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A Comparative Study between Space Law and the Law of the Sea*

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Contents

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I. Introduction

Space law(or outer space law) and the law of the sea are branches of international law dealing with activities in geographical ares which do not or do only in part come under national sovereignty. Legal rules pertaining to the outer space and sea began to develop once activities emerged in those areas: amongst others, activities dealing with transportation, research, exploration, defense and exploitation. Naturally the law of the sea developed first, followed, early in the twentieth century, by air law, and later in the century by space law. Obviously the law of the sea, of the air and of outer space influence each other. Ideas have been borrowed from one field and applied to another.[1] This article examines some analogies and differences between the outer space law and the law of the sea, especially from the perspective of the legal status, the exploration and exploitation of the natural resources and environment. I recently published two books in relation to this topic. I published "Air and Space Law"[2] in 2007 and later "International Law of the Sea"[3] with Professor Chan-Ho Park in Pusan National University Law School in 2009. Writing the two books I found some analogies and differences between outer space law and the law of the sea which were worthy to analyse. For the development of space law it is very important to analyse the comparisons between space law and the law of the sea.

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1) P. P. C. Haanappel, Comparisons between the Law of the Sea and Outer Space, *Proceedings of the 28th Colloquium on the Law of Outer Space*, American Institute of Aeronautics and Astronautics (1985), p.145.

2) Han-Taek Kim, *Air and Space Law* (written in Korean), Jiin Books Publishing Co., Seoul Korea (2007), 12 ff.

3) Chan-Ho Park & Han-Taek Kim, *International Law of the Sea* (written in Korean), Jiin Books Publishing Co., Seoul Korea (2009), 15 ff.

Ⅱ. Legal Status of Outer Space and High Seas

According to the Professor P. P. C. Haanappel the most significant analogies between the law of outer space and modern high seas seem to be as follows: non-appropriation and freedom of use; use for peaceful purposes; international responsibility of states for national activities; a growing recognition of benefits by developing states; and finally the adoption of the Common Heritage of Mankind(hereinafter "CHM") doctrine with regard to exploration and exploitation of natural resources.[4)]

1. Outer Space

As far as the legal status of outer space is concerned the 1967 Outer Space Treaty[5)] is the cornerstone among other space related treaties. According to Article II of the 1967 Outer Space Treaty, Outer Space including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. The main standpoint of this article is that outer space including the moon and the other celestial bodies is *res extra commercium,* areas not subject to national appropriation like high seas. It proclaims the principle of non-appropriation concerning the celestial bodies in outer space.

According to Professor Bin Cheng under international customary law, whilst outer space constitutes *res extra commercium,* that is to say, areas not subject

4) Haanappel, *op. cit.*, p.145.

5) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. As of January 2008, 99 countries are states-parties to the treaty, while another 26 have signed the treaty but have not yet completed ratification.

to national appropriation, celestial bodies are *res nullius*, that is to say, areas which may be subject to international sovereignty. As among contracting States, however, the status of the latter has now been changed. Under the treaty, both outer space and celestial bodies are declared *res extra commercium*, thus forestalling any possible recurrence of colonialism in extraterrestrial space.[6)]

2. High Seas

The high seas are open to all States, and no State may validly purport to subject any part of them to its sovereignty. This rule of customary law is codified in the 1958 Convention on the High Seas(hereinafter "Geneva Convention") and the 1982 United Nations Law of the Sea Convention (hereinafter "UNCLOS").[7)] For the high seas the most important rules are contained in Articles 87 and 89 of the UNCLOS. Whereas the principles are identical, there are differences. According to Article 87 of the UNCLOS, it does not include freedom of exploration. In the law of the high seas, exploration is subject to CHM regime established by the UNCLOS.[8)]

In so far as invalidity of claims of sovereignty over the high seas is concerned Article 89 stipulates that no State may validly purport to subject any part of the high seas to its sovereignty. So the legal status of the high seas is *res extra commercium,* not subject to national sovereignty and free for use by all nations.

