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Activities on Naming Undersea Features in Korea*

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한국에서 해저지명 부여를 위한 활동*

성효현**

Abstract : The consistent use of appropriate names for the undersea features is an essential element of effective communication among ocean scientists. The correct use of names on bathymetric and nautical charts provide benefits to national and international communities. Also it is expected that naming of the marine geographical features within the territorial waters and EEZ contributes to secure the territorial waters and preserve the various marine resources.
This paper will seek to addresses a variety of activities where geographic names issues for undersea features arises. For the purpose of this paper, the attention will be given upon 1) the general history of activities on naming undersea features in Korea; 2) development of the guideline for standardization of marine geographical names; 3) geomorphological characteristics of undersea features in East Sea; and 4) future plan to conduct a systematic analysis for naming marine geographical features in Korea.
Key Words : undersea features, marine geographical name, standardization, East Sea

요약 : 해저지형에 대해 일관성 있고, 체계적인 지명을 부여하는 것은 해양학과 관련된 학문을 연구하는 사람들끼리 의사소통을 원활이 하며 그 연구결과의 활용이나 해도 사용에 혼동을 초래하는 것을 막기 위해 필수적인 작업이다. 따라서 각 국가나 국제기구에서는 일관성 있고 체계적인 해저지명사업을 활발히 진행하고 있다. 대한민국도 영해 범위 내에서나 EEZ 또는 공해상에 해저지명을 부여하기 위한 여러 활동을 전개하여 왔다. 본 연구는 최근 대한민국에서 해저지형에 지명을 부여하기 위한 다양한 활동을 소개하는 것이 목적이다. 이를 위해 구체적 연구 내용은 첫째, 한국에서 해저지명을 부여하는 활동들을 역사적으로 조명하고, 둘째 해양지명 표준화를 위한 지침개발 내용을 소개하며, 셋째, 그 동안 과학적 탐사가 종료되어 SCUFN(국제수로국 산하 해저지명 소위원회)에 제안할 동해에 위치하고 있는 14개의 해저지형의 특색을 밝히고, 마지막으로 체계적 해저지명 활동을 지속하기 위한 미래계획을 제시하는 것으로 구성되었다.
주요어 : 해저지형, 해양지명, 표준화, 동해

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1. Introduction

The consistent and diligent use of appropriate names for distinct undersea features is an essential element of effective communication worldwide between ocean scientists, hydrographers, geomaticists and environmentalists. The proper scientific naming of submarine features is the key for addressing topographic structures on the seafloor in publication or text books and for placing names on bathymetric and nautical charts. The correct use of names provide benefits to national and international communities. Unregulated or off-hand naming can lead to confusion, such as the use of the same name for different features or multiple naming of the same feature by different proposer or to unsuitable combinations of words. In general it is a great interest for most scientists to use for their work on interpretation, modelling and visualizing a uniform and consistent data base for undersea feature names (Schenke, 2006).

The standardization of marine geographical name is necessary to use harmonized name for various nautical publications, nautical charts and other publications producing by individual countries for safe navigation and marine development. In addition to standardization of marine geographical names in Korea, the Republic of Korea has been carried out national and international activities on examining, identifying and naming for undersea features in diverse respects.

This paper will seek to addresses a variety of issues where geographic names issues for undersea features arises. For the purpose of this paper, attention will be given upon the general history of activities on naming undersea features in Korea; development of the guideline for standardization of marine geographical names; geomorphic characteristics of undersea futures in East Sea; and future plan to conduct a systematic analysis for naming marine geographical features in the Republic of Korea.

2. General History

The general history of naming for undersea feature in Korea is marked by the following events :

- 1952 : The early time of undersea feature name in Korea is marked by the first pilot. The first Pilot has been published by the National Oceanographic Research Institute (NORI) in 1952, and then released many times with additions and amendments. It shows the data of the marine geographical feature names from the marine oceanography, port, fisheries, meteorology and etc. In addition, this Pilot have the informations from Charts, Nautical publications and Notice to Mariners which is produced by the NORI. Also it includes the data from the hydrographical survey, ocean survey and sea route survey (NORI, 2004).
- 1987 : It is encouraged to establish national boards of geographical names and undersea features by GEBO-SCUFN (General Bathymetric Chart of the Oceans-Sub Committee on Undersea Feature Name).

In 1980s, considerable concern has been expressed at the indiscriminate and unregulated naming of undersea features which often get into print in articles submitted to professional journals, or on ocean maps and charts, without any close scrutiny being made concerning their suitability, or even whether the feature has already been discovered and named. SCUFN

encourage the establishment of national board of geographical names and undersea features to remedy this situation and to bring the geographical names of undersea features to a better standardization (IHB, 2001).

- 1996~7 : Shipbuilding of Haeyang 2000, scientific research ship. Undersea features has been surveyed by Haeyang 2000, scientifically (Multi-Beam Echo Sounder, Gravity and magnetic surveys were conducted).
- 2002. 7 : Establishment of KCMGN (Korean Committee on Marine Geographical Names).
  The establishment of KCMGN and on-going progress of its activities were already reported in the Eighth United Conference on the Standardization of Geographical Names (E/CONF .94/INF .48), in Berlin, 2002 and in the twenty-second session of the United Nations Group of Experts on Geographical Names (WP No.88), in New York, 2004.
- 2004. 11 : The Guideline for Standardization of Marine Geographical Names was developed by KCMGN
- 2002. 9 ~ 2005. 11 : KCMGN approved sixty-six new marine names which are registered in the government official gazette.

Along with the maritime survey on the undersea features, there has also been domestic standardization process of their names under the direction of Korean Committee on Marine Geographical Names (KCMGN).

4 marine geographical names in September 2002, 7 marine geographical names in April 2004, 15 marine geographical names in May 2005 and 22 marine geographical names in November 2005 were registered in the government official gazette, as the sea surface features. KCMGN has approved only sea surface feature names until 2005. On november 2005, 18 undersea feature names were approved by KCMGN and registered in the government official gazette.

- International activities-GEBCO SCUFN (General Bathymetric Chart of the Oceans-Sub Committee on Undersea Feature Name) Meeting

1 Korea representative participated the 18th meeting, Monaco, 2005. The Korea representatives participated the 19th meeting, Bremerhaven, Germany and 1 geologist (member of KCMGN) has been approved as a SCUFN member

3. Development of the Guideline for Standardization of Marine Geographical Names

The marine geographical names can be classified into sea surface feature names and undersea feature names. As a sea surface feature, there are ocean, sea, strait, channel, rock, ledge, rock which covers and uncovers, gulf, bay, bight and creek. In this paper, the attention will be given primarily upon the principles for naming of undersea features.

Due to the invisibility of the submarine topography and morphology, the establishment of a scientific classification for undersea features is generally very difficult. Especially the selection of a correct generic terms for a features is not easy processes. In this aspect, the list of terms and dimensions have been worked out through collaboration between the "GEBCO Sub-Committee on Undersea Feature Names", appointed by the "Joint IOC/IHO Guiding Committee for GEBCO", and the Working Group on Maritime and Undersea Features of the "United Nations Group of Experts on Geographical Names (UNGEGN)", in accordance with provisions of appropriate resolutions of United

Nations Conferences on Geographical Names (IHB, 2001).

