Measurement of groundwater salt concentration in mangrove swamp using the chlorine electrode system

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1. Introduction
Mangroves forests grow in tidal saline wetlands along tropical and subtropical coasts. It is known that mangrove has the role of preservation of bio-diversity in coastal ecosystems, and averting from tsunami damage. Mangrove plants live in the area where sea levels are from the mean level to the highest level. Groundwater salt concentration in mangrove swamp is one of the major factors determining the growth of mangrove species. There is a growing concern that sea levels rise due to global warming may cause destruction of important ecosystems such as wetlands and mangroves. Especially, it is important to monitor groundwater behavior and salt concentrations in mangrove forests, because the growths of mangrove forests have close interactions with sea levels and salt concentrations. The purpose of this study is to develop the cheap and easy monitoring system which measure groundwater behaviors and salt concentrations in mangrove sediments using a chloride electrode. 2. Materials and methods

2.1 Monitoring system
The system was mainly made from the chloride electrode(ϕ 4mm; DKK-TOA), the reference electrode(Leak Free type ϕ 2mm;Warner Instruments Inc) and voltage data logger（VR-71;T&D）. The electrodes were set in the stainless-steel bar (ϕ 2cm). The tip of bar was cuspidate for sticking in the sediment easily. The waterproof box for storage the data logger was set on the top of bar. 2.2 Measurement The analytical curve was made using sodium chloride solutions. The sampling points were the mangrove forests in Ooura river where the north of main land in Okinawa, Japan. The measurement point was under 30 cm from the surface of sediment in mangrove forests. Water level on the point was measured with water level indicator (Water level Logger Titanium; HOBO Onset Co.). Grain size distribution at the measurement point of sediment was analyzed.

3. Results and Discussion
Analytical curves were two lines, for the low salt concentrations (<30 g NaCl/L) and the high salt concentrations. However, the range of high salt concentrations (>30 g NaCl/L) was not enough to distinguish the values. It is considered for improving the problems that to be higher the detection range of data logger, and to set the chloride electrodes for low salt concentrations and high salt concentrations. When the salt concentrations were measured on the point under 30 cm from sediment surface, the salt concentrations reach the highest concentrations (27g NaCl/L) after 70 minutes later when the water level reached the highest. In addition, the rate of increasing salt concentrations in groundwater was almost same as the rate of sea level rising. These results showed that groundwater salt concentration behaves in relation to the change of tidal shift.

4. Conclusion
Groundwater salt concentration in mangrove swamp was measured continuously using the monitoring system with a chloride electrode. This system is useful for measuring the salt concentrations under mangrove sediments, and investigation the permeation flow by set many points of mangrove forest.

Modeling solid waste dispersal from milkfish farm

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Assessing environmental impacts of aquaculture through numerical modeling have been demonstrated for sea bass, sea bream and salmon but none for milkfish culture. This study investigated solid waste dispersion in milkfish farm and assessed if existing guidelines are appropriate through numerical hydrodynamic and particle dispersal models. Unlike other studies which used single sinking velocity of a particle, this model took into account variable sinking velocities of solid waste such as excess feed. The spatial extent and degree of sedimentation were used as bases for determining threshold distances for fish cage spacing.

Design and completion of database and geographical information system of Iranian ports and coasts

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Introduction
Development of a suitable Database and GIS is of prime importance for effective planning, and management of the ports and coastal areas. Integrated Coastal Zone Management (ICZM) plan of Iran has performed comprehensive and multidisciplinary studies on various aspects and problems of the coastal zones of the country. These studies have resulted in production of many maps, data and reports which would be available to all users. For proper classification, storage and effective use of this information a powerful and flexible database in GIS environment is required. Integration of GIS and attributes database has been selected as a good solution for this purpose. A group of multidisciplinary experts have been striving to define an appropriate models and software.

Design of a suitable data model

Because of the variability of coastal geographical data and problems, there is a need to design special models. Some of the existing models and solutions include the ArcMarine, IHO and NTDB which provide useful guides for modeling of the marine, hydrographical and topographical data. However by considering the spatial characteristics of the ports and coasts and various responsibilities of the ICZM project, neither of the existing models is adequate for this purpose and design of a suitable model is an important task.

Therefore by considering the different requirements of the ICZM project a suitable structure and data model for organization and management of the geographical and attribute data was defined. In this model, all data are classified in three groups as below:

1- Base and Technical data
2- Related activity data
3- ICZM programs and plans.

Each of the three groups is subdivided in minor classes as outlined in figures 1 to 3.

Data collection and database development
After the conceptual, logical and physical design of the data model, different map layers and attribute data were collected and imported to the data base. The collected data include about 250 map layers and 20 main attribute tables. And provide a unique GIS-based database for many applications by different users.