As far as freedom of the high seas is concerned Article 87 stipulates that the high seas are open to all States, whether coastal or land-locked. Freedom

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6) Bin Cheng, *Studies in International Space Law*, Clarendon Press · Oxford (1997), p.229.
7) As of January 2008, 158 countries and the European Community have joined in the UNCLOS; R. R. Churchill & A. V. Lowe, *The Law of the Sea*, 3rd ed., Manchester University Press (1999), p.204.
8) Haanappel, *op. cit.*, pp.145-146.

of the high seas is exercised under the conditions laid down by this Convention and by other rules of international law. It comprises, *inter alia*, both for coastal and land-locked States, freedom of navigation, freedom of overflight, freedom to lay submarine cables and pipelines, freedom to construct artificial islands and other installations, permitted under international law, freedom of fishing and freedom of scientific research.[9)]

Ⅲ. Exploration and Exploitation of Natural Resources; Common Heritage of Mankind

1. Moon and Other Celestial Bodies

The Moon is the only celestial body on which human beings have made a manned landing. While the Soviet Union's Luna Programme was the first to reach the Moon with unmanned spacecraft, only the NASA Apollo program achieved the manned missions to date, beginning with the first manned lunar mission by Apollo 8 in 1968, and six manned lunar landings between 1969 and 1972 – the first being Apollo 11 in 1969. Human exploration of the Moon temporarily ceased with the conclusion of the Apollo program, although a few robotic landers and orbiters have been sent to the Moon since 1972.[10)]

The Moon and other celestial bodies of our solar system contain a large quantity of natural resources. The use of these resources represents a unique opportunity of development for mankind, and may significantly contribute to

9) Concerning the high seas *see* Chan-Ho Park & Han-Taek Kim, *op. cit.*, pp.137-157.
10) http://en.wikipedia.org/wiki/Moon.

the betterment of conditions of people on the Earth.

As to the Moon, it contains a vast amount of mineral resources distributed uniformly across its surface and subsurface. Manned and unmanned explorations have demonstrated that the Moon is rich of aluminum, iron, silicon, oxygen, hydrogen, chromium, manganese, potassium, etc. These minerals can be utilized in their original form or refined into structural and electrical materials. They can be brought back to the Earth, used for life support of a permanent lunar basis, or used as rocket propellant. For instance, oxygen and hydrogen are contained in the lunar regolith at all latitudes. There is also evidence that the lunar poles contain a certain amount of water-ice, though not clear yet how much it is. However, in case a large amount of water exists, this could be used as rocket propellant and life-support materials for astronauts.[11)]

The most valuable resource contained in the Moon, however, is Helium-3, which represents the main reason behind the renewed attention of States and private sectors for exploiting extraterrestrial resources. Helium-3 is an isotope, rare on the Earth but abundant on the Moon, and can be used as a fuel in fusion power reactors, combined with other materials such as deuterium. The value of Helium-3 is indescribable in that it can generate nuclear power, thereby a clean energy through a process of nuclear fusion which does not produce toxic waste. Thanks to this special advantage, the extraction of Helium-3 is likely to have a huge impact in the way energy is produced and distributed on the Earth. It is well known that mankind is currently facing an energy crisis. The stocks of raw mineral materials are running out, and experts estimate that fossil fuels will be exhausted in 30-40 years. Thus, Helium-3 is one of the best alternatives to counter this energy crisis, thanks to its potential to replace fossil fuels and other substances as primary sources

11) Fabio Tronchetti, A legal regime to govern the exploitation of the natural resources of the Moon and other celestial bodies, 23 *Korean Journal of Air and Space Law* (2008), pp.133-134.

of energy on the Earth.[12)]

According to Article I of the 1967 Outer Space Treaty the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind. The 1979 Moon Agreement developed the concept of province of all mankind into the principle of common heritage of mankind(CHM). Article 11(1) of the Moon Agreement[13)] stipulates that "The moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement and in particular in paragraph 5 of this article."[14)]

The concept of CHM stipulated in the Moon Agreement created an entire new category of territory in international law. This concept basically conveys the idea that the management, exploitation and distribution of natural resources of the area in question are matters to be decided by the international community and not to be left to the initiative and discretion of individual State and their nationals.[15)] Similar provision is found in the 1982 Law of the Sea Convention that operates the International Sea-bed Authority created by the concept of CHM.

