting various delicious seafood you can feel the pleasure of life.

Dalian, facing the sea on three sides, is a flourishing coastal and beautiful port city with convenient land, water and air transport. The port of Dalian is the major one for China's northeast province. Thriving financial, trading, shipbuilding, chemical and garment industries have been developed since it was founded 100 years ago.

More Information

Request for additional information and registration for our mailing list should be directed to the symposium secretariat:
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Tel: 86-411-8476-3561
Fax:86-411-8476-2706
E-mail:**afas@dlfu.edu.cn, sonarway@hotmail.com**


第一届亚洲渔业水声学术研讨会
SHERIES