KCMGN developed policies and the guideline for standardization of marine geographical names and principles and procedures for naming features. Also undersea feature terms and definition were developed in conformance with undersea feature terms and definitions list of GEBCO-SCUFN. (Table 1) shows the list of generic terms which have been developed by KCMGN, GEBCO-SCUFN, and USBGN(United States Board on Geographic Names)-ACUF (Advisory Committeeon undersea features) for standardization of undersea features names. Most generic terms are overlapped by 3 organizations. However some of GEBCO and KSMGN generic terms of undersea features differ from those of USBGN-ACUF. For example, some generic terms, such as Bench, Cordillera, Deep, Flat, Fork, Furrow, Gully, Ledge, Mesa, Mound, Mountain, Self Valley, Tongue, Ramp, are only included in the list of USBGN-ACUF undersea features generic terms. GEBCO generic terms of undersea features can be 2different terms with same definition. In this case, KCMGN assigns one korean generic term for 2different English terms with same definition. In cases where a conflict in feature name appears, evidence for prior usage in published literature or maps should be utilized to determine correct generic term of the features.

1) principles for naming undersea features

(1) Generic Terms

The name of a submarine features is a composition of the 'specific term' and the 'generic term'. As compared to naming

Table 1. Generic terms, developed by KCMGN, GEBCO, and USBGN(United States Board on Geographic Names) for standardization of undersea features names.

	KCMGN	GEBCO	USBGN
1	ABYSSAL HILLS	ABYSSAL HILLS	-
2	ABYSSAL PLAIN	ABYSSAL PLAIN	-
3	APRON	APRON	APRON
4	ARCHIPELAGIC APRON	ARCHIPELAGIC APRON	-
5	BANK	BANK	BANK
6	BASIN	BASIN	BASIN
7	-	-	BENCH
8	BORDERLAND	BORDERLAND	BORDERLAND
9	CALDERA	CALDERA	-
10	CANYON	CANYON	CANYON
11	CONE	CONE	-
12	CONTINENTAL MARGIN	CONTINENTAL MARGIN	-
13	CONTINENTAL RISE	CONTINENTAL RISE	CONTINENTAL RISE
14	CONTINENTAL SHELF	CONTINENTAL SHELF	-
15	CONTINENTAL SLOPE	-	-

	KCMGN	GEBCO	USBGN
16	-	-	CORDILLERA
17	-	-	DEEP
18	ESCARPMENT	ESCARPMENT	ESCARPMENT
19	FAN	FAN	FAN
20	-	-	FLAT
21	-	-	FORK
22	FRACTURE ZONE	FRACTURE ZONE	FRACTURE ZONE
23	-	-	FURROW
24	GAP	GAP	GAP
25	-	-	GULLY
26	GUYOT	GUYOT	GUYOT
27	HILL(S)	HILL(S)	HILL(S)
28	HOLE	HOLE	HOLE
29	KNOLL	KNOLL	KNOLL
30	-	-	LEDGE
31	LEVEE	LEVEE	LEVEE
32	MEDIAN VALLEY	MEDIAN VALLEY	MEDIAN VALLEY
33	-	-	MESA
34	-	MID-OCEANIC RIDGE	-
35	MOAT	MOAT	MOAT
36	-	-	MOUND
37	-	-	MOUNTAIN
38	OCEANIC TROUGH	-	-
39	OCEANIC RIDGE	-	-
40	OCEANIC RISE	-	-
41	PASSAGE	PASSAGE	-
42	PEAK	PEAK	PEAK
43	PINNACLE	PINNACLE	PINNACLE
44	-	-	PLAIN
45	PLATEAU	PLATEAU	PLATEAU
46	-	-	PLATFORM
47	PROMONTORY	PROMONTORY	-
48	-	PROVINCE	PROVINCE
49	-	-	RAMP
50	-	-	RANGE
51	-	-	RAVINE
52	REEF	REEF	REEF
53	RIDGE	RIDGE	RIDGE

	KCMGN	GEBCO	USBGN
54	RISE	RISE	RISE
55	SADDLE	SADDLE	SADDLE
56	SCARP	SCARP	SCARP
57	-	SEA VALLEY	-
58	SEACHANNEL	SEACHANNEL	SEACHANNEL
59	SEAMOUNT(S)	SEAMOUNT(S)	SEAMOUNT(S)
60	SEAMOUNT CHAIN	SEAMOUNT CHAIN	-
61	SHELF	SHELF	SHELF
62	SHELF BREAK	SHELF BREAK	-
63	SHELF-EDGE	SHELF-EDGE	SHELF EDGE
64	-	-	SELF VALLEY
65	SHOAL	SHOAL	SHOAL
66	SILL	SILL	SILL
67	SLOPE	SLOPE	SLOPE
68	SPUR	SPUR	SPUR
69	SUBMARINE VALLEY	SUBMARINE VALLEY	-
70	SUBMARINE TERRACE	-	-
71	SUBMARINE CANYON	-	-
72	TABLEMOUNT	TABLEMOUNT	TABLEMOUNT
73	-	TERRACE	TERRACE
74	-	-	TONGUE
75	TRENCH	TRENCH	TRENCH
76	TROUGH	TROUGH	-
77	VALLEY	VALLEY	VALLEY

Source: IHB (International Hydrographic Bureau), 2001, *Standardization of Undersea Feature Names, Bathymetical Publication No. 6(B-6* and KCMGN, 2004, *The Guideline for Standardization of Marine Geographical Names.*

topographic features on the land, the process of naming undersea features is more complicated. Due to the invisibility of submarine topography, identifying scientific classification for undersea features is generally difficult. Since this would require a comprehensive knowledge about all forms and structures on the seafloor, the selection of a correct generic terms for a features is very difficult. Therefore national-international organizations, relating to naming undersea features, developed the list of generic terms and its definitions. KCMGN developed the list of generic terms and definitions for undersea features which is comprised of 42 terms in Korean, that are defined as closely as possible to correspond to their definitions by GEBCO-SCUFN. In developing the definitions, it was realized that modern investigations at sea have the advantage of using very advanced instrumentation and technology that enables a

more precise description of certain features. Generic terms should be selected from the list of definitions which is in "The Guideline for Standardization of Marine Geographical Names" to reflect physiographic descriptions of features (Table 2).

There are 42 generic terms for undersea features in Korea. Reference scheme for generic terms and definitions of undersea feature is designed to support international and

Table 2. Generic terms and definitions in Korea guidelines for generic terms of undersea features.

	Terms	Definition(GEBCO)
1	ABYSSAL HILLS	A track of small elevations on the deep seafloor.
2	ABYSSAL PLAIN	An extensive, flat, gently sloping or nearly level region at abyssal depths.
3	APRON	A gently dipping surface, unerlain primarily by sediment, at the base of any steeper SLOPE.
4	ARCHIPELAGIC APRON	A gently SLOPE with a generally smooth surface of the sea floor, characteristically found around groups of islands or SEAMOUNTS.
5	BANK	An elevation of the sea floor, over which the depth of water is relatively shallow, but sufficient for safe surface navigation.
6	BASIN	A depression, in the sea floor, more or less equidimensional in plan and of variable extent.
7	BORDERLAND	A region adjacent to a continent, normally occupied by or bordering a SHELF and sometimes emerging as islands, that is irregular or blocky in plan or profile, with depths well in excess of those typical of a SHELF.
8	CALDERA	A collapsed or partially-collapsed SEAMOUNT, commonly of annular shape.
9	CANYON	A relatively narrow, deep depression with steep sides, the bottom of which generally deepens continuously, developed characteristically on some continental SLOPE.
10	CONE	see FAN
11	CONTINENTAL MARGIN	The zone, generally consisting of SHELF, SLOPE and CONTINENTAL RISE, separating the continent from the deep sea floor or Abyssal Plain. Occasionally a TRENCH may be present in place of a CONTINENTAL RISE.
12	CONTINENTAL RISE	A gentle slope rising from the oceanic depths towards the foor of a continental SLOPE.
13	CONTINENTAL SHELF	see SHELF.
14	CONTINENTAL SLOPE	see SLOPE
15	ESCARPMENT	An elongated, characteristically linear, steep slope separating horizontal or gently sloping sectors of the sea floor in non-SHELF areas. Also abbreviated to SCARP.
16	FAN	A relatively smooth, fan-like, depositional feature normally sloping away from the outer termination of a CANYON or canyon system. Also called CONE.
17	Fracture Zone	An extensive linear zone of irregular topography, mountainous of faulted, characterized by steep-sided or asymmetrical RIDGES, clefts, TROUGHS or ESCARPMENTS.
18	GAP	see PASSAGE
19	GUYOT	A SEAMOUNT having a comparatively smooth flat top. Also called TABLEMOUNT. See also SEAMOUNT.
20	HILL(S)	An isolated (or group of) elevation(s), smaller than a SEAMOUNT. See also ABYSSAL HILLS and KNOLL.