Article 11(5) provides that "State Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible." The Moon Agreement, based on the expectation

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12) *Ibid.*, p.134.

13) Agreement Governing the Activities of States on the Moon and Other Celestial Bodies; As of December 19, 2008, only 13 states have ratified it. 5 states have signed but have not ratified it.

14) On the notion of "CHM" *See* Ruediger Wolfrum, Common Heritage of Mankind, *Encyclopedia of Public International Law* (hereinafter *EPIL*) (1989), 224 ff.

15) Bin Cheng, *op. cit.*, p.436.

of future exploitation, then prescribed a sharing of resource benefits based on equitable considerations.

According to the Moon Agreement, an international regime will be established as the exploitation of the natural resources of the celestial bodies other than the Earth is about to become feasible. Before the establishment of an international regime we could imagine moratorium upon the exploitation of the natural resources on the celestial bodies. But the drafting history of the Moon Agreement indicates that no moratorium on the exploitation of natural resources was intended prior to the setting up of the international regime. So each State Party could exploit the natural resources bearing in mind that those resources are CHM.[16] As Professor Christol said until the parties of the Moon Agreement were able to put into operation the legal regime for the equitable sharing of benefits, they would remain free to disregard the CHM principle. Parties to one or both of the agreements would retain jurisdiction over national space activities.[17]

The Main purpose of international regime are concerned only with natural resources' exploitation and not with any other type of activity. The purposes are orderly and safe development, rational management, expansion of opportunities, and "equitable sharing by all States Parties in the benefits derived from these resources". It should be noted that such sharing is not with raw materials but with benefits derived therefrom. According to Article 11(7)(d) of the Moon Agreement an equitable sharing by all States Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly - or indirectly to the exploration of the moon, shall be given

16) Kevin B Walsh, Controversial Issues under Article XI of the Moon Treaty, 6 *Annals Air and Space Law* (hereinafter *AASL*) (1981), p.494.

17) Carl Q. Christol, The 1979 Moon Agreement: Where is it today ?, 27 *Journal of Space Law*(hereinafter *JSL*) (1999), p.32.

special consideration.[18)]

The debate over the Moon Agreement was heavily influenced by the similar debates over the Law of the Sea and its CHM principle and the negotiations concerning the international sea-bed authority, which had, it was argued, effectively restrained sea-bed mining through its requirements of transfer of technology from the advanced countries for the benefit of the less advanced.[19)]

2. Deep Sea-bed

The potato-sized nodules scattered across large areas of the sea bed, mainly beyond the geological continental shelf at depths of around 3,500 meters were discovered. These manganese nodules are known to be composed of high grade metal ores. When the problem of the commercial exploitation of the nodules was raised among states, 1982 UNCLOS established international regime to govern all activities connected with exploration and exploitation of mineral resources in the Area(UNCLOS Art. 134(2)). The Area is defined as the 'sea bed and ocean floor and subsoil thereof beyond national jurisdiction'(UNCLOS Art. 1). It was explained that 'national jurisdiction' for these purposes extends, broadly speaking, to the outer edge of the continental margin, or to a distance of 200 miles from the baseline where the margin does not extend up to that distance. Both the Area itself, which comprises about sixty per cent of the whole sea bed, and its resources (limited by article 133 to mineral resources) are the 'common heritage of mankind'. As such they are not susceptible of unilateral national appropriation. Rights in the Area and to its resources can be obtained only in accordance with the provisions of the Convention, which

18) Eilene Galloway, Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 5 *AASL* (1980), p.500.

19) Nandasiri, Jasentuliyana, *International Space Law and United Nations*, Kluwer Law International (1999), pp.231-232.

is to say, only with the authorization of the International Sea Bed Authority established by the 1982 Convention(UNCLOS Arts 136, 137).

