

Development in Geomorphology and Soil Geography: Focusing on the Journal of the Korean Geomorphological Association

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한국지형학회지를 중심으로 본 지형학과 토양지리학의 발달

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Abstract : Last review papers on Korean geomorphology and physical geography had been published in 1997 and 2000 respectively. A proposal to publish a book on Korean geomorphologists' achievement resulted in series of review papers in Journal of the Korean Geomorphological Association. This article aims to summarize these papers and introduce their findings to foreign scholars. On remarkable achievement is a fierce debate on the effectiveness of traditional mountain concept to explain the shape of Korean peninsula, which made the public's understanding of geomorphology widen to the general public. Reflecting public demands, concerns for the effects of coastal facilities on coastal erosion and conservation mind and scientific researches for the coastal sand dunes have increased so much. Geomorphological hazards such as debris flow attracted many concerned scientists, and geotourism-related papers in scientific journals increased thanks to the designation of first geopark in Korea. Research papers submitted to the famous foreign academic journals are increasing in numbers these days.

Key Words : Journal of the Korean Geomorphological Association, mountain ranges, coastal landform, coastal sand dune, natural hazard, geotourism

요약 : 오경섭(1997)과 손일(2000)에 의한 지형학과 한국의 자연지리학 연구 성과에 대한 정리가 있을 후, 처음으로 한국지형학회지를 통해 2011년과 2012년에 걸쳐 지형학 각 분야 성과에 대한 정리가 있었다. 이 논문은 이들 연구 성과를 종합하여 지형학과 토양학 분야에서 이루어 놓은 성과를 정확히 소개하고자 하는 데 연구의 목적이 있다. 2000년 이후 특히 주목할 만한 성과는 우리나라의 전통적인 산지체계와 서양의 근대적 산맥론과 관련된 수년간에 걸친 논쟁을 통해 뚜렷한 성과는 없었지만 학계에만 머물던 지형학이 대중매체에 알려졌다는 것이며, 둘째는 사회적 수요를 반영하여 해안 지역의 구조물과 해안도로 등의 개발과 이에 따른 해안지형의 변화가 주요한 주제가 되고 있으며, 해안사구를 비롯한 해안퇴적 지형의 연구 성과가 크다는 점이다. 기후변화로 인한 자연재해의 증가는 산사태와 같은 방재지형학적 연구의 필요성을 증대시키고 있고, 제주도의 지질공원 지정에 따른 지오투어리즘 분야의 연구 성과가 주목할 만하다. 최근 한국의 연구 성과가 해외저널에 소개되기 시작한 점은 고무적이며, 이러한 추세는 지속될 것으로 판단된다.

주요어 : 한국지형학회지, 산맥론 논쟁, 해안지형, 해안사구, 자연재해, 지오투어리즘

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1. Introduction

Geomorphological Society of Korea has had a turning point in 1990s since the establishment of Korean Geomorphological Association and the initiation of nationwide landforms survey as a part of “The National Natural Environment Survey” which is initiated and funded by the Ministry of Environment of the Republic of Korea (Kim and Yun, 2008). As of 2009, there are no more than 145 professors in Korea, of which physical geographers make up 20.8 % and they are mostly geomorphologists. They published their researches in five major scientific journals. The author classified researches done in Korea focusing on journal of the Korean Geomorphological Association according to landform process as follows:

- (1) Fluvial landforms; Depositional landforms, Erosional landforms
- (2) Mountain Topography; Debates on mountain ranges, Granite weathering
- (3) Coastal Geomorphology: Tidal flats, General coastal geomorphology
- (4) Structural and Karst Geomorphology
- (5) Applied Geomorphology
- (6) Soils in Geomorphology

Regarding the above categorization, the following must be admitted. They do not present complete objectivity and writer's subjectivity play a part in classifying the landform influenced by more than one of the agencies into one of the above categories. It might also be possible that an important thesis was dropped from the list for this analysis. The Korean Geomorphological Association prepared special publications regarding the history of geomorphological studies on several subjects of geomorphology from 2011 to 2012, and this paper owes a lot to these summary papers during the

preparation.

2. Fluvial geomorphology

In this chapter, the author divided fluvial researches into depositional and erosional landforms studies and summarized research trends mainly after year 2000.

1) Depositional landforms

Fluvial geomorphology in Korea has been studied mainly on places suitable for human settlements. Numerous hills and mountains are the main component of Korean landscape, therefore alluvial plains and fluvial terraces offer valuable flat surface where people can live on thousand years, which explains the reason why they become the center of fluvial geomorphology. Fluvial terraces also offer valuable subject for the paleo-climatic reconstruction because they contain sediments from various quaternary age deposits.