	Terms	Definition
21	HOLE	A small local depression, often steep sided, in the sea floor.
22	KNOLL	An elevation somewhat smaller than a SEAMOUNT and of rounded profile, characteristically isolated or as a cluster on the sea floor. See also HILL(S).
23	LEVEE	A depositional natural embankment bordering a CANYON, VALLEY or SEACHANNEL on the ocean floor.
24	MEDIAN VALLEY	The axial depression of the MID-OCEANIC RIDGE system.
25	MOAT	An annular depression that may not be continuous, located at the base of many SEAMOUNTS, oceanic islands and other isolated elevations.
26	OCEANIC TROUGH	See TROUGH
27	OCEANIC RIDGE	See RIDGE
28	OCEANIC RISE	See RISE
29	PASSAGE	A narrow break in a RIDGE or a RISE. Also called GAP.
30	PEAK	A prominent elevation either pointed or of a very limited extent across the summit.
31	PINNACLE	Any high tower or spire-shaped pillar of rock, or coral, alone or cresting a summit.
32	PLATEAU	A flat or nearly flat elevation of considerable areal extent, dropping off abruptly on one or more sides.
33	PROMONTORY	A mojor SPUR-like protrusion of the continental SLOPE extending to the deep seafloor. Characteristically, the crest deepens seaward.
34	REEF	A mass of rock or other indurated material lying at or near the sea surface that may constitute a hazard to surface navigation.
35	RIDGE	(a) An elongated narrow elevation of varying complexity having steep sides. (b) An elongated narrow elevation, often separating ocean BASINS. (c) The linked major mid-oceanic mountain systems of global extent. Also called MID-OCEANIC RIDGE.
36	RISE	(a) A broad elevation that rises gently and generally smoothly from the sea floor. (b) The linked major mid-oceanic mountain systems of global extent. Also called MID-OCEANIC RIDGE.
37	SADDLE	A broad pass or col, resembling in shape a riding saddle, in a RIDGE or between contiguous elevations.
38	SCARP	see ESCARPMENT
39	SEACHANNEL	A continuously sloping elongated discrete depression found in FANS or ABYSSAL PLAINS and customarily bordered by LEVEES on one or both sides.
40	SEAMOUNT(S)	A discrete (or group of) large isolated elevation(s), greater than 1,000m in relief above the sea floor, characteristically of conical form. See also GUYOT.
41	SEAMOUNT CHAIN	A linear or arcuate alignment of discrete SEAMOUNTS, with their bases clearly s eparated. See also SEAMOUNT(S).
42	SHELF	A zone adjacent to a continent (or around an island) and extending from the low water line to a depth at which there is usually a marked increase of slope towards oceanic depths.
43	SHELF BREAK	see SHELF-EDGE
44	SHELF-EDGE	The line along which there is marked increase of slope at the seaward margin of a CONTINENTAL (or island) SHELF. Also called SHELF BREAK.

	Terms	GEBCO's Definition
45	SHOAL	An offshore hazard to surface navigation with substantially less clearance than the surrounding area and composed of unconsolidated material.
46	SILL	A sea floor barrier of relatively shallow depth restricting water movement between BASINS.
47	SLOPE	The deepening sea floor out from the SHELF-EDGE to the upper limit of the CONTINENTAL RISE, or the point where there is a general decrease in steepness.
48	SPUR	A subordinate elevation or RIDGE protruding from a larger feature, such as a PLATEAU or island foundation.
49	SUBMARINE VALLEY	see VALLEY
50	SUBMARINE TERRACE	A relatively flat horizontal or gently inclined surface, sometimes long and narrow, which is bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side.
51	SUBMARINE CANYON	See CANYON
52	TABLEMOUNT	see GUYOT
53	TRENCH	A long narrow, characteristically very deep and asymmetrical depression of the sea floor, with relatively steep sides.
54	TROUGH	A long depression of the sea floor characteristically flat bottomed and steep sided and normally shallower than a TRENCH.
55	VALLEY	A relatively shallow, wide depression, the bottom of which usually has a continuous gradient. This term is generally not used for features that have CANYON-like characteristics for a significant portion of their extent. Also called SUBMARINE VALLEY or SEA VALLEY.

Source: KCMGN, 2004, *The Guideline for Standardization of Marine Geographical Names.*

multilingual applications. It is containing Korean, Chinese, English generic terms, Korean definition, IHO/IOC(GEBCO) definition, American Practical Navigator definition, Remarks, Examples and Others (photo, figures, 3D-map, etc). (Table 3) shows an example of reference scheme for generic terms and definition in the Guideline for Standardization of Marine Geographical Names.

(2) Specific Terms

As a specific term, short and simple terms (or names) are preferable. The principal concern in naming is to provide effective, conveniently usable, and appropriate reference. In the event of a conflict, the persons and agencies, most directly involved, should resolve the matter. Where two names have been applied to the same feature, the older name generally should be accepted. However sometimes it is needed to conciliated by KCMGN. Where a single name has been applied to two different features, generally the two named feature can retain the name if two different features located in geographically separated regions. Inappropriate specific name such as dialect name, disgusting name, difficult name to pronounce can be changed by KCMGN.

Table 3. An example of reference scheme for generic terms and definitions of undersea features

Generic term	해저 분지	海底盆地	basin
Definition	주변이 높은 지형으로 둘러싸인 움푹하고 낮은 지형. 위에서 보면 원형, 타원형, 계란형 등의 모양을 띠고 있고 크기도 다양하며, 일명 해분이라 고도 한다.		
IHO/IOC GEBCO	<basin> A depression, in the sea floor, more or less equidimensional in plan and of variable extent. 평면적으로 보면 다소 등방형 형태의 함몰된 해저지형으로 크기는 여러 가지로 나타난다.		
American Practical Navigator	<basin> A depression of the sea floor approximately equidimensional in plan view and of variable extent. 평면적으로 보면 대체로 등방형 형태의 함몰된 해저지형으로 크기는 여러 가지이다.		
Remark	1. 해양수산법률용어사전 : 해분(海盆) (basin) 원형, 타원형 혹은 계란형 등의 형상을 이루고 있는 대양 바닥의 오목한 부분. 2. 일본 : 해분(海盆) (basin) 평면적으로는 다소 등방형 형태의 함몰지역으로, 크기는 여러 가지이다. 3. Britannica : 해분(海盆) (basin) 수심 3,000m~6,000m에서 약간 둥글고 오목하게 들어간 해저 분지 4. 세계대백과 : 해분(海盆) (basin) 대양저에 분포해 있는 분지 모양의 해저지형. 대양분지 · 해저 분지라고도 한다. 면적이 광대한 오목한 땅이며, 평면형은 원형 또는 타원형이다. 5. 백과사전 : 해분(海盆) (basin) 대양저에 분포해 있는 분지 모양의 해저지형. 심도는 3,000m~6,000m이며, 해분저의 퇴적물의 두께는 얇다. 동해의 동쪽 반은 커다란 해분이다.		
Example	Brazil basin, 앙골라 Basin		
Figures or Maps			

2) Procedure of Korea standardization for naming marine geographical features

Procedure of Korea standardization for naming marine geographical features is as follows (Fig. 1).

