

The Study on ensuring Effectiveness of IMO Instrument regarding GHG emission from Ships – focusing on MARPOL73/78 Annex VI

† Hyun-Wook Doo, Yun-Cheol Lee*

† Professor, Korea Institute of Maritime and Fisheries Technology, Busan 606-080, Republic of Korea

* Professor, Division of Maritime Transportation Science, Korea Maritime and Ocean University, Busan 606-791, Republic of Korea

Abstract : UNFCCC was adopted in 1992 in order to prevent global warming. However, as a lack of concrete reduction goal and implementation plan, UNFCCC could not have effectiveness. In 1997, Kyoto Protocol to UNFCCC was adopted and UNFCCC regime started practically binding on the parties. Global warming takes the leading role in changing marine environment such as the rising of water level and sea water temperature. Also, Ocean plays the vital role in storing carbon to prevent global warming. Meanwhile ships which get the propulsion generated by consuming the fossil fuel are identified as GHG source and the discussions regarding the control of GHG emitted from ships are still in progress in IMO. IMO instrument has some legal conflicts with UNFCCC in principle. Therefore, this paper reviews the present UNFCCC regime and UNCLOS. Also, it surveys activities of IMO and analyze the Amendment to MARPOL73/78 Annex VI which entered into force on January 1, 2013. Finally, conclusions suggest the improvements in order to ensure effectiveness the new Amendment to MARPOL73/78 practically.

Key words : Climate Change, UNFCCC, IMO, MARPOL73/78 Annex VI, EEDI, SEEMP.

1. Introduction

The Climate Change has been the biggest challenge from the end of the twentieth century and the international regime on Climate Change is known as the widest and the most complicate governance system in environment field and beyond. In order to combat the Climate Change on earth and the discussions on UN Framework Convention on Climate Change(UNFCCC) began in 1992, and the reduction commitments for the objective of UNFCCC became effect by the 1997 Kyoto Protocol. UNFCCC regime interacts with numerous international environmental laws and Organizations. Particularly, Kyoto Protocol regulate that the parties included in Annex I shall pursue limitation or reduction of emissions of Greenhouse Gases(GHG) not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization(ICAO) and International Maritime Organization(IMO) respectively.

IMO is the only recognized regulatory body in international shipping industry and today responsible for some fifty International Conventions and Protocols including environmental matters. However, GHG emitted from ships

is the new challenge to IMO in the aspect of law-making and implementation. International environmental law regime of the sea such as UN Convention on the Law of Sea(UNCLOS) and MARPOL73/78 has some legal conflicts with UNFCCC regime in principle. Even though IMO has developed technical and operational measures, there are disparities in application between the member states of IMO. Therefore, this paper reviews the present UNFCCC regime and the relationship with UNCLOS. Also, it surveys the activities of IMO and the regulations of the Amendment to MARPOL73/78 Annex VI. Meanwhile, the legally controversial issues are identified. Finally, conclusions suggest the improvements in order to ensure effectiveness the new Amendment to MARPOL73/78 practically.

2. Review of Climate Change Regime

2.1 UNFCCC

The discussions regarding Climate Change Convention started at a meeting of experts in Ottawa, Canada in 1989 and by the Intergovernmental Panel on Climate Change in 1990. Then, it accelerated in 1990 by UN General Assembly

† Corresponding author, hwdoo@seaman.or.kr 051)620-5838

* lyc@kmou.ac.kr 051)410-4249

Note) This paper was presented on the subject of "The Study on ensuring Effectiveness of IMO Instrument regarding GHG emission from Ships – focusing on MARPOL 73/78 Annex VI –" in Asia Navigation Conference 2013 proceedings.

resolution 45/212. Finally UNFCCC was adopted in 1992 at the Rio Conference (Birnie et al., 2009). UNFCCC regime is built on two universal treaties, UNFCCC and Kyoto Protocol. UNFCCC established the comprehensive and ultimate objective that guides its parties as follows in Article 2 :

“The ultimate objective of this convention and any related legal instruments that the conference of the parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”

It established Common But Differentiated Responsibilities (CBDR), which is the fundamental but controversial legal principle today in Post-Kyoto Protocol. Furthermore, it requested that the developed countries should take the lead in combating Climate Change and the adverse effects. Even though UNFCCC didn't establish the concrete and particular commitments but it is recognized by 195 majorities of countries in the world and international community.

