SEVERAL ASPECTS FOR DEVELOPING OF THE SEAWATCH ACTIVITIES IN MARINE METEOROLOGICAL FIELD OVER INDONESIA

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Abstract

As the Seawatch activities were initiated over South East Asia Region, the deploying the buoys has been implemented in Indonesia recently under the Seawatch Indonesia. As the initiation action has realized the buoys deployment over several places over Indonesia's waters and continuation activities have been implementing toward the better management for supporting the sustainable development in several places over South East Asian Region especially in Indonesia.

As the Indonesia waters did not cover the monitoring and observation in meteorological field, the Seawatch activities will improve the gathering data through the networking of the buoys over some part of Indonesia waters. As this meteorological field especially Marine Meteorological Field was under-developed since the beginning of Indonesia's independence. It is hope that Seawatch activities will encourage the developing in this field in near future. Even though the sea-waters can be observed through the satellite system, the direct observation in the earth surface is still the best way for gathering information to improve the air - sea interaction system. Such that air-sea interaction system has become most famous as part of the Global Climate Ocean Observing System.

In this paper will deal with several matters especially the proposed idea of the implementation of Seawatch activities of Indonesia in Meteorological field such that it will give the understanding for the improvement of environmental monitoring as well as the air - sea interaction system. As the climatic system of the earth always varies with respect with the time and experience in the operational field showed the air-sea interaction system to be more important in the main key-play role of the climate variability. The action of the direct measurement through the buoys deployment over Indonesia waters hopefully opens the chance for further understanding this system in the near future over Indonesia region as well as over South East Asia region.

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1. INTRODUCTION.

Oceanography is the study of the ocean making use of the various basic sciences, physics, chemistry, biology and geology, with mathematics being used as an aid to parts all of the studies. Particular attention is paid to the ocean as an environment both for the organism which inhabit it naturally and in relation to man's activities, and also to its interaction with the atmosphere such that the environment in which man lives.

The physics's contribution is to study the distribution of properties such as temperature, salinity, density, transparancy, etc., which distinguish water mass from another, and to study and understand the motion of the ocean in response to the forces acting from the atmosphere as part of the introducing of the air-sea interaction system. In reality, this system generated into surface waves and current.

Some problems which have been recognized and studied in the oceanography and meteorology fields are:

- Why are the gross mid-latitude surface circulation in the ocean clockwise in the northern hemisphere but anti clockwise in the southern hemisphere ?
- What is the distribution with the depth of the sea/ocean current ?
- What is the reason for the complicated equatorial flow pattern ?
- What are details of the mechanism of transfer momentum and energy between air and water ?
- What are the characteristics and causes of surface and internal waves ?
- What are the characteristics and significance of turbulent motions in the sea waters/ oceans ?

In order answering the question should refer into several ways either through the direct observation/monitoring or literature studies. Physical studies are carried out both by the direct observation of the properties and movements and also by applying the basic principle of mechanics and thermodynamics to determine the motions. The observational approach is called descriptive or synaptic oceanography/meteorology because the physicist tries to reduce the observational studies to a simple summary. The essential feature of the second approach to be dynamic meteorology/oceanography. In either case, the ultimate objective is to learn enough about the structure and motion of the ocean to be able to predict its future state.

As it mentioned earlier of the importance for understanding the physical processes in the interface layer between sea waters and air in above, current situation showed more advancing of the science and technology such that the combination of the subject might be explored for further used of the human life. As most of the people in the world live along watercourses or in the coastal zone, the consequences/impact of these activities might overload the environment. As the beginning of the human activities over South East Asia region especially the Maritime Continent Area of Indonesia, the crucial problem arose coincide with increasing number of the accident starting from the pollution, traffic and decreasing of fisheries production. As its is known the SEAWATCH has the two system for the monitoring and information, it might be better to explore for further consideration in the

development of the environmental and information system that they always needed. This paper will deal with the idea in the further application especially from the marine meteorological fields. This action will hopefully encourage the improvement in the marine meteorological monitoring and information system including the data base management system in the Maritime Continent area of Indonesia. To cover the proposed idea, it will start with the discussion of the background of Marine Meteorological Services in National Forecast Center of the Meteorological and Geophysical Agency of Indonesia then the proposed idea in the application of SEAWATCH Indonesia improve the services of the agency.