All activities in the Area, which in principle may be conducted both by the Authority itself through its mining arm, the 'Enterprise', and by commercial operators, are to be carried out for the benefit of mankind as a whole, taking into particular consideration the interests of developing States and peoples who have not attained self-governing status(UNCLOS Art. 140). Furthermore, since the superjacent waters and air space remain high seas, reasonable regard must be had to other legitimate uses of those waters and of the Area itself(UNCLOS Art. 147).[20]

Part XI of 1982 UNCLOS as originally drafted contained a detailed legal regime providing for the exploitation and management of the 'Area' for the benefit of all mankind. It remains the longest part of the Convention and the one to which most time was devoted. It was also the Part to which some of the industrialized countries most strongly objected and was the reason why the United States voted against adoption of the Conference text, and why the United Kingdom would not have ratified the Convention in its original form. On 27 July 1994, the UN General Assembly was presented with an Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea. This was adopted on 28 July by a vote of 121 to 0, with 7 abstentions. The Agreement is to be regarded as an integral part of the Convention and the two instruments are to be interpreted and applied as one, the Agreement prevailing in cases of conflict. So, no state can become bound by the Agreement unless it first becomes bound by the Convention.[21]

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20) Churchill & Lowe, *The Law of the Sea*, 3rd ed., Manchester University Press (1999), pp.238-239.

21) Martin Dixon, *Textbook on International Law*, 5th ed., Oxford University (2005), pp.215-216.

Ⅳ. Protection of Environment

1. Protection of Environment in Outer Space

Currently, there are two major concerns over environmental threats arising from space activities: the use of nuclear power sources (NPS[22]) in outer space, and debris generated by space activities. The use of nuclear power sources has been one of the most active items on the agenda of the United Nations Committee on the Peaceful Uses of Outer Space(COPUOUS) and its two sub-committee(Legal Sub-committee and Scientific and Technical Sub-committee) while space debris has been the subject of discussions in various forums.

In examining existing laws relating to space activities and the environment, a number of space treaties providing piecemeal measures must be considered, since there is no general convention codifying universal principles relating to environmental protection.

The earliest treaty dealing with the space environment is the 1963 Partial Test Ban Treaty, which prohibits nuclear explosion in the atmosphere and beyond, including outer space. More extensive environmental protection is provided by the 1967 Outer Space Treaty and the 1979 Moon Agreement, which essentially demilitarize the Moon and other celestial bodies, thus protecting them from the environmental impact of military activities.[23] But these treaties only partially demilitarize outer space, since in Earth orbit only the placement of nuclear weapons and "any other kinds of weapons of mass

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22) Concerning NPS *see* S. Neil Hsenball, Nuclear Power Sources in Outer Space, 6 *JSL* (1978), 119 ff; N. Jasentuliyana, Multitateral Negotiations on the Use of Nuclear Power Sources in Outer Space 14 *AASL* (1989), 297 ff; He Qizhi, Towards A New Legal Regime for the Use of Nuclear Power Sources in Outer Space, 14 *JSL* (1986), 95 ff; Han-Taek Kim, *op. cit.*, pp.124-135.

23) Art. 4 paragraph 1 of the 1967 Outer Space Treaty.

destruction" are banned.[24] Thus these treaties leave open the possibility of testing, deploying, and utilizing space weapons other than nuclear weapons, thus leaving the possibility of a further worsening of the debris situation.

The 1976 Convention on the Prohibition of Military and Other Hostile Use of Environmental Modification Techniques also contributes to the protection of the environment, since such techniques include any means of modification of the dynamics, composition, and structure of the Earth or space environment, through intentional control of natural processes.[25]

For protecting the environment from potentially dangerous non-military activities, Article 9 of the Outer Space Treaty is the most important legal provision. Article 9 obliges states parties to (1) avoid harmful contamination of outer space or introduction of extraterrestrial matter that could result in adverse changes in the environment of the Earth, and (2) enter into international consultation if their space activities would cause potential harmful interference with space activities of other parties. Since "harmful contamination" has to be related to outer space, whereas "adverse changes" cover only those effects on the Earth's environment that are due to the introduction of extraterrestrial matter, these two provisions are rather limited in providing protection of the Earth environment. The consultation envisaged in the article, although very important, is not mandatory, nor is any procedure established or recommended. If the party concerned does not initiate consultation or refuses consultation demanded by another party, it does not constitute a violation of the Treaty.