2.2 Kyoto Protocol

During the first UNFCCC Conference of Parties (COP) in 1995, the COP decided to start an appropriate action for the period beyond 2000 by developing a protocol or legal instrument to meet the objective of UNFCCC. At the third COP in 1997, Kyoto Protocol which established legally binding GHG emission-reduction commitments was adopted. It defined what GHG is in UNFCCC regime and puts the emission limitations, with view to reducing overall emissions of GHG by at least 5 percent below 1990 year levels to developed countries from 2008 year to 2012 year (Article 3.1). Furthermore, It established three Kyoto Mechanisms such as Joint Implementation (Article 6), Clean Development Mechanism (Article 12) and International Emission Trading (Article 17) as the measures to implement the commitments of developed countries listed in Annex I.

3. UNCLOS and IMO Instruments

3.1 UNCLOS and GHG

Various activities in the Oceans have a number of

impacts on the GHG concentrations in the atmosphere. Furthermore, the phenomenon of global warming caused by Climate Change has the adverse impacts on the biological processes in the Oceans (Bothe, 2011). IMO instruments have been developed to be consistent with United Nations Convention on Law Of the Sea (UNCLOS). On the other hands, Article 2(2) of Kyoto Protocol stipulates that “the parties include in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through ICAO and IMO respectively”.

Therefore, IMO instruments regarding GHG emission from ships carefully consider two Umbrella Conventions. First of all, early lawyers questioned that the application of UNCLOS is reasonable or lawful. Article 1(1) of UNCLOS defined pollution of the marine environment. If it was interpreted such as consideration at that time as UNCLOS was negotiated. It is disputable that Climate Change or GHG emission was not included or considered in negotiation between parties. However Doelle (2006) insisted that such a way is not appropriate for a number of reasons. As the example of them, the clear wording of pollution definition was to cover all possible threats to the marine environment. There is no any manifestation or intent that parties were intending to limit pollutants which identified at that time. In addition, suggested that international treaties to serve a constructive role over time they should be interpreted at a perspectives of changing circumstances.

As another advocate, Part XII of UNCLOS deals with state obligation for marine environment. Article 192 establishes general obligation that states have the obligation to protect and preserve the marine environment from the threatened species and ecosystems which existed before UNCLOS (Klemm, 1981). Article 211 of UNCLOS deals with pollution from ships. It does not mention any particular pollutant prevented from being discharged but states, acting through the competent International Organization or general diplomatic conference, shall establish international rules and standards to prevent pollution of marine environment originated vessels.

Another provision, Article 212 obligated that states shall adopt laws and regulations to prevent, reduce and control pollution of marine environment from or through any air space under sovereignty and to vessels which states has the jurisdiction.

Therefore, provided that GHG emitted from any ship eventually caused an increase of ocean temperature and threaten the life of human or marine species, even give the

potentially harmful effects to them, the reduction or control of GHG should be interpreted lawful and GHG emission also should be marine pollution in accordance with UNCLOS.

