

Scientific cooperation to respond climate change in the South China Sea: The study of tides and sea level change

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Abstract. The South China Sea, one of Large Marine Ecosystem in the world, is located in strategic waterways and has become a hot-spot area as it is contested by six countries namely China, Malaysia, Brunei, Taiwan, Vietnam and the Philippines. The sea is now facing a serious problem in terms of ecology degradation due to pollution and climate change. This issue is not handled properly regarding its location in the disputed area with high tension of suspicion. Indonesia is not a claimant in the South China Sea but since the 1990s launched Track Two Diplomacy by conducting annual workshop under the name "Workshop on Managing Potential Conflicts in the South China Sea". One of the outcomes of the meeting was to conduct scientific cooperation project namely "The study of tides and sea levels of change and their impact on coastal environment in the South China Sea affected by potential climate change". The objectives of this project are to build solid tidal knowledge and characteristic of sea level variation as well as to standardize methods of measurement for tidal analysis and prediction. This article analyzes the initiation and implementation of the project as a breakthrough of scientific cooperation in a disputed area.

1. Introduction

The South China Sea (SCS), one of Large Marine Ecosystem in the world, is known as the richest sea in term of marine biodiversity. The sea has a unique ecosystem and is home of thousands species and organisms, ranging from coral reefs, mangroves, seagrasses, fishes and plants [1]. It is about 30% the world coral reef found in the sea as well as 45 of the 51 mangrove species [2]. Khemakorn [3] noted that the SCS is home of various fish species such as in the north part there are 1,027 fish, 91 shrimp and 73 cephalopod species. Beside flora and fauna, the SCS is laid on strategic location connecting Indian and Pacific Oceans. Therefore, the SCS is known as one of the busiest sea lanes of communication in the world. It is also believed that the sea-bed of the SCS to be rich in oil and gas.

Given the potential of strategic location and economic value, the jurisdiction of maritime demarcation and sovereignty of the SCS is claimed partly or wholly by six states namely China, Taiwan, Vietnam, Malaysia, Brunei and the Philippines. This dispute caused diplomatic contentions and even military skirmishes. Therefore the SCS has become a hot-spot area in the world since the end of the 1980s and made the region was unstable.

To date, the sea is facing a serious problem in terms of environmental degradation due to pollution in line with the economic growth of surrounding states and climate change effect especially on sea level rise. According to the Asian Development Bank [4], Southeast Asia including the SCS region is highly vulnerable to climate change as well as sea level rise. It is projected that the sea level will



increase between 18 and 59 centimeter by 2100 due to global warming and glacial melting [5]. But in some areas, sea-level rise exceed of the projection.

Although there was environmental degradation and accompanied with the threat of climate change in the SCS and exacerbated by conflict among claimants, in the late of 1980s there were no parties take initiative to manage the dispute as well as to handle environment problems. Indonesia, a non-claimant state to the dispute, took initiative to bring the conflicting parties as well as those who have interests in the SCS sitting together to discuss activities in an informal manner as a means to promote stability in this region.

Since 1990 Indonesia conducted an annual workshop called Workshop on Managing Potential Conflict in the South China Sea (hereafter the Workshop). This Workshop was an informal meeting attended by parties from surrounding countries of the SCS on a personal capacity. Through informal meetings, while avoiding sensitive issues, the Workshop was expected to create mutual trust and encouraged a desire for cooperation in the SCS region. One of the results of this Workshop was the collaboration of studies on tides and sea level change.

This article examines the initiation and implementation of scientific cooperation among experts from surrounding countries of the SCS on the study of tides and sea level change. It divides into five sections. The first section is introduction then followed by theoretical framework and method as the second and the third section. The fourth section is finding and discussion and the last section is the conclusion.



Figure 1. South China Sea map [6]

2. Theoretical framework

One method to ease conflict in the study of international relations is track two diplomacy or unofficial diplomacy. It is common track two diplomacy is used to manage intractable conflict and after obtaining tension relief, conflicting parties enable to socialize new perspective to provide alternatively acceptable regulations and to shape common awareness on certain issue [7]. After declining tensions among adversaries, track two diplomacies can be transformed into track one diplomacy or official diplomacy.

As a supporting tool for dispute management, track two diplomacy has some basic assumptions. First, track two diplomacy focuses on the process that improves the relationship between the adversaries through communication, understanding and working together. Such processes break psychological barriers and pave the way for the conduct of official diplomacy. Second, the process enables the adversaries to explore ideas and reactions concerning alternative solutions in a non-

obligatory framework. Third, track two diplomacy is designed only as a supplement by providing inputs into each stage of the official negotiation process

The main instrument to conduct track two diplomacy is a problem solving workshop, an unofficial face-to-face meeting which involves the representative of the conflicting parties and is usually facilitated by a neutral third party. The problem solving workshop process provides an opportunity for the participants to examine their perspectives, hopes, needs, fears, and priorities in their quest to engage in joint thinking as well as a joint activity to find the best solutions to the conflict [8].