Step 1. Surveying and identifying the geomorphic characteristics, location and dimension of undersea feature.

Step 2. Assigning the generic name to undersea feature from (Table 2).

Step 3. Search the specific names for the undersea feature from the local peoples.

Step 4. Set specific name with local knowledge to review and revise the specific name as necessary, as well as to contribute additional data and information.

Step 5. Find reason for choice of the specific name.

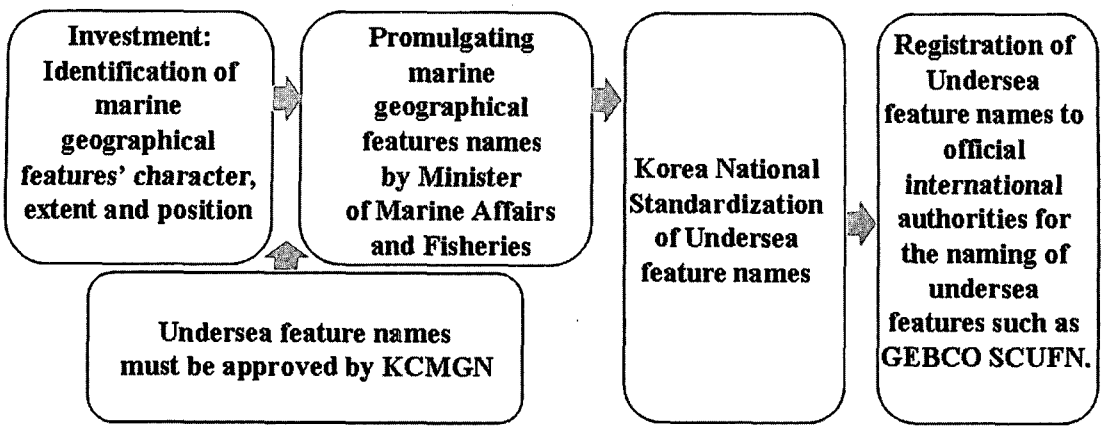

Figure 1. Procedure of Korea standardization for naming marine geographical features

(Source: http://www.nori.go.kr)

Step 6. Approved by KCMGN. It should be recognized that as ocean mapping continues, features will be discovered for which existing terminology is not adequate. New term or name required to describe those features should conform to guideline.

Step 7. Promulgating marine geographical feature names by Marine Affairs and Fisheries. The framework for recording descriptions of named marine places for Korea National Standardization includes the generic terms, specific terms, coordinate of location, extent, ID, promulgating dates, historical details of their origin and location map or 3D map.

Step 8. Propose and registration undersea feature name to IHO(International Hydrographic Organization) and IOC(International Oceanographic Commission)- GEBCO, SCUFN. The undersea feature name proposal is asked the following informations (IHO, 2001) :

① Ocean or Sea
② Name Proposed
③ Coordinates
④ Description (kind of feature)
⑤ Identifying or categorizing characteristics (shape, dimensions, total relief, least depth, steepness, etc.)
⑥ Associated features
⑦ Chart reference
⑧ Reason for choice of name (if a person, state how associated with the feature to be named)
⑨ Discovery facts
⑩ Description of survey (track spacing, line crossings, grid network, etc.)
⑪ Nature and repository of other survey activities (dredge samples, cores, magnetics, gravity, photographs, etc.)
⑫ Supporting material (enclose, if possible, a sketch map of the survey area, profiles of the features, etc., with reference to prior publication, if any)

5. Undersea Features in East Sea

Topography of sea floor is one of the most priority component in understanding of any sea, because all processes in the sea are related with underwater relief. East Sea is located on the eastern margin of the Eurasia continent. It is a semi-enclosed back-arc basin surrounded by Korean Peninsula, Japanese islands Arc and Sakhalin Island. This sea is characterized as a marginal basin of the most complicated topography with several deep see basins, bank, gap, cliffs and numerous topographic highs such as plateaus, ridges, and seamounts. The intricate bottom relief is considered to be caused by rifting process of continental crust occupied proto-East Sea region (Tsoy, I. B., Lelikov, Y. P., and Mel'nichenko, Y. I., 2006).

International concern for naming undersea features is limited to those features entirely or mainly (more than 50%)outside waters under the jurisdiction of states, outside territorial waters, usually limited to 12miles from the straight baseline, in agreement with the United Nations Conservation on the Law of the Sea (IHB, 2001).

14 undersea features out of 18 undersea feature which were registered in the government official gazette are belongs to outside water under the jurisdiction of Korea. The names approved by national names authorities in water beyond national limits should be accepted by other nations. In this paper, 14 undersea features where are located outside of territorial water in Korea can be described geomorphologically to propose undersea features names into IHO-IOC GEBCO-SCUFN.

For topographic analysis, data were collected by Haeyang 2000 on 1997. Bathymetric data were created by Multi-Beam Echosounder (SeaBeam2100) which line space of survey tracks was less than 2km in order to 100% coverage of our multi-beam system. Gravity and Magnetic surveys were also conducted. Topographic analysis of 14 undersea features were conducted based on bathymetric data which were provided by NORI, using iView 3D software.

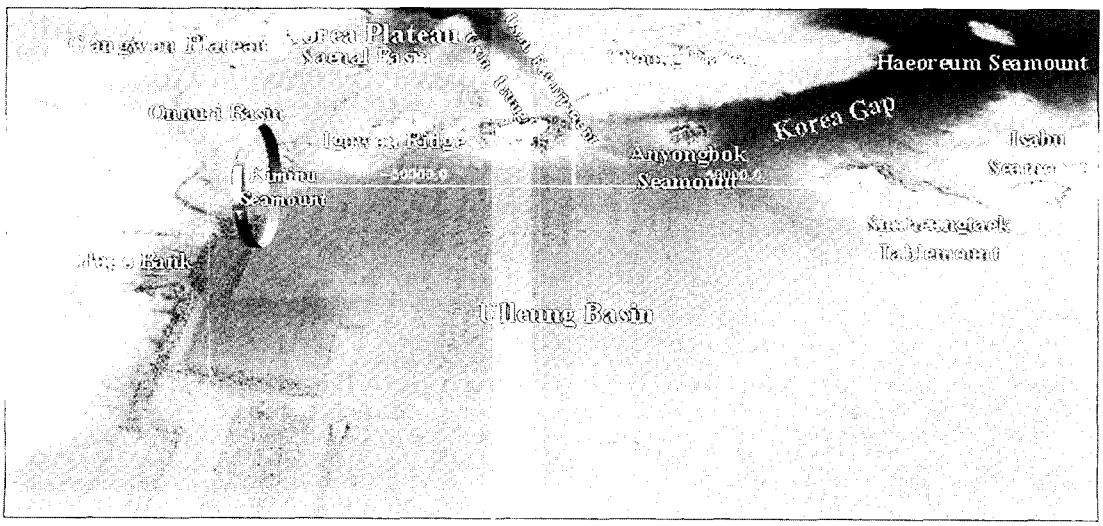

Figure 2. Topography of seafloor in East Sea

1) Gangwon Plateau

The Gangwon Plateau rises about 1,000~1,500m above the surrounding basin floor. It is bounded by the Usan Trough on the east, and the eastern continental slope of the Korean Peninsula on the north and west. In the south, the plateau abruptly passes into the flat floor of the Ulleung Basin. The Plateau is characterized by rugged topography. The Gangwon Plateau consists of numerous ridges, seamount, and basins. The ridges are relatively broad and rarely exceed 1° in slope gradient. The ridges are commonly bounded by intervening basins. The basin occurs at about 1,600~2,200m water depth and range in width from about 14~40km. Gangwon Plateau is located on the west part of Korea Plateau. The length of the plateau is approximately 140km from the far south to the far north. It is approximately 100km from the far east to the far west (Fig. 3).