3.2 MARPOL73/78 and GHG

1) The activities of IMO

With respect to shipping, IMO is the only competent international organization to establish international rules for the safety of ships and seafarers and prevention of marine environment as mentioned. MARPOL73/78 is the most representative international laws concerning the prevention of pollution originated from ships. Particularly, MARPOL 73/78 Annex VI deals with air pollution from ships adopted in 1997 MARPOL Conference and entered into force on May 19, 2005. When Annex VI was negotiated, consequently, even though there was suggestion that GHG should be included in Annex VI, it was not accepted by majority of member states. However, the Conference adopted Resolution 8 on CO₂ emissions from ships which invite the IMO co-operate with UNFCCC in the exchange of information on GHG issues and Marine Environmental Protection Committee(MEPC) to consider feasible GHG emissions reduction strategies. As the following works to the Resolution, IMO carried out two studies on GHG Emissions from ships in 2000 and 2009. First study estimated the emission of GHG from international shipping about 1.8% of the global total emissions. Second study estimated about 2.7% based on 2007 year and the primary source of GHG is carbon dioxide. Also it pointed out that technical and operational measures could reduce the estimated emission rate up to 75% below(IMO, 2009).

Meanwhile the Assembly of IMO adopted Res.A.963(23) "Work Plan to Identify and Develop the Mechanisms Needed to Achieve the Limitation or Reduction of CO₂ Emissions from International Shipping" in 2004. MEPC carried out tasks according to Assembly Resolution and developed MEPC/Cir.471 "Interim Guidelines for Voluntary Ship CO₂ Emission Indexing for use in Trials". Member states and shipping industry finally finalized specific technical and operational measures in 2009 and the first mandatory regulations regarding GHG reduction and control emitted from ships were adopted as the Amendment to MARPOL73/78 Annex VI in 2011 and entered into force on January 1, 2013(IMO, 2011). Newly included Chapter 4 obligated Energy Efficiency Design Index(EEDI) for new ships and Ship Energy Efficiency Management Plan (SEEMP) for all ships over 400 G/T and over engaged international voyage.

2) The meaning of the Amendment to MARPOL73/78 Annex VI

The new Amendment to MARPOL73/78 Convention Annex VI included Part IV. As mentioned above, the Amendment does not bring new challenge into IMO, but also gives the opportunity to look into diverse views regarding Climate Change issues in shipping.

From the beginning of discussion in making legally binding instruments, it was suggested that a stand-alone instrument should be developed. The advantage of this option is that developing a new Convention would overcome the potential confusion and complications that could arise from linking the measures either Annex VI or MARPOL 73/78 and provides maximum flexibility in the scope of the instrument(IMO. 2008). However, IMO has experienced that a stand-alone instrument needed much time to satisfy member states and even much more time for it to enter into force. Therefore, concerning with urgent matter of GHG emission from ships, the technical regulations on GHG emissions from ships was included into the Annex VI (James, 2012).

The most controversial issue was whether or not the new regulations shall be applied to ships of all flag states regardless of developing or developed countries. IMO instruments have been developed in consistence with non-discrimination principle with respect to foreign ships visiting port states under UNLCOS and the parties to IMO instruments excise their Port State Control(PSC) jurisdiction according to No More Favorable Treatment principle(NMFT) equally to ships fly the flag of a party to the instrument and also ships not entitled to fly the flag of a party. On the other hand, Kyoto Protocol stipulates that parties including Annex I negotiate for limitation and reduction of GHG emitted from ships in IMO and it is completely burden of IMO and the member states.

Severe arguments took place during the MEPC meetings and Inter-sessional meeting of the working group between developed countries and developing countries such as India, China and Argentina etc., However, the majority of delegates prefer non-discrimination principle to CBDR. This view was supported by intervention of the IMO Secretary-general during MEPC 61. IMO circulated the draft Amendment to Annex VI prepared by the Working Group on Energy Efficiency Measures for ships. It was on the agenda in MEPC 62. However, some countries still opposed to apply non-discrimination principle to international shipping and finally the MEPC chair invited the Committee carried out a roll call vote. Then, the

Amendment was adopted by a vote of 49 parties in favour, 5 against, 2 abstentions and 3 absences.