II. CURRENT CONDITION OF MARINE METEOROLOGICAL SERVICES

In Indonesia the marine meteorological services has been a little improved comparing with the situation before 1990. Where last situation the existing marine meteorological stations were only 3 places over ports of Tanjung Priok of Jakarta, Tanjung Emas of Semarang and Tanjung Perak of Surabaya. After 1990 the additional meteorological stations have been implemented such as Ports of Belawan of Medan, Teluk Bayur of Padang, Ujung Pandang, Bitung and still in progress of development in several places of Eastern Indonesia such as ports of Kendari, Ambon and Jayapura. As it regulated by the World Meteorological Organization that the marine meteorological station has an objective to provide the service in terms weather and sea state information, the services have also been done after 1990 with the guidance from the National Meteorological centers and receiving the product from other centers of foreign countries (Bureau of Meteorology Australia, National Oceanic and Atmospheric Services and etc.). The Marine Meteorological Services in providing the services is mainly the weather information (weather and sea state forecast of each consecutive waters), where the sea state forecast are usually received and obtained from the global marine information and direct computation from the surface wind field without supporting the local prediction model such as High Resolution Limited Area and Wave Area Models. These activities have been done operationally in Marine Meteorological Information. The problem arose when the user communities requested the detail information for commercial purposes in terms of local information for insurance companies (ship sinking and shipping crash), offshore exploration activities, guidance for shipping weather en-route and others. Those services have been done through the weather charts analysis with additional from the low resolution of the satellite cloud picture, even though those activities can be served to the users but it some time requires the detail data in the site location and faster services. With lacking data and information especially the site can be shown with the weakness data for the assessment studies of the shipping crash over Malaka Strait with arising oil pollution. Due to the lacking of the data and information, the study could not be realized and it might encourage the problem for designing penalty to the owner of the ships. There were any example showing the weakness of the services when it required for further consideration especially for the commercial purposes.

The initiation of the wave spectrum analysis as part for triggering the marine meteorological research activities had also been done by the Meteorological and Geophysical Agency starting 1992 - 1993 in various places in Indonesia waters

(Surrounding Bawean Island, South of Makasar Strait, and waters of South of Bali Island) in cooperation with Indonesia Hydrodynamics Laboratory of Agency for Application and Assessment of Technology (BPPT). This initiation action of the sea state monitoring and studies had been implemented successfully and it might encourage the research activities for further application of the sea state information to be used as part for further expansion in commercial purpose (shipping design).

After receiving the research activities of the sea state studies and it was supported by the sending the people in Asean Specialized Meteorological Center in Singapore and other centers under the WMO's program such as in Bureau of Meteorology Australia, the expansion of the understanding of the wave modeling was initiated with lacking of the infrastructure for further research activities in Indonesia. It was caused the research works rather slow to support the operational activities in Meteorological and Geophysical Agency of Indonesia. Looking at the further activities of the operational Marine Meteorological Services, it need the resources both coming from the infrastructure and budget. The challenging of the commercialization in the field of sea - state information as part of the commercialization products of the Meteorological Information has arisen few years ago up present time. Meaning, the further consideration of the Marine Meteorological Activities might be the proposed idea that it will be presented in the next chapter. As it might be proposed that the further proper management of the environment in near future could be explored from the marine environment, so that the need of the improvement in this field will support the sustainable development of the nation especially in Indonesia. Where Indonesia with the so called of the Maritime Continent Region brings and required the proper management and understanding of the exploration exploitation from the Marine Field deeply.