Conclusions
Availability of this database, and connection of many map layers with the relevant attribute data, provides many possibilities and opportunities for planning, management and monitoring of different activities in coastal areas. These may include simple to complex applications such as Querying, buffering, Overlay, data fusion, modeling and decision support. Completion of the developed database and increase of its efficiency is a continuous effort in the future.
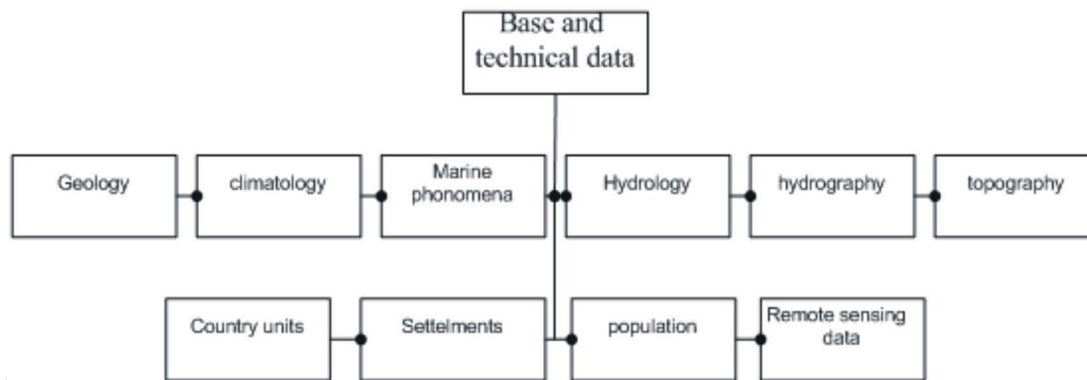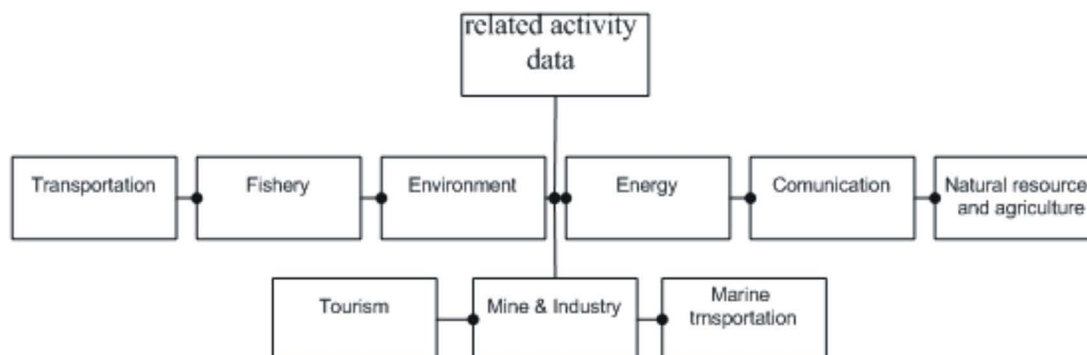

Figure. 1 classes of the Base and technical data group

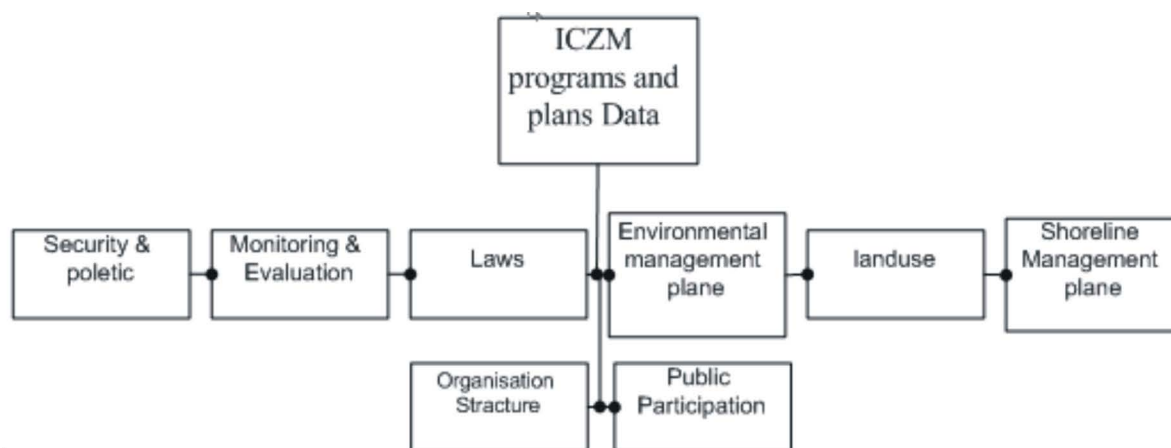Figure. 2 classes of the related activity data