As a result of the Amendment to MARPOL73/78 Annex VI, new ships applied with EEDI are expected to annual reduction of 180 million tonnes of CO₂ upto 2020 year and SEEMP for all ships in operation will increase to 390 million tonnes of CO₂ reduction annually. However, the Amendment to MARPOL73/78 Annex VI is not sufficient for reduction of GHG emitted from international ships when taking into consideration with the growth of world trade. As a different way, the first trial in IMO history, Market Based Measures(MBM) is agreed as the part of the comprehensive measure to complete GHG reduction. However, IMO does not present tangible MBM. The developing and developed member states in IMO are in negotiation and the destination is still far.

4. Analysis of MARPOL73/78 Annex VI

4.1 Energy Efficiency Design Index

EEDI is the most important technical measure and it aims at promoting the use of more energy efficient equipment and engines. It requires a minimum energy efficiency level per tonne mile for different ship type and size segments.

EEDI will apply to all ships of 400 gross tonnage and above, “which the building contract is placed on or after 1 January 2013 ; or in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013 ; or the delivery of which is on or after 1 July 2015(Reg.2.3.23)”. However, this requirement does not apply to ships which have diesel-electric propulsion, turbine propulsion or hybrid propulsion systems. Although there is particular date for the application established in Annex VI, Regulation 19.4 establishes that the administration may waive EEDI requirement for a ship of 400 gross tonnage and above by January 1, 2017.

Some International Associations such as the Board of Directors of the International Chamber of shipping and BIMCO had the opposite positions as the reasons that EEDI waiver is the result of the political reasons in order to settle down disgruntled voice. Also, it will give the restricted ability to the exempted ships and less charming in the charter market because of their lower efficiency(IMO, 2011).

The master plan for the application consists with three

phases. Phase 1 starts from January 1, 2015, phase 2 starts from January 1, 2020 and finally phase 3 starts from January 1, 2025. It assumes that the technology for the reduction of EEDI would be improved progressively. Also the parties will endeavor to develop the highly efficient technology to emit low GHG(James, 2012). In addition, “at the beginning of phase 1 and at the midpoint of phase 2, the Organization shall review the status of technological developments and, if proven necessary, amend the time periods, the EEDI reference line parameters and reduction rates(Reg.21.6) The amendment might be weakened or strong regulation, which is dependent on the development of technology.

4.2 Ship Energy Efficiency Management Plan

New and existing ships shall keep SEEMP on board, which is an operational measure that established a mechanism to improve the energy efficiency of a ship in a cost-effective manner. In addition, It urges voluntary use of Ship Energy Efficiency Operational Indicator(EEOI), which requires to collect such data as distance travelled, quantity and type of fuel used and all fuel information regarding to CO₂ emitted in accordance with Bunker Delivery Note. Meanwhile IMO guidelines that shore staff monitor EEOI not to increase burden of crew, and ship owners are urged to review and consider operational practices and new technologies to optimize the performance of a ship(IMO, 2012). Ship owners and operators should take into account the guidelines adopted by IMO.

4.3 Promotion of technical co-operation and transfer of technology

Reg.23 of the Annex VI requires that administration provide and support developing countries with technical assistance through IMO and other international bodies. Furthermore, emphasize co-operation and transfer of technology and exchange of information with developing countries to fulfill waiver regulations. 19.4 to 19.6.

5. Issues and Proposals

5.1 CBDR in International shipping sector is right or not?

CBDR is a key principle of UNFCCC regime and differential treatment, which is doctrinal basis of CBDR, is reflected into the various forms in international environmental treaties such as the Vienna Convention, the

Montreal Protocol, the Convention on Biological Diversity and the Convention to Combat Desertification as well as UNFCCC. Theoretically, it recognized that developed countries are responsible for causing Climate Change by the contributions of them. Therefore, it recognized broad distinctions between states on the basis of economic growth or consumption level of fossil fuel. Yet, CBDR is considered less authoritative than customs but more authoritative than soft. Legal Status is in the process of change and weak(Rajamani, 2006). While non-discrimination principle of UNCLOS is recognized as customs and the PSC practice NMFT according to all IMO instruments as the basic principle globally and it has enhanced the safety of ship and marine environment(Lee et al., 2011)

Practically, non-discrimination principle is feasible for the following reasons. Firstly, majority of ships engaged with international voyage registered in Panama, Liberia and Malta etc., as open register as shown in Table. 1. These countries, developing countries, are not listed on Annex I and II but occupied with 72% G/T of the World's merchant fleet(Clarkson, 2013).