The Moon Agreement provides more detailed provisions in this sense than the Outer Space Treaty. The protection of environment is important in all phases of the exploration and use.[26] Article 7 of the Moon Agreement makes

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24) Art. 4 paragraph 1 of the 1967 Outer Space Treaty.

25) He Qizhi, Space Law and the Environment, *Space Law-Development and Scope*-(ed. by Nandasiri Jasentuliyana), Praeger (1992), p.166.

26) Jan Ondre, From the Common Heritage of Mankind to Commercialization and Back Again ?, *Proceedings of the 43rd Colloquium on the Law of Outer Space* (2000),

an improvement on the general obligations contained in the Outer Space Treaty. It obliges states parties to the Treaty to (1) take measures to prevent disruption to the existing balance of the environment of the Moon and other celestial bodies, whether caused by introduction of adverse changes, by harmful contamination, or otherwise; (2) avoid harmful effects to the Earth environment through the introduction of extraterrestrial matter or otherwise; (3) inform the United Nations of the measures being adopted to prevent the disruption of the existing balance of the environment of the Moon and any plans to place any radioactive material on it. In this article, the prevention of disruption of the existing balance of the environment of the Moon is the key obligation of all states parties. This provision of the Moon Agreement on environmental protection makes up for some of the inadequacy of the corresponding provision of the Outer Space Treaty.

The question of liability for environmental damage has been partially dealt with by the 1972 Liability Convention,[27] which establishes a launching state's absolute liability for all damage caused by its space object on Earth or to aircraft in flight. It also covers damage caused by one object in space to another on condition that such damage is caused by the fault or negligence of the launching state. According to the definition given in Article I of the Liability Convention, "damage" could cover damage to the Earth's environment as long as this means the surface of the Earth under the jurisdiction of a state. Following the Cosmos-954 incident[28] in 1979, Canada based its claim for

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American Institute of Aeronautics and Astronautics, p.21.

27) Convention on International Liability for Damage Caused by Space Objects; As of 2007, 82 States have ratified and 25 States have signed the Convention, but have not yet completed ratification.

28) Concerning the Cosmos-954 incident *see* Bryan Schwartz and Mark L. Berlin, After the Fall: An Analysis of Canadian Legal Claims for Damage Caused by Cosmos 954, 27 *McGill Law Journal* (1982), 676 ff; Paul G. Dembling, Cosmos 954 and the Space Treaties, 6 *JSL* (1978), 129 ff; Alexander F. Cohen, Cosmos 954 and the International Law of Satellite Accidents, 10 *Yale Journal of International Law* (1984), 78 ff.

compensation for damage from the Soviet Union mainly on the provisions of the Liability Convention, and the claims were settled by diplomatic negotiation between the two countries.[29] Damage to the atmospheric or space environment, or to area outside national jurisdiction, such as the high seas and Antarctica, dose not seem to be covered by the Convention. This appears to be one of the lacunas which needs to be filled by further elaboration of space law.

The 1976 Registration Convention[30] requires registration of launchings with the United Nations, but it does not require notification of explosions or malfunctioning space objects, nor registration of the type or amount of fuels or exhaust, chemical or radioactive substances, or other contaminants which might affect the space environment.[31]

2. Protection of the Marine Environment

Protection of the marine environment was not given special importance in the Geneva Conference on the Law of the Sea in 1958, and the Geneva Conventions have little to say on the subject. Articles 24 and 25 of the 1958 High Seas Convention do require states to prevent oil pollution from ships, pipelines, and seabed operations, and pollution from radioactive substances, but they fall short of acknowledging a more comprehensive duty to prevent marine pollution or protect the marine environment, and offer no definition of the term 'pollution'.[32]

The emergence of a more strongly expressed obligation to protect the marine

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29) He Qizhi, Environmental Impact of Space Activities and Measures for International Protection, 16 *JSL* (1988), pp.117-118.

30) Convention on Registration of Objects Launched into Outer Space.

31) He Qizhi, Space Law and the Environment, *op. cit.*, pp.166-168.