2) Ulleung Plateau

Ulleung Plateau is located to on the east part of Korean Plateau. The Plateau rises about 1,000~1,500m above the surrounding basin floor. It is bounded by the Usan Trough on the west. In the north, the plateau abruptly passes into the flat floor of the Japan basin and into the Korea Gap in the southern part. The plateau consists of numerous seamount chains, ridges, and intervening troughs trending NE-SW. The ridges and seamount chains occur at about 600~1,600m in water depth. The ridges are relatively broad. In contrast, the seamount chains are dominantly steep and narrow. The intervening troughs occur at about 1,500~2,200m in water depth and range in width from 10~20km. The length of the plateau is approximately 95km from the far south to the far north (Fig. 4).

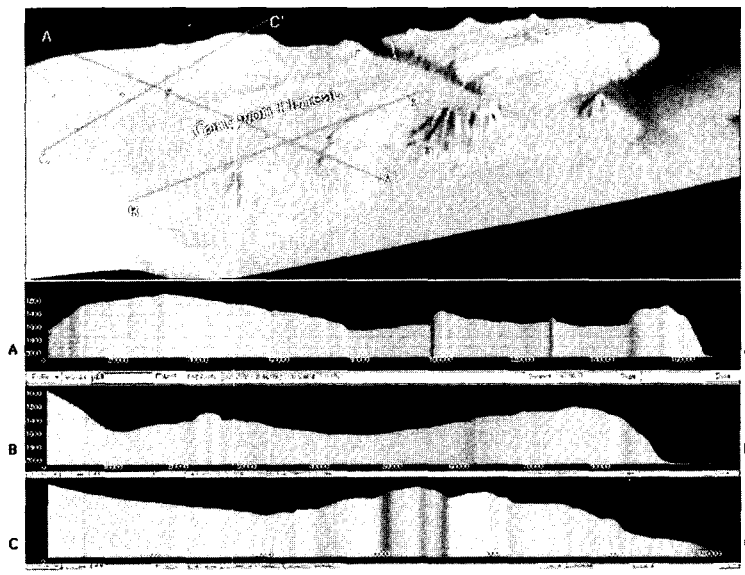

Figure 3. Gangwon Plateau

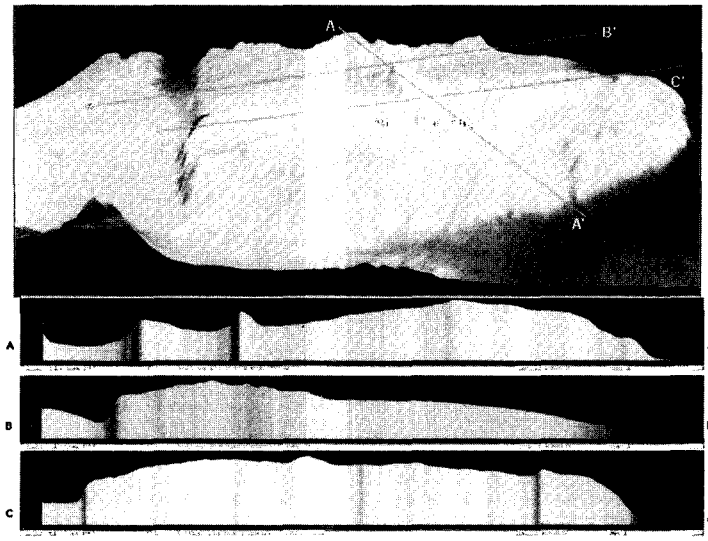

Figure 4. Ulleung Plateau

3) Usan Escarpment

It is an elongated, linear, steep slope separating from gently sloping sector of Ulleung Plateau. Ulleung Plateau ends abruptly to the west against NNW-SSE trending Usan Escarpment. The water depth of this feature is 1,500m at the top and 2,000-2,300m at the bottom. The height of this feature is 500-800m and the length of that is approximately 95km (Fig. 5).

4) Usan Trough

This feature is the long depression of the sea floor characteristically flat bottomed and steep sided. This feature is located on the central part of the Korean Plateau. It divides Korea Plateau

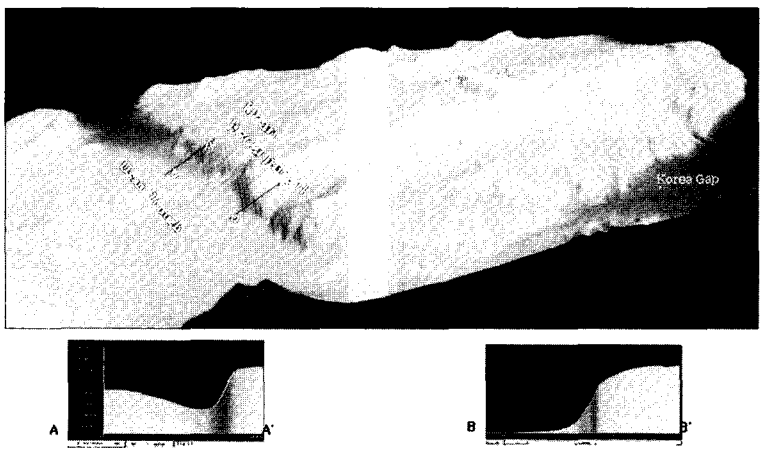

Figure 5. Usan Escarpment

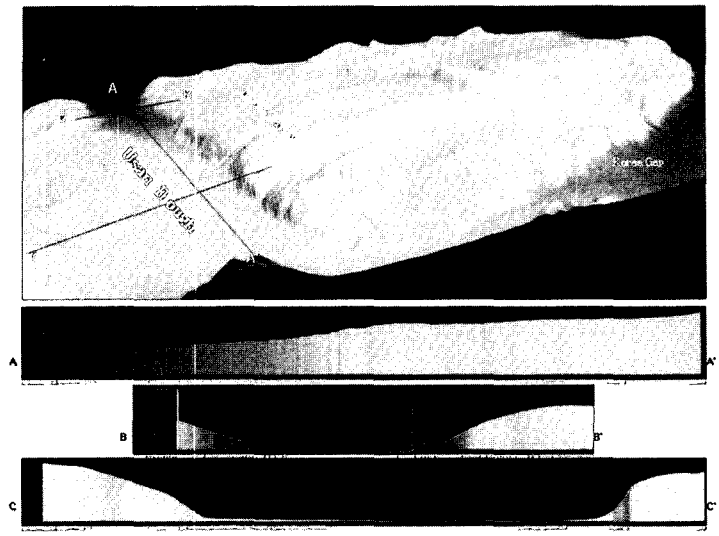

Figure 6. Usan Trough

into two parts, Gangwon Plateau and Ulleung Plateau. The water depth of the trough is approximately 2,000-2,900m. This feature is approximately 105km long and varies in width from 10~20km. Usan Trough deepens northward along the Usan Escarpment (Fig. 6).