Table 1 Statistics of Top 10 flag States(2009 ~ Jul. 2013)

Flag state	Register	No. of Vessel				
		2009	2010	2011	2012	2013.7
Panama	Open	7,990	8,220	8,358	8,492	8,562
Liberia	Open	2,396	2,736	3,017	3,142	3,159
Marshall	Open	1,402	1,654	1,874	2,056	2,131
HK	Open	1,535	1,747	1,984	2,208	2,295
Singapore	Open	2,675	2,878	3,150	3,346	3,466
Bahamas	Open	1,421	1,428	1,436	1,439	1,428
Malta	Open	1,611	1,710	1,801	1,764	1,801
China	National	3,082	3,283	3,473	3,536	3,587
Greece	National	1,563	1,558	1,545	1,537	1,537
Cyprus	Open	999	1,023	1,027	1,027	1,038
Total		24,674	26,237	27,665	28,549	29,004
Flag state	Register	Million G/T				
		2009	2010	2011	2012	2013.7
Panama	Open	192.8	205.0	216.5	226.5	230.1
Liberia	Open	88.8	105.1	120.3	127.8	129.7
Marshall	Open	50.5	64.0	75.6	84.8	88.3
HK	Open	45.3	55.0	67.3	77.5	81.4
Singapore	Open	42.0	45.3	53.0	60.2	64.9
Bahamas	Open	49.8	51.8	53.1	54.5	54.8
Malta	Open	34.7	37.7	43.3	43.8	45.7
China	National	30.4	35.8	40.0	44.0	45.3
Greece	National	40.3	41.0	41.6	42.6	43.3

Cyprus	Open	20.9	21.3	21.5	20.6	20.7
Total		595.5	661.9	732.2	782.4	804.3

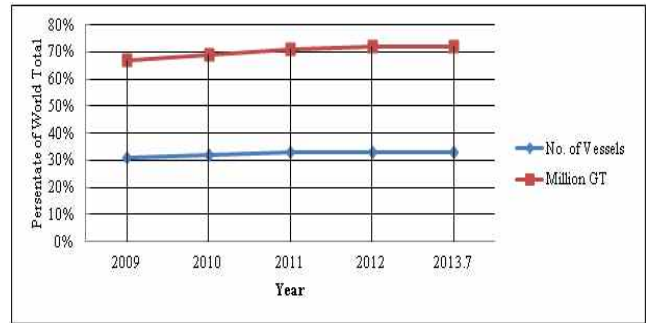


Fig. 1 Trend of Top 10 Flag States Total(2009 ~ Jul. 2013)

If those ships registered into the developing countries enjoy the immunity of the reduction and control of GHG emission from ships, it is clear that the regulations lead to ineffective and might not draw the joining of international community. Furthermore, the flag change would be occurred to escape from stricter regulations. Consequently, technical GHG emission regulations from ships might be ineffective and international shipping could not avoid criticism from international community.

5.2 Implementation of differential treatment through UNCLOS and IMO Instrument.

UNCLOS establish a number of provisions favoring developing countries which is not directly connected with GHG emission regarding the pollution of the marine environment. The Article 207(4) provides that states shall endeavor to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing states and their needs for economic development. Also, Article 202 requires that states promote programs of scientific, educational, technical and other assistance to developing states for the protection and preservation of the marine environment and the prevention and control of marine pollution. Furthermore, Article 266, 267 and 268 establish the development and transfer of marine technology provisions favoring for developing countries.