32) Patricia Birnie and Alan Boyle, *International Law and the Environment*, 2nd ed., Oxford University Press (2002), p.351.

environment is evidenced by Articles 192-195 of the 1982 UNCLOS,[33] by regional treaties, and by other multilateral agreements negotiated progressively since 1954. These include the 1972 London Dumping Convention[34], the 1973/78 MARPOL Convention[35], which deals with pollution from ships and supersedes the earlier 1954 London Convention for Prevention of Pollution of the Sea by Oil, and a variety of regional treaties requiring states to control land-based sources of marine pollution, dumping, and seabed operations. The degree of acceptance of these various treaties and the consensus expressed by states in negotiating the environmental provisions of the 1982 UNCLOS suggest that its articles on the marine environment are supported by a strong measure of *opinio juris* and represent an agreed codification of existing principles which have become part of customary law.

The content of this obligation is elaborated in more detail by Article 194 and subsequent provisions of the 1982 UNCLOS. It is evident from the Convention, first, that its protection extends not only to states and their marine environment, but to the marine environment as a whole, including the high seas. This goes beyond the older customary rule based on the Trail Smelter arbitration[36] between USA and Canada and reflects its extension to global common areas contemplated by Principle 21 of the Stockholm Declaration.[37]

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33) On the drafting history of Articles of 192-195 of 1982 UNCLOS *see* Nordquist (ed.), *United Nations Convention on the Law of the Sea: A Commentary*, iv (Dordrecht, 1991), 36 ff.

34) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter; As of 2008, 78 States have ratified the Convention.

35) International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" is short for marine pollution and 73/78 short for the years 1973 and 1978); There are 161 countries party to the agreement as of 2005.

36) The Trail Smelter case (1931-1941), *Reports of International Arbitral Awards* II. *See* K. J. Madders, Trail Smelter Arbitration, 2 *EPIL* (1995), pp.653-656.

37) <Principle 21 of the Stockholm Declaration>
States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their

The award of the Trail Smelter arbitration which was initiated in 1926 and finally concluded in 1941 is usually referred to for the basic legal position that no states may knowingly allow its territory to be used in a manner that would cause serious physical injury to the environment of another state.[38)]

Moreover, the 'environment' for this purpose includes 'rare and fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life(UNCLOS Art. 194(5)). The obligation of states is thus not confined to the protection of economic interests, private property or the human use of the sea implied in the Convention's definition of 'pollution' (UNCLOS Art. 1(4)). This conclusion is consistent with the provisions of modern treaties dealing with the wider environmental impact of marine pollution, including the 1992 Protocol to the 1969 Convention on Civil Liability for Oil Pollution Damage, the 1989 Salvage Convention, and a number of regional treaties and protocols concerned with specially sensitive ecological areas.[39)]

Secondly, the 1982 UNCLOS represents an important advance over the earlier 1958 Geneva Conventions by formulating the obligation of environmental protection in terms which are comprehensive of all sources of marine pollution(UNCLOS Art. 194). Thus it applies to ships, land-based sources, seabed operations, dumping, and atmospheric pollution, and provides a framework for a series of treaties both global and regional on each of these topics. In this respect the comprehensive scope of the 1982 UNCLOS follows

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jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

38) Peter Malanczuk, *Akehurst's Modern Introduction to International Law,* 7th revised ed., Routledge (1997), pp.245-246.

39) Concerning the Regional Treaties and Protocols *see* 1985 Nairobi Protocol Concerning Protected Areas and Wild Flora and Fauna in Eastern Africa, 1990 Kingston Protocol Concerning Specially Protected Areas and Wildlife of Wider Caribbean and 1996 Barcelona Protocol Concerning Specially Protected Areas and Biological Diversity in Mediterranean; Birnie and Boyle, *op. cit.*, p.352.

the pattern established by the 1974 Helsinki Convention for the Protection of Marine Environment of the Baltic Sea, and subsequently adopted in UNEP's regional seas treaties.