3. Method

This article is based on a descriptive qualitative method with describing certain phenomena. Main data and information are collected through library research. Data are validated by using triangulation technique especially sources triangulation. Then, the Interactive model is applied on data analysis which conclusion is drawn from collecting, reducing and displaying data [9].

4. Finding and Discussion

4.1. *The workshop*

The Workshop was initiated by Ambassador Hasjim Djalal from Indonesia and funded by Canadian International Development Agency (CIDA). It held a meeting for the first time in 1990. In the 1st Workshop participants came from five ASEAN member countries who were present on their personal capacity. The purpose of this meeting was to harmonize the views from the original member of ASEAN on SCS before inviting non ASEAN member. They agreed that the purpose of this Workshop includes: Manage potential conflicts by searching areas which everyone are able to participate; Develop confidence-building measures that the participants would be comfortable with one to another, so it enables to create conducive atmosphere for solving their dispute; Exchange views through dialogue in order to intensify mutual understanding [10]. Moreover, they agreed to take a decision mechanism by consensus. At the second meeting in 1991, the Workshop was attended by countries outside ASEAN such as China, Taiwan, Laos and Vietnam. Since the second Workshop, all claimants of the SCS attended the meeting.

The Workshop meetings were held annually in various cities in Indonesia. To implement cooperation, the Workshop established Technical Working Group (TWG) and Group of Experts (GE). The TWG consisted of experts who were in charge of preparing and organizing joint activities after gaining approval from their government. Meanwhile, if it is needed, the TWG can form a GE consisted of technical experts in charge for preparing joint proposal activities in detail. The TWG and GE conducted their meeting at the outside of Indonesia. Since 1995, a rough hierarchy of meeting held under the Workshop process has emerged, whereby each GE meeting reported to the TWG, and then TWG reported to the annual workshop as a plenary meeting of the whole process [11].

During the period from 1990 to 2015, the Workshop formed five TWGs, namely TWG on Marine Scientific Research, TWG on Resource Assessment and Ways of Development, TWG on Legal Matters, TWG on Marine Environment Protection and TWG on Safety Navigation, Shipping and Communication. In 1990 to 2001 the Workshop was funded by CIDA and after that year, the Workshop collected funds through the Special Fund from the authorities surrounding the SCS with voluntary based. The collaboration of various projects initiated by the Workshop was able to maintain stability in the SCS area and even some of the results from the Workshop were transformed into track one diplomacy.

At the 1st to the 3rd Workshop, environment issues were discussed seriously. Dr. Sugiarto [12] a participant from Indonesia for example, expressed his idea that the SCS had a unique marine ecology. The high intensity of rainfall, warm and humid tropical climate have allowed coral reefs and the mangrove ecosystem to flourish along the coastlines. On the other hand, population pressures together with high economic activities have caused large-scale destruction and degradation of the coastal and marine environment. Unfortunately, littoral states had insufficient knowledge and limited experience of joint marine research. Participant from China added that devastation of marine ecology in the SCS

was not only caused by human activities but also by natural disasters. The disasters differed from other types such as typhoon, tsunami, algae bloom and climate change that caused the rising of sea level. Thus, he suggested that states surrounding the SCS should focus on ways of mitigating losses and casualties from maritime disasters such as by establishing regional cooperation in the monitoring network of meteorology, oceanography and in activities that provide environmental data and information.

Regarding that marine environment protection needed a lot of budgets, participants from Vietnam advised that activities of cooperation should start with collaboration researches. These activities were relatively simple and inexpensive, and required little time to conduct. The areas of research could be: a compilation of marine biological species; typhoon surge prediction; tide current; and predicting program for oil slick spreading in the case of an accident.

4.2. *Joint study of tides and sea level change*

At the 3rd meeting convened in Yogyakarta in 1992, the Workshop agreed to establish TWG on Marine Scientific Research (MSR) and held the first meeting in Manila 1993. The meeting explored various maritime issues and proposed three project proposals at the 4th Workshop namely: Proposal of Collaborative Research Project on Biological Diversity in the SCS; Proposal of Regional Cooperation in the Field of Marine Scientific Data and Information Network in the SCS; and Proposal of Study of Tides and Sea Level Change and Their Impact on Coastal Environment in the SCS affected by Potential Climate Change. Coordinator for implementing these proposals was Vietnam, China and Indonesia respectively.

At the 3rd meeting of the TWG MSR held in Singapore in 1994, especially on the study of tides sea level change, participants agreed to promote marine science in order to obtain a common understanding of the SCS as a unique environment. The participants also agreed to build solid knowledge on tidal regime and characteristic of sea level variation in the SCS as well as to standardize methods of measurement and analysis. After revising many times, Proposal on the study of tides and sea level change was approved at the 6th Workshop in Balikpapan in 1995.