Reg.19(4) and (5) of MARPOL 73/78 Annex VI have the significant meaning in perspective that they provide differential treatment with developing countries. However, Reg.23 only provides the general obligation and does not

set the concrete obligation. During MEPC 65 in 2013, the committee adopted the resolution on promotion of technical co-operation and transfer of technology relating to the implementation of energy efficiency of ships(IMO, 2013). However, the resolution does not only contain the duty and obligation of the developed countries but it also can not bind the parties of the Annex VI due to non-binding instrument. Still, it seems to be not enough to draw the participation of the developing countries and needed to be further developed.

5.3 Feasibility of SEEMP

All ships are required to keep SEEMP on board regardless of new and existing ships. In the MEPC 63, the guideline for the development of a ship energy efficiency management plan was adopted to assist for the preparation of SEEMP required by Reg. 22 of Annex VI. The general purpose of a SEEMP is to establish a mechanism for a company and/or a ship to improve the energy efficiency of a ship's operation. Preferably, the ship-specific SEEMP is linked to a broader corporate energy management policy for the company that owns, operates or controls the ship, recognizing that no two shipping companies are the same, and that ships operate under a wide range of different conditions(IMO, 2012). SEEMP should be consisting with four steps, planning, implementation, monitoring and self-evaluation and improvement. The guideline recommends that the measures and considerations which the company should reflect at each step.

Even though SEEMP is mandatory document on board, the contents and tools considered should be developed on the voluntary basis and depend on the company's capacity totally. As a monitoring tools, IMO developed EEOI as the quantitative indicator. However, the guideline allows that if convenient and/or beneficial for a ship or a company, other measurement tools can be utilized. Consequently, ship owners and operators could get the competitiveness in international shipping industry. On the other way, the company which wants to get the benefit and incentive through the energy of efficiency of a ship might abuse monitoring system. However, according to the present regulation, the survey carried out by the Administration or Recognized Organizations should only be restricted to verify that the SEEMP is on board(Reg.5(4)) and Port State Control(PSC) is limited to verify the valid International Energy Efficiency Certificate on board as well(Reg.10(5)). Therefore, the control or approval procedure under Administration level might be needed in the future and the

mandatory requirements should be developed to facilitate and certify the monitoring tool for fair competition.

Concerning the effectiveness of SEEMP, the rising anxiety is how much seafarers are familiar with and interested with energy efficiency of ship. Most of the shipping companies are satisfied with Environmental Management System under ISO 14001. It might not ensure that seafarers are also competent with environmental system such as SEEMP. Seafarers have historically focused on discharge and reduction of bilge, oil residues and garbage dumping according to the forced standard set in international law or national law. Even EEDI Regulations are applied for ships, operation and maintenance are quite important when considering the life span of ships. Furthermore, the seafarer's skill and understanding of energy efficiency of ships affect the emission and efficiency. Therefore, the training and education of seafarers are necessary.

SEEMP is complex and comprehensive environmental system. It should be considered from voyage planning, weather routing, speed optimization, hull maintenance and cargo handling, and so on. Therefore, it should be the part of ship's Safety Management System required by ISM Code. The company should carry out the specific training for officers and engineers relating to SEEMP before manning on board. IMO is also developing Model Course for energy efficient operation ships so that the seafarers' training institute and instructors could provide the advanced and sophisticated energy manageable course in line with SEEMP(IMO, 2013). Eventually, the ultimate purpose of Annex VI could be realized in international shipping sector.

6. Conclusion

The international shipping and IMO face with a new turning point due to Climate Change. IMO and all Flag States have been free from Climate Change Regime since UNFCCC and Kyoto Protocol bound on the international community past decade. UNFCCC regime was constructed under CBDR, and according to this in principle, international responsibility has been imposed on the developed countries so called as Annex I. However, CBDR does not give immunity from state's responsibility in UNFCCC Regime. It is the same under UNCLOS. As long as GHG belongs to marine pollution defined as UNCLOS, states have the duty to protect and preserve the marine environment regardless of developed and developing countries.