Figure. 3 classes of the related activity

Study on food composition of the Persian Sturgeon (Acipenser Persicus) in coastal zone of Caspian Sea

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Introduction
The Caspian Sea with a catchments area of 3.5 million square kilometers (km2) is famous for its population of Sturgeon and, at its peak in the mid-1980s harbored some 85% of the world sturgeon population.(Ivanov et al., 1999). The present study was conducted to study the feeding habits in Sturgeon caught up to depths lesser than 10 m in southern part of the Caspian Sea (Guilan Province) for to determine the different types of main and secondary prey consumed and also to determine the feeding index in sturgeon to understand the food availability of these species.

Material and methods
This paper is based on the data obtained during 2000-2003 when cooperative societies and trawl surveys were carried out in the Caspian Sea at different depths to collect premature Sturgeon specimens. Away from each other throughout the year using a 6-m trawl net with a mesh size of 8 mm. Trawling wires were pulled for 20 minutes at different depths of 2-4 m, 5-7 m and 8-10 m.Organisms consumed were benthic invertebrates belonging to class Bivalvia, Polychaeta, Crustacea and Bony fishes.

Results
Frequency of food items in Sturgeon in showed that Maximum and minimum total lengths recorded were 34 and 10 cm, respectively. it is evident that for fishes in the length range 10-25 cm the main prey was comprised of animals belonging to the class Polychaeta. However gradually from length class 25-35 cm feeding intensity of premature *A. persicus* changed to crustaceans (Pseudocumidae) and fishes belonging to other families were given lesser preference.

Discussion
Seasonal changes in diet are characteristic of this species: in spring, the main food items were Gammaridae and fish; in summer - Gammaridae and Cumacea. Indices of stomach fullness in juveniles were higher in spring (57.5 0/000, 32.0% of sampled fish with empty stomachs), than in summer (10.0 0/000 and 50.0%, respectively) (Zolotarev et ale., 1996) also Food composition in *A. persicus* studied in 1997-1998 indicates that these fish show a preference to bony fishes belonging to the families Gobiidae along with benthic invertebrates when they reach a length of above 25 cm (Mai Seiv & Philatova, 1985).Recent findings indicate that food spectrum in premature *A. persicus* (young of year, one year old and two year olds) was composed of 8 genera of benthic organisms whereas that in adult *A. persicus* was composed of fishes belonging to the families Gobiidae, Atherinidae and Clupidae.

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Responsibility and policy relevant aspects of ecological interests in the activities of different social actors: sociological point of view

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Water problem issues is too important for Ukraine that caused not only by the state of water supply resources, technologic regimes of water treatment, the number of emergency and regular pollution source but the attitude of population towards this problem, the dominance of economical and ecological priorities in mass consciousness, the users' mood of the citizens. Sociological researches show the stereotypes of ecological consciousness of population can be determined as principle factors of human behavior regarding different spheres of the environment including the hydrosphere. They are also important for finding out the causes which have to be taken into the consideration by other social actors during decision making. At that time the change of stereotypes of ecological consciousness is considered as the level of real change of situation within political and social negotiation process. In this context policy relevant aspects of ecological interests of the social actors (political parties, NGO, business) are investigated.
On basis of empirical research the estimation of ecological perception and behavior of different social groups, willingness to cooperate is conducted. The results of issues demonstrate that the division of population only partially depends on occupation and residence of population. The main factors are the formed stereotypes among which the most spread aspects are the following: 1) the necessity of environment renewal; 2) the determination of the role of social actors participated in this renewal; 3) the readiness of the citizens to the individual participation in corresponding ecological activity. The sociological indicators were used: the public trust to the ecological information received from the bodies of various levels executive power; individual people participation in environmental activity; the role of different social subjects in solving of ecological problems and individual readiness of citizens for cooperation with them. These data opposes to the indices of satisfaction/dissatisfaction of Ukrainian population by the ecological situation residentially, the disquietude of water supply, soils, air and other components of environment; evaluations of its influence on the health and migration behaviour of anthropogenic factors. The determined stereotypes of ecological consciousness limits largely the successful achievements of political decisions and support of effective social dialogue between various part of society engaged into the solving of water issues. To solve this problem it is necessary to change, firstly, the opinion of population about the factors of rehabilitation and environment protection, increasing of individual interesting of the citizens in development of successful strategies regarding the environment.

Influence of phytoplankton bloom and heterotrophic bacteria on dissolved organic matter in coastal water

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Dissolved organic matter (DOM) in the sea, one of the largest reservoirs of organic matter on the earth's surface (Ogawa and Tanoue, 2003), plays an important role in the global biogeochemical