5) Onnuri Basin

Onnuri Basin is located in the south of Gangwon Plateau. The south and west of the basin is bordered by continental slopes of Korean peninsula. The north and east of the basin is bordered by small-scale topographic

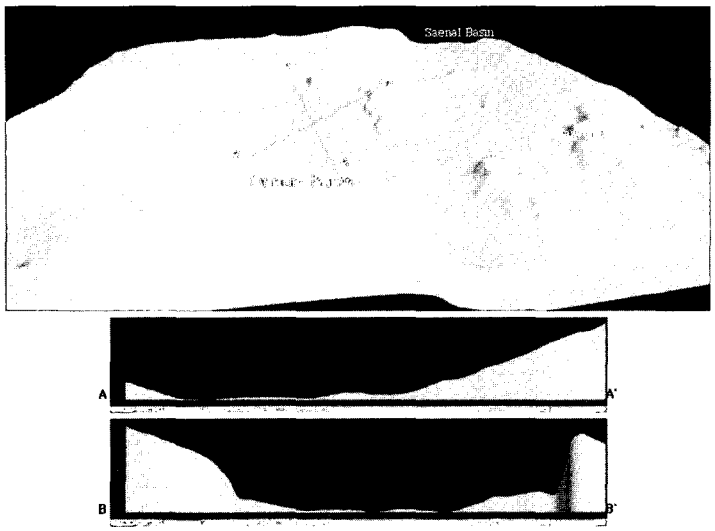

Figure 7. Onnuri Basin

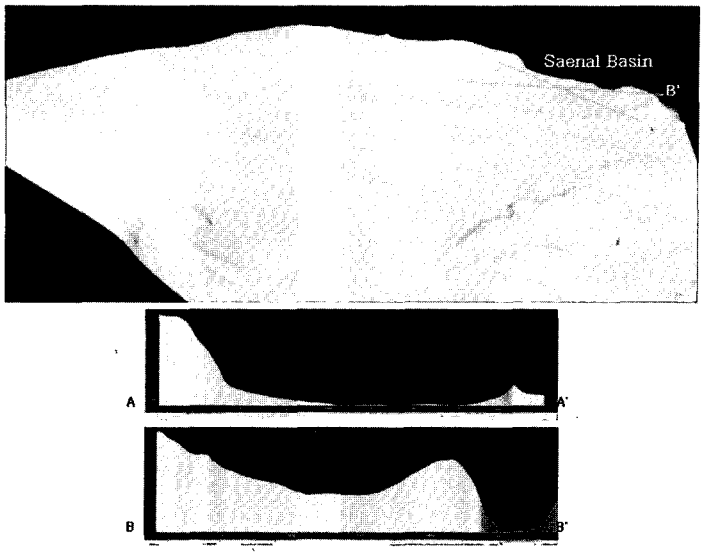

Figure 8. Saenal Basin

highs and ridges. The depth of the basin is approximately 1,600m. The diameter of the basin is about 20km to the east-west, 40km to the south-north. It is a depression of the sea floor which is surrounded by high grounds. The basin's shape is oval (Fig. 7).

6) Saenal Basin

Saenal Basin lies in the northeastern part of Gangwon Plateau. The depth of the basin is approximately 2,200m. The diameter of the basin is about 17km to the east-west, 35km to the south-north. It is a relatively small depression of the sea floor which is surrounded by high grounds and is irregular oval shaped. It is bounded by ridges and topographic highs in Gangwon Plateau, which abruptly passes into the flat floor of Usan Trough on the east (Fig. 8).

7) Ulleung Basin

It is a depression of the sea floor which is surrounded by high grounds and is approximately equidimensional in plan view. The continental shelf at the eastern shorelines of the Korean Peninsular is dominantly flat and narrow and abruptly drops off into the steep(2~8°) continental slope. The continental slope abruptly passes into the flat basin floor of the Ulleung Basin. The basin floor lies at water depths of 2,000 to 2,300m and gradually deepens to the north and northeast. Its size is about 180km from the south to the north, and about 240km from the east to the west. In plan view, the Ulleung Basin is rhomboidal, bounded by the continental sloped of the Korean peninsular and the southwestern Japanese Arc on the west and south, respectively, and by the Korean Plateau on the north. The northern and western margins of the basin are relatively steep with gradients of up to 10°. In the south and east, the basin is bordered by a rather gentle slope(1~2°) and a broad shelf(30~150km wide). It is fairly smooth and flat, except for a few islands and seamounts of volcanic origin in the northeastern part (Fig. 9).

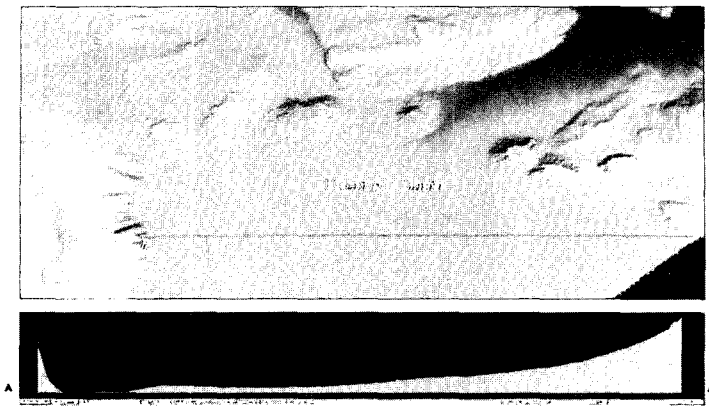

Figure 9. Ulleung Basin

8) Korea Gap

The Korea Gap is a narrow, long passageway connecting the Ulleung and Japan basins. It progressively deepens northeastward. The Gap is bounded on the southeast by slopes of the Dok Island, and on the northeast by an ENE-WSW trending escarpment of the Ulleung Plateau. The Gap is punctuated by the Haeoreum Seamount in northeastern parts and Anyongbok Seamount in the southwestern. This feature, which lies in the NE-SW direction, develops in the area between the 2,400 to 2,600m water depth contours. The width of this feature is about 40km and its length is about 90km. In the Gap, a deep-sea channel system occurs along the base-of-slope of the Ulleung Plateau. The channel is formed most likely by bottom currents flowing through the long axis of the Korea Gap (Fig. 10).