But perhaps its most significant feature is the way the Convention handles the concept of due diligence. As with other treaties it makes reference to the need to take 'all measures necessary' to prevent and control pollution damage to other states, but it moderates this requirement by allowing use of the 'best practicable means at their disposal and in accordance with their capabilities' where the risk is to the marine environment in general, rather than to other states. This wording implies a somewhat greater flexibility and discretion, particularly for developing countries, whose interests received particular attention in the drafting of this part of the Convention.[40] The significance of this point can be seen more clearly in Articles 207 and 212, dealing with the control of land-based and atmospheric sources of pollution, where reference is made to economic capacity, development needs, and 'characteristic regional features'.[41]

V. Conclusions

We dealt with some analogies and differences between space law and the law of the sea from the comparative point of view. As far as the comparisons of the legal status between the outer space and high seas are concerned the two areas are *res extra commercium*. The latter is *res extra commercium* based on both the customary international law and treaty, however, the former is different respectively according to the customary law and treaty. Under

40) Nordquist (ed.), *A Commentary*, iv, *op. cit.*, p.64.
41) Birnie and Boyle, *op. cit.*, pp.351-353.

international customary law, whilst outer space constitutes *res extra commercium*, celestial bodies are *res nullius*. However as among contracting States of the 1967 Outer Space Treaty, both outer space and celestial bodies are declared *res extra commercium*.

As for the comparisons of the exploration and exploitation of natural resources between the Moon including other celestial bodies in 1979 Moon Agreement and the deep sea bed in the 1982 UNCLOS, the both areas are the common heritage of mankind. The latter gives us very systematic models such as International Sea-bed Authority, however, the international regime for the former will be established as the exploitation of the natural resources of the celestial bodies other than the Earth is about to become feasible. Thus Moon Agreement could not impose a moratorium, but would merely permit orderly attempts to establish that such exploitation was in fact feasible and practicable, by allowing experimental beginnings and thereafter pilot operations. As Professor Christol said until the parties of the Moon Agreement were able to put into operation the legal regime for the equitable sharing of benefits, they would remain free to disregard the CHM principle. Parties to one or both of the agreements would retain jurisdiction over national space activities.[42)]

In so far as the comparisons of the protection of the environment between the outer space and sea is concerned the legal instruments for the latter are more systematically developed than the former. In the case of the former there are growing tendencies of concerning the environmental threats arising from space activities these days. There is no separate legal instrument to deal with those problems.

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42) Christol, The 1979 Moon Agreement: Where is it today ?, *op. cit.*, p.32.

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Abstract

Space law(or outer space law) and the law of the sea are branches of international law dealing with activities in geographical ares which do not or do only in part come under national sovereignty. Legal rules pertaining to the outer space and sea began to develop once activities emerged in those areas: amongst others, activities dealing with transportation, research, exploration, defense and exploitation. Naturally the law of the sea developed first, followed, early in the twentieth century, by air law, and later in the century by space law. Obviously the law of the sea, of the air and of outer space influence each other. Ideas have been borrowed from one field and applied to another. This article examines some analogies and differences between the outer space law and the law of the sea, especially from the perspective of the legal status, the exploration and exploitation of the natural resources and environment.

As far as the comparisons of the legal status between the outer space and high seas are concerned the two areas are *res extra commercium*. The latter is *res extra commercium* based on both the customary international law and treaty, however, the former is different respectively according to the customary law and treaty. Under international customary law, whilst outer space constitutes *res extra commercium*, celestial bodies are *res nullius*. However as among contracting States of the 1967 Outer Space Treaty, both outer space and celestial bodies are declared *res extra commercium*.

As for the comparisons of the exploration and exploitation of natural resources between the Moon including other celestial bodies in 1979 Moon Agreement and the deep sea bed in the 1982 United Nations Convention on the Law of the Sea, the both areas are the common heritage of mankind. The latter gives us very systematic models such as International Sea-bed Authority,

however, the international regime for the former will be established as the exploitation of the natural resources of the celestial bodies other than the Earth is about to become feasible. Thus Moon Agreement could not impose a moratorium, but would merely permit orderly attempts to establish that such exploitation was in fact feasible and practicable, by allowing experimental beginnings and thereafter pilot operations. As Professor Carl Christol said until the parties of the Moon Agreement were able to put into operation the legal regime for the equitable sharing of benefits, they would remain free to disregard the Common Heritage of Mankind principle. Parties to one or both of the agreements would retain jurisdiction over national space activities.