Also, IMO instruments have enforced PSC jurisdiction under NMFT principle and consequently promoted global and regional implementation of IMO instruments. However, IMO and member states have experienced large gap in the application of the Amendment to MARPOL73/78 Annex VI, Chapter 4. The gap still exists for future work. However, there is the possibility to resolve this by differential treatment. Doctrinal basis of differential treatment is based on CBDR. It is used in various environmental treaties and is reflected as various forms(Rajamani, 2006). One of them is to implement the different scheme between developed countries and developing countries. Another is to grant technical co-operation and transfer of marine technology.

During discussion regarding the Amendment to MARPOL73/78 Annex VI, the developed and developing countries were opposed to application of new GHG regulations. Majority of flag states prefer non-discrimination principle. Because it is recognized as customs, and PSC practices NMFT according to all IMO instruments as the basic principle globally. Also, it has enhanced the safety of ship and marine environment. However, the special provisions are required to meet the needs of developing countries. In consequence, Reg.19(4) and (5) of the Annex VI provide that the Administration may waive EEDI requirements by the certain period of time. Reg.23 provides that technical co-operation and transfer of technology for the improvement of energy efficiency of ships. However, the definitive and concrete provisions and the agreements are insufficient and IMO needs to be worked further to develop the mandatory IMO instruments.

The effect of SEEMP is still questionable. The control or the approval procedure is to be supplemented in Annex VI and the mandatory requirement also should be developed to facilitate and certify the monitoring tool for fair competition. Meanwhile the seafarer's skill and understanding of energy efficiency of ships affect the emission and efficiency. Therefore, the training and education of seafarers are necessary in order to achieve the ultimate purpose.

References

- [1] Bothe, M(2011), Measures to Fight Climate Change - A Role for the Law of the Sea?, H. Hestermeyer et al.(eds), Law of the Sea in dialogue, Springer, pp. 31-33.
- [2] Birnie, P., Boyle, A., and Redgwell, C(2009): International Law & the Environment, Oxford University Press, pp. 356-357.
- [3] Clarkson(2013), World Fleet Monitor, Vol. 4. No.7(July -2013), p. 3.
- [4] Doelle, M(2006), "Climate Change and the Use of the Dispute Settlement Regime of the Law of the Sea Convention", Ocean Development & International Law, 37:3, pp. 321-323.
- [5] Harrison, J(2012), Recent Development and Continuing Challenges in the Regulation of Greenhouse Gas Emission from International Shipping, University of Edinburgh School of Law Research Paper 2012/12, pp. 3-23.
- [6] International Maritime Organization(2008), MEPC58/4/15 -Consideration of the appropriate instrument for a mandatory regime to address GHG emissions, pp. 1-3.
- [7] International Maritime Organization(2009), Second IMO Greenhouse Gas Study 2009, pp. 1-10.
- [8] International Maritime Organization(2011), Resolution ME PC.203(62)-Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, pp. 1-13.
- [9] International Maritime Organization(2012), Resolution ME PC.213(63)-2012 Guidelines for the Development of Ship Energy Management Plan, pp. 3-10.
- [10] International Maritime Organization(2013), MEPC65/ INF. 17-Update of the draft IMO model course on energy-efficient operation of ships. pp. 3-5.
- [11] Klemm, C(1981), Living Resources of the Ocean, The Environmental Law of the Sea, IUCN, p. 71.
- [12] Lee, Y. C., Doo, H. W(2011), "A Study on the IMO Regulations regarding GHG Emission from Ships and its Implementation", Journal of Navigation and Port Research. Vol. 35, No. 5, pp. 376-377.
- [13] Rajamani, L(2006), Differential Treatment in International Environmental Law, Oxford University Press, pp. 251-253.

Received 8 October 2013

Revised 28 October 2013

Accepted 29 October 2013