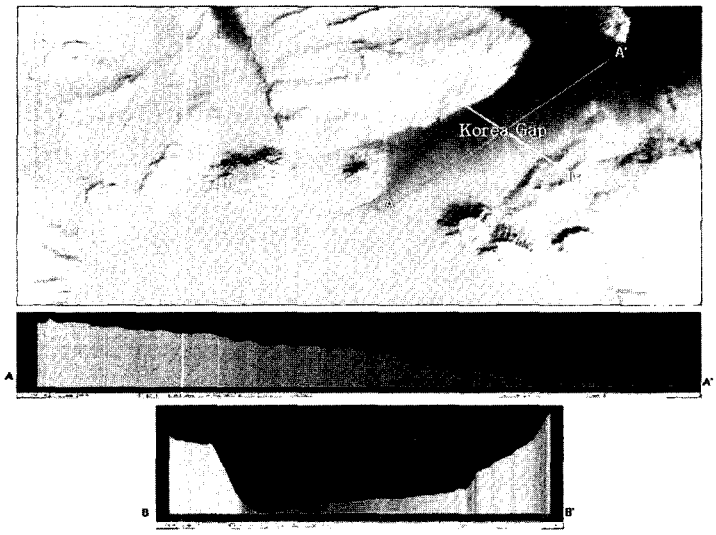

Figure 10. Korea Gap

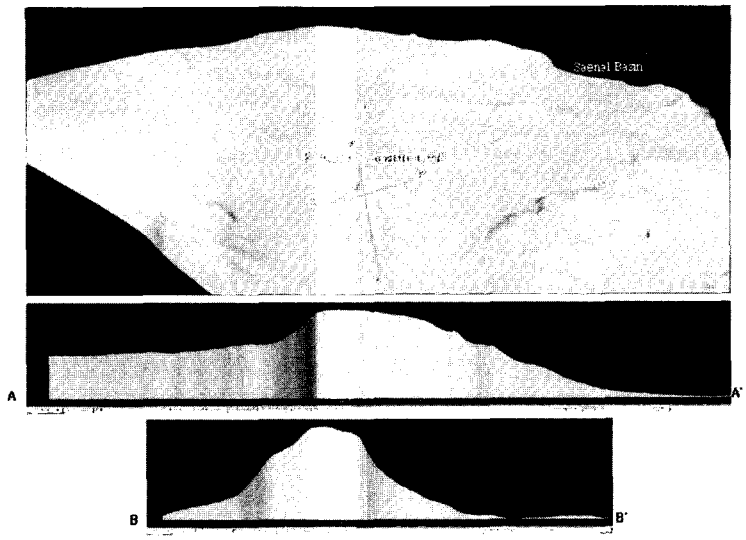

Figure 11. Kiminu Seamount

9) Kiminu Seamount

Kiminu Seamount is located in the south of Onnuri Basin. The shape of the feature is an elongated seamount in south-north direction that shows an irregular oval shape in the plan view and cone-shape in cross-section. Whereas the eastern and western slopes are relatively steep, the northern slope is fairly gentle at the base to middle. It is approximately 18km from the far east to the far west. The summit has irregular topographic relief and the depth of the top is 868m below the sea level, and the bottom of this feature is defined by 1,600m to 2,000m depth contours. Thus the height of this feature is about 1,000m (Fig. 11).

10) Hupo Bank

Hupo Bank is aligned parallel to N-S trenching the eastern shoreline of the Korean Peninsula between 36° 20'N and 37° 15'N. The shape of this feature is an elongated narrow zone and an elevation of sea floor, over which the depth of the water is relatively shallow, but sufficient for safe surface navigation. This feature is approximately 100km long and varies in width from less than 1 to 14km. Its top is relatively flat and lies between 100~200m below sea level. The Hupo Bank is approximately 150m deep at the western boundary and gradually shoals landward. To the east of the bank, the slope gradient increase down slope up to 8~10° (Fig. 12).

11) Igyuwon Ridge

The shape of the feature is an elongated ridge in SSW-NNE direction that shows an elongated narrow elevation of varying complexity having peaks. The dimension of ridge is defined by the 892m contour at the top and 1,000~2,000m contour at the base. The dimension of feature as an elongated shape with a SSW-NNE direction is 45km long and 12km wide with an irregular topographic relief at the summit and small-scale

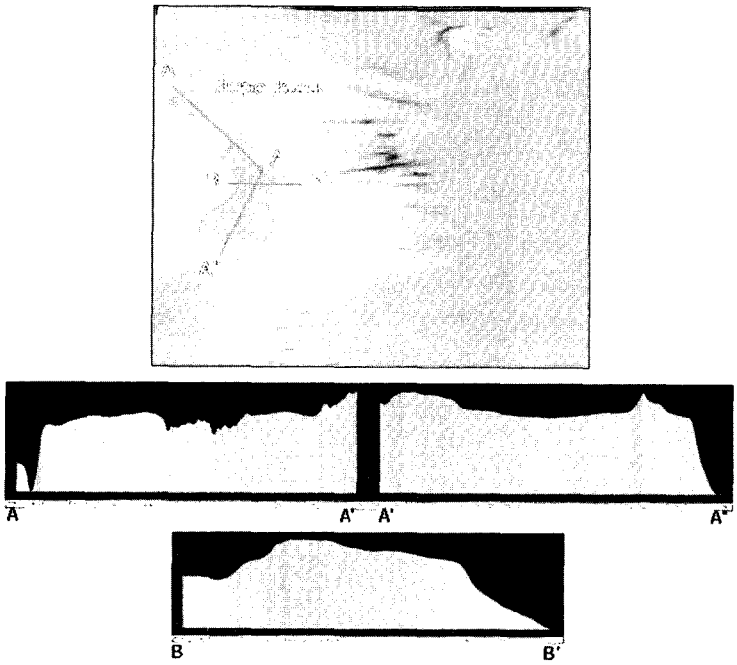

Figure 12. Hupo Bank

topographic highs rising approximately 200-300m above the top of ridge. It may be formed by a couple of volcanic eruptions with different contacts. The top of the seamount, which is a center of this area, is 892m deep in water depth, and the bottom of this feature is defined by 1,600m to 2,000m water depth contours. Thus the height of this feature is about 1,000m (Fig. 13).

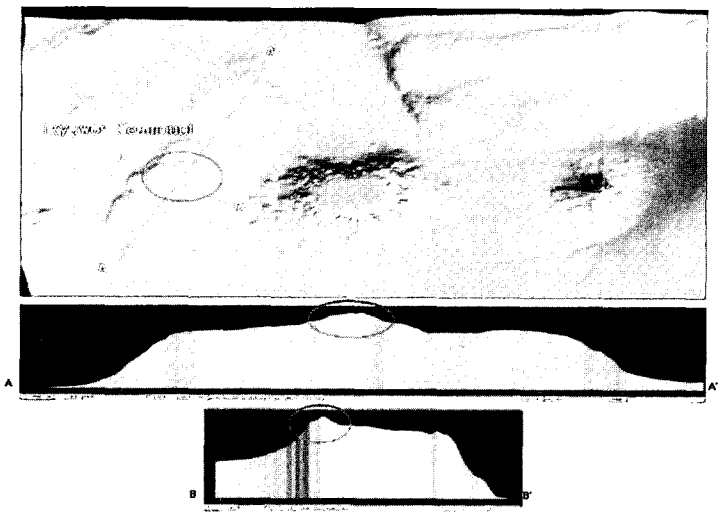

Figure 13. Igyuwon Ridge

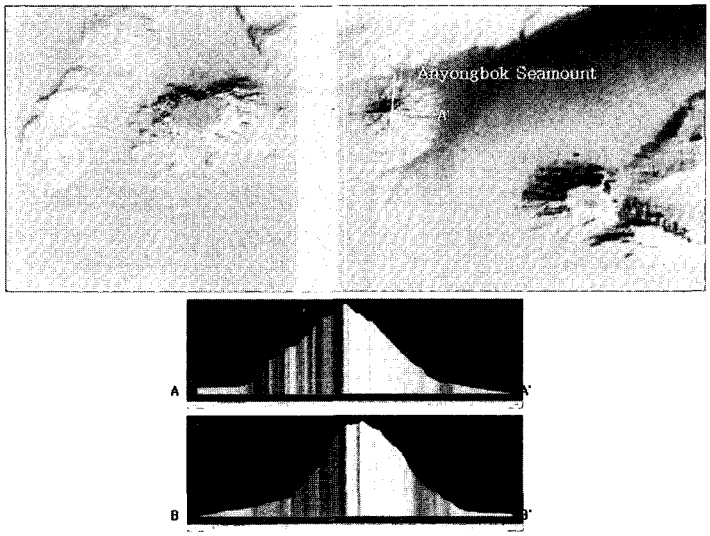

Figure 14. Anyongbok Seamount

12) Anyongbok Seamount

Anyongbok Seamount is bounded in the northeast by the Korea Gap. The shape of the feature shows a circle shape in the plan view and a cone-shape in the profile. The slope of the seamount is relatively steep. The dimension of 'Anyongbok Seamount' is defined by the 457m in water depth at the top and 2,100m in water depth at the base. The height of the seamount is approximately 1,600m. The diameter of the seamount at the base is approximately 15km (Fig. 14).