With existing the weakness in the field of Marine Meteorology subject of the infra-structures and supporting resources might give little contribution in the development of the nations where most of the commercial resources starting from the mining, transportation and engineering fields can be explored further deeply. If there are no action as part of the anticipation, the expansion from the foreign countries in Indonesia will take place without the transfer technology unknown. So that, to overcome these aspects will discussed in the next chapter. As it mentioned earlier in the introduction the un answer question still existed and it might cause missing link with national sustainable development in Indonesia.

III. PROPOSED IDEA FOR IMPROVED THE SERVICES USING SEAWATCH

As it discussed last chapter about the condition of the operational Marine Meteorological Services with existing of the weakness. The need for further improvement. As it might know that marine forecasting services was one of the major areas picked out for special attention, it should be established with supporting the infra structures and resources. Referring with the current situation of these services in the international communities where the best way for serving the Marine Forecast contains of the optimal numerical products, continual monitoring of the weather and sea state conditions, combined with local know how and expertise of the human

resources. It might be better if the arrangement can be adjusted through the action from foreign country to help this subject.

Seawatch is the product from foreign company from Norway (OCEANOR) where it has involved in the design, production and implementation of SEAWATCH in some part of South East Asia region (India, Thailand, Malaysia, Vietnam and Indonesia). It might give the solution for the further improvement for monitoring and information system especially in Marine Meteorology Field. According to a report from the Organization for Economic Cooperation and Development (OECD) last 1995, Seawacth was a cost-effective infrastructure investment for coastal nations. Instead of relying on piecemeal environmental data from different sources and also as part for offering the integrated environmental information in a single system. In Seawatch facility usually contains the following components :

- Sensors carriers such as buoys
- Sensors tailored to a range of specific tasks
- Real time, two way communication
- Data bases, numerical models and presentation software including GIS.

Based upon this short description, it can serve as basis for complete regional environmental monitoring and forecasting system. However Seawatch is equally suitable for integration into already existing infrastructure.

As the National Forecast Center of Meteorological and Geophysical Agency has already set up the infrastructure starting from the networking of the land/sea meteorological stations, communication and processing/analysis facilities both the inside (national) and outside (international) country the need of the integration of this Seawatch has been setting up. The proposed idea of Seawatch Indonesia in term of the improvement of the Marine Meteorological Services through the integration with existing facilities as the first action. Then second action toward the human resources to maintain the operational system between Seawatch and MGA infrastructures including the research budget for supporting the operational Marine Forecast in Indonesia. Of course, the detail implementation should be carried out for this purpose. Hopefully the improvement of National Forecast Center of MGA will supply a number of special forecast, forecasts for designated area in tern of the information of extreme and freak waves, heave, currents and underwater condition.

The short proposed idea for the improvement of application Seawatch Indonesia Information System in term of the improvement of the Marine Forecast System including the data base system could be done. In reality that the Seawatch has received in National Forecast Center of MGA in Jakarta but further research and development is till required. The experience showed that lacking the data from the global models such that, it is required in the developing HIRLAM and WAM can be solved through the continuing of the research and development. Due that research is just starting this year, it is hoped that the proposing additional budget is needed through the aid of this activities.

IV. SUMMARY

To summarize the discussion of this paper can be explain as follows,

1. The Marine Meteorological Services is required the improvement, lacking of the resources caused rather slow the improvement of this services.
2. The proposed idea for the application of Seawatch Indonesia is in the integration this system to be fit with existing the infrastructure in MGA. The experience showed that lacking of the budget for supporting this action and research, human resources development activities will be proposed the near future.
3. Exploring the commercialization of the activities will be proposed after setting up the facilities coincide with the two others action will be supported. As it is known the economical crises might be the first priority in MGA for finding the internal budget.
4. The commercialization action has been implemented for instance in Norway to support the sea communication service, offshore mining exploration, public request, insurance companies etc. It should be better this part to be considered further for the successfully the implementation Seawatch Indonesia in the future.