The study of tides and sea level change faced some obstacles and had little progress. There were several causes. The first was limited budget since CIDA terminated its financial assistance to the Workshop in 2001. Then, all projects after the year of 2002 was based on voluntary budget from its participants' countries. Consequently, proposal of the project needed some adjustments. At the beginning for example, the budget for the proposed project for three years has been contained of US\$ 1,156,100 [13], then it was reduced to US\$ 99,000 in 2005 and finally, it became US\$ 30,000 [14]. Second, the proposed project was lack of support from participant's government authority so its implementation needed times longer. Third, due to the sensitiveness of conflict, government authority prohibited to build gauge station in the disputed area. Therefore, the proposed project relied on existing gauge stations having by participants' government that located surrounding the SCS.

Indonesia as project coordinator through Bakosurtanal (National Coordinating Agency for Surveys and Mapping, then its name changed in 2011 become Geospatial Information Agency) gradually commenced the project by establishing Working Group on the Study of Tides and Sea Level Change at the 14th Workshop in 2004, developing project management and demanding participants' authority to send the name of institution involved in this project. The progress of the project was seen when a sub web-site has been operating by Indonesia in 2006 as a media for exchanging data under the name Indonesian Responsible Oceanographic Data Centers for the South China Sea with the address was <http://www.bakosurtanal.go.id>. While the main website was designed by China with the address was <http://www.col.gov.cn/scs>.

Exchange data, as well as ideas of tide and sea level rise in the SCS, continued in annual meeting both in the Workshop and in the Working Group. Moreover, it was agreed that 27 gauge stations surrounding SCS were integrated into a network for the project. Several scientific institutions were also approved to support this project.

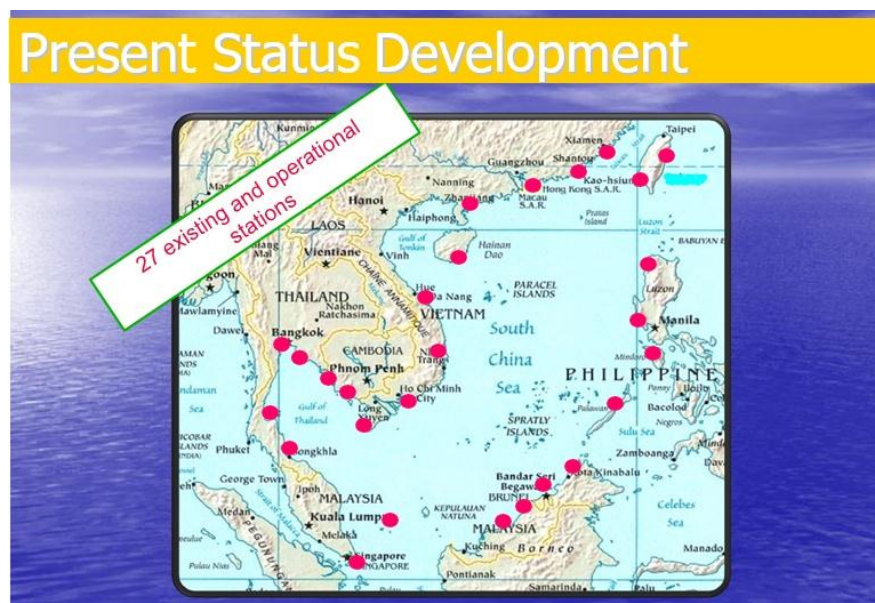


Figure 2. Gauge stations in the SCS [14]

Table 1. Scientific institutions involved in the project [15]

No	Authority	Institution
1	China	State Oceanic Administration
2	Taiwan	Central Water Bureau
3	Philippine	NAMREA
4	Indonesia	Geospatial Information Agency
5	Vietnam	Nha Trang Oceanography Institute

5. Conclusion

Since it was initiated in 1992, implementation of the study of tides and sea-level change project has faced several obstacles. Ranging from limitation of the budget to the sensitiveness [1] of the conflicting issues such as sovereignty and jurisdiction claim, Indonesia as a coordinator should make progress of the project. It has been shown when web-site as media for exchanging data was established, the commitment of marine scientific institutions to continue study and standardize its methods and the operation of gauge stations network surrounding the SCS.

The most important of the project is the emergence of dialogues among experts in the conflicting region then enhance into cooperation on a certain activity. Continues cooperation is an entry point to develop a sense of community so it enables to reduce the sense of suspicion. In short words, cooperation in low politics issues such as scientific cooperation including a study on tides and sea level change has a contribution on managing conflict in the SCS.

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