13) Haeoreum Seamount

Haeoreum Seamount is bounded in the southwest by the Korea Gap. The shape of the feature is an elongated seamount in north-south direction that shows an elongated oval shape in the plan view and asymmetric geometry in cross section. The dimension of 'Haeoreum Seamount' is defined by the 849m in water depth at the top and 2,600m in water depth at the base. The height of the seamount is approximately 1,700m. It is about 30km from the far south to the far north and 20km from the far east to the far west. The summit of the seamount shows a rough saw-shape feature and relatively gentle gradient (Fig. 15).

14) Isabu Tablemount

Isabu Tablemount is located on the east of Dok Islands. Isabu Tablemount is characterized by a dome shape with in a flat-topped summit. It is 136m in water depth at the top and the bottom of this feature is defined by the 1,150m contour line. Thus the height of this feature is about 1,000m. The diameter of the summit is about 12km. The flatness of this feature is about 0.5° at the top and the slope angle is about 10°. To the east of tablemount, the slope gradient is very gentle at the base, which shows asymmetric geometry cross section (Fig. 16).

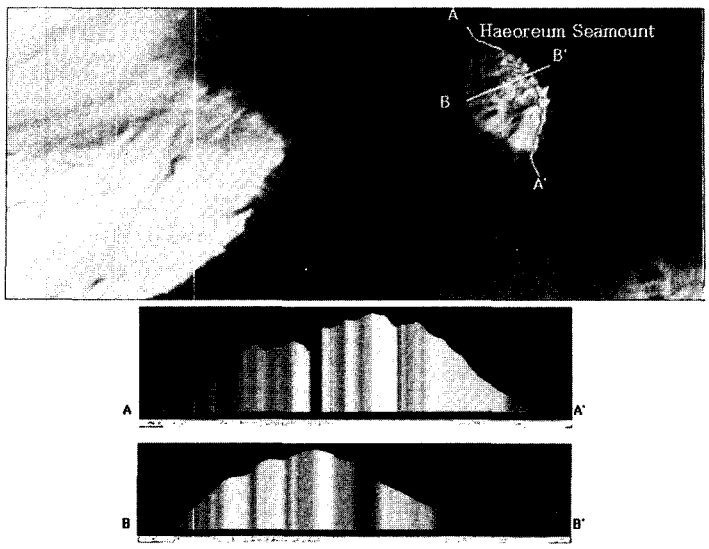

Figure 15. Haeoreum Seamount

6. Future Plan

Regarding the current names of undersea features in East Sea, NORI(National Oceanographic Research Institute) of the Ministry of Marine Affairs and Fisheries is supposed to review them in more diverse respects and make some further proposals. It will be proposed to register undersea features names to the international organization for the international as well as domestic recognition under the direction of KCMGN.

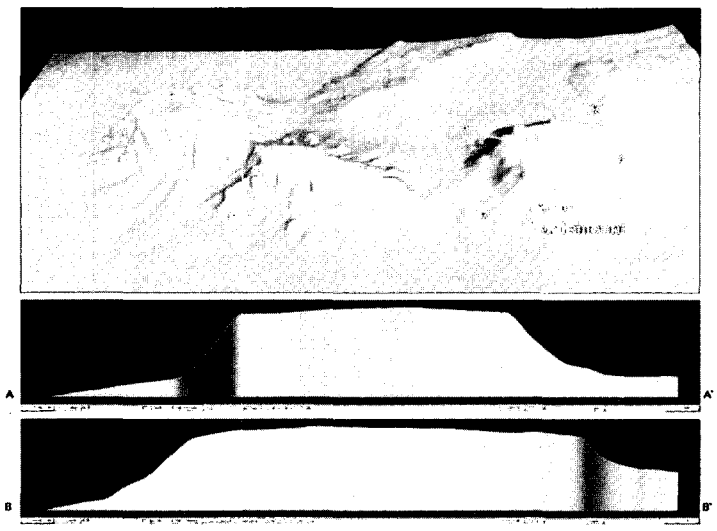

Figure 16. Isabu Tablemount

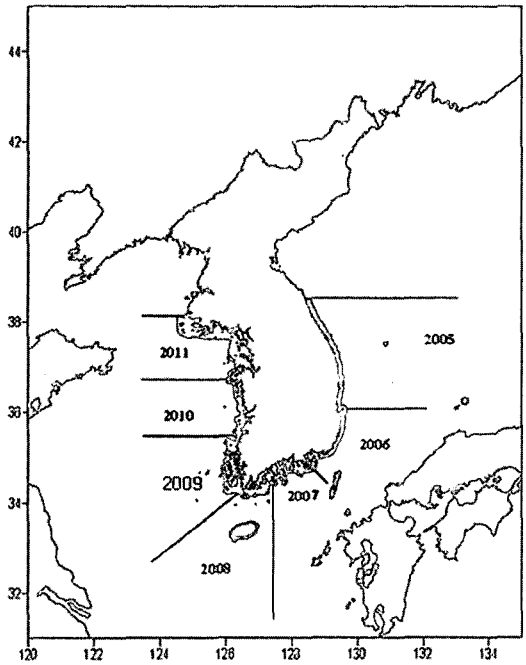

Figure 17. Future plan of a systematic analysis for naming marine geographical feature in Republic of Korea , 2005- 2011.

A systematic analysis for naming marine geographical feature in Republic of Korea will conducted until 2011(Fig. 17). Also an intensive advertisement for the public recognition will be addressed for related academic association and government organization to use the proposed undersea feature name. For this purpose, teaching material for undersea features have been developed. Finally, to promote its adoption and using marine geographic features name, gazetteers will be prepared and maintained for marine geographical features, and gazetteer data will be created by various local, national and international agencies and special knowledge groups. It can be considered to be an 'archival' structure.

7. Conclusion

The proper scientific naming of undersea features is an essential activities for addressing topographic structures on the seafloor in publications and for placing names on bathymetric and nautical charts. It is also very important for hydrographical survey, ocean survey, and sea route survey. In addition, proper undersea features names should be provides for handling data from the marine related organizations such as shipping, oceanography, port, fisheries, and meteorology.

The Republic of Korea has been carried out national and international activities on surveying, identifying, and naming for undersea features in diverse respects. Activities on naming undersea features in Korea can be summarized as follows:

First, Undersea features within territorial water and EEZ have been surveyed by scientific research ship.

Second, Korea Committee on Marine Geographical Names(KCMGN) was established for regulated naming marine geographical features. Also KCMGN members have been actively involved in international naming activities as a SCUFN member or observer.

Third, The guideline for standardization of marine geographical names in Korea was developed based on internationally accepted principles and procedures.

Fourth, To propose 14 undersea feature names within EEZ of East sea into International Hydrographic organization and International Oceanographic Commission of UNESCO, the proposal has been prepared.

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