In so far as the comparisons of the protection of the environment between the outer space and sea is concerned the legal instruments for the latter are more systematically developed than the former. In the case of the former there are growing tendencies of concerning the environmental threats arising from space activities these days. There is no separate legal instrument to deal with those problems.

Key Words : Space Law, Law of the Sea, *res extra commercium*, Common Heritage of Mankind, Protection of Environment.

초 록

우주법과 해양법은 모두 국제법에 속하며 주권에 종속되거나 종속되지 않는 지리적 분야를 다루는 학문이다. 이 두 분야는 운송, 과학탐사. 자원개발, 국가방위와 관련되어 발달해 왔다. 우선 20세기 초반에 해양법이 먼저 발달하고 그 다음 20세기 후반에 항공법과 우주법이 발달되었다. 이 논문은 우주법과 해양법의 유사점과 차이점에 관하여 비교법적인 측면에서 분석하였다. 특히 여러 비교적 요소 중에서 법적 지위와 자원탐사와 개발 그리고 환경적 측면에서 비교하였다.

첫째, 우주와 해양의 법적 지위를 비교하면 두 영역 모두 비전유원칙을 선언하고 있는데, 우주법에서 보면 우주를 마치 공해(公海)와 같이 누구나 자유롭게 접근하여 사용 수익이 가능하나 점유할 수 없다는 원칙을 내포하는 국제법상 '국제공역'(國際公域, *res extra commercium*)으로 파악하고 있는 것이다. 이와 같이 1967년 우주조약은 동 조약 이전의 국제관습법 상 외기권 우주를 국제공역으로 보고 천체를 무주지(*res nullius*)의 상태로 보아왔던 입장을 우주와 천체 전부를 국제공역화하는 데에 기여하였다.

둘째, 두 영역의 자원의 탐사 및 개발의 측면에서 비교하면 1979년 달조약과 1982년 해양법협약의 심해저개발을 비교할 수 있다. 이 두 영역은 조약상 인류공동유산으로 선언되었는데, 1979년 달조약 제11조에 명시된 '달의 천연자원의 개발이 가능해질'(exploitation of the natural resources of the Moon is about to become feasible)시기에 국제제도를 수립해야 한다는 규정은 국제제도의 수립 전에는 자원개발을 금지하는 것을 의미하는가? 해양법에서 1982년 해양법협약이 제정되기 전 심해저자원과 해상(海床)의 자원개발을 금지하는 '개발유예'(moratorium)에 관한 UN총회의 결의 2574가 채택되어 심해저의 국제제도가 조약으로 확정되기 까지는 심해저 자원의 탐사 및 개발을 금지시켜야 한다는 선언을 한 것과 비교한다면 달조약도 그러한가? 달 조약의 제정과정을 살펴보면 국제제도의 수립 전에 달과 다른 천체의 천연자원에 대한 개발유예는 예정되지 않았다고 해석해야 된다. 그러나

이것은 그와 같은 개발에 어떠한 제한이나 한계가 없음을 의미하는 것이 아니고 달과 다른 천체는 인류공동유산영역이므로 모든 개발가는 그들이 인류공동유산인 천연자원을 개발하고 있음을 명심할 것이 요구된다.

마지막으로 환경보호에 관한 두 영역의 접근법을 살펴보면 해양의 경우 환경보전을 위한 법제정이 활발한 반면 우주의 경우는 이제 시작에 불과하다는 점을 발견하게 된다. 우주환경을 다루는 법문서는 아직 제정되지 못한 것이 현실이다.

결론적으로 이 두 영역의 비교법적 접근법이 주는 의미는 두 영역이 서로 같지는 않지만 유사한 면도 발견되고, 그 연구방법이 유사하므로 먼저 발달한 해양법 모델을 통해서 우주법의 발전가능성을 진단해 보고 상호 보완적 연구의 가능성을 모색할 수 있다.

주제어 : 우주법, 해양법, *res extra commercium*, 인류공동유산, 환경보호.