Studies on flood plain and delta started in 1970s and lead by Kwon H.J. He investigated the age of formation of Nakdonggang River delta through the reconstruction of formation processes and divided delta topographic units into upper, lower delta and surrounding basin. He continued and expanded his research to other major rivers, and found that the thick sediments of coastal Honam plain has been formed during the sea level rise, and that back swamps of Nakdonggang river basin has been formed after sea level reached present level. Many master theses on that subject have been submitted in 1970s.

Two eminent scholars like Kwon H.J. and Jo H.R. lead the fluvial research circle in 1980s, the former focused his researches in landform and land use in alluvial plain, and the latter did in sedimentary structure and quaternary environment. Kwon H.J. also proposed

a division system of the alluvial plain in Hangang River into several landform units (1984) and investigated characteristics and development processes in two alluvial plains. Jo (1982, 1986) investigated subtle changes in sedimentary structures in the estuarine deposits and studied sea level changes. He published a book as a culmination of his lifelong research in 1987, its title is "Korean Alluvial Plains".

From 1990s to 2000s, their fluvial landform studies are followed by their graduate students. Lee (1993), who is Kwon's student, performed granulometric and geochemical analyses to classify the micro-landforms on fluvial terraces and investigated the changes in landforms. Hwang and Yoon (1998) performed the first historical landform studies in Daegu basin. In 2000s relatively few studies have been done in alluvial landforms compared with other geomorphological studies. Lee (2003)'s work in Chuncheon basin, and work on Jucheongang river (2005) and Yoon and Hwang's researches are few outcomes of riverine landforms in this period.

During the 20th century, researches on fluvial terrace have become the mainstream of fluvial landform studies. This trend has not been changed till today, however diverse scientific methodologies are applied in this field. Geographic information system, mineralogical and chemical analyses have been widely applied to the fluvial terrace studies. Fluvial terrace become the main focus of fluvial landform studies, occupies sixty percent of whole fluvial landform studies as a matter of facts.

One of the most important progresses is the introduction of age determination technologies into geographical area especially luminescence dating technique to determine the absolute age in the fluvial terrace studies. Lee *et al.* (2003) applied thermoluminescence technology to the terrace deposits of paleolithic era at an archaeological site in Imjingang River. Lee G. R. is an active young scientist who applied various

analytical technologies such as thickness of weathering rind, redness index, XRD and XRF to determine the weathering degree and to reconstruct paleoenvironment. Many research papers have been published applying optical luminescence technique since the middle of 2000s, of which classification of terrace into climatic terrace and sea level change terrace is one, erosion rate determination in Chatancheon River is another and comparison of western and eastern slope of Taebaek Mts. is also very important (Lee, 2011).

Different opinions for the development of terrace deposits have come from other scholars with different academic background, among them Yang (2008) argued that fluvial terraces in coastal area in South Sea were formed during the glacial period when large supply of debris material came from physical weathering processes during the last glacial period.

2) Erosional landforms

Among a few researches on erosional landforms in bedrock river channels, micro-landforms such as potholes rather than macro-landform such as waterfall or stream channels themselves has been the focus of academic researches. After the year 2000, most researches are on geological and structural control over the formation of channel. In a recent paper, Kim (2011) reviewed and summarized the research papers on the subject of erosional landforms developed in bedrock channels, he pointed out that Lee (1985) classification of potholes into six classes and Ko and Hong (1999)'s report on pothole types developed in Jirisan National Park area are relatively important in the history of bedrock channel studies. Ko and Hong (1999) listed water fall, rapids, plunge pool, pothole, falling stone and bed rock channels as important landscape resources in their study area.

Studies focused in macro-landforms started after the year 2000, Kim (2005), for the first time, classified

thirty waterfalls in Seoraksan national park (granite), Jeju Island (basalt), and Hantangang River (basalt) by analyzing cause and development history of them. Kim in her thesis maintained that waterfalls in granite regions are mainly formed through the headward erosion as a replacement retreat slope; however, waterfalls of basalt region have been formed by the parallel retreat due to the characteristic columnar joints developed in basalt.

Micro-landforms including potholes and groove have been the focus of Park's research (2002). He explained the development of potholes and grooves is the results of direction and density of joint system. He ascribed the pothole development to the abrasion and granular disintegration of minerals due to the frequent freeze-thaw and wet-dry cycles. Kim and Bae's 1987's paper on Gapyeongchen River classified potholes into four types according to joint system and presence of schistose structure, many potholes turned out to be not related to the joint system in this study (Kim, 2011). In his 2011 paper, Kim suggested the quantitative studies on relationship among the many variables working on bedrock channels should be inquired closely to make a progress in bedrock landforms. He applied new techniques including cosmogenic nuclides to estimate erosion rate and exposure ages of bedrock surfaces.

3. Mountain Topography

The research papers on mountain topography in five major geography journals since 1990s are classified by Kang(2011) and Kwon (2007).

1) Debates on mountain ranges

Mountain ranges (Sanmaek) in Korea can be di-

vided into two categories based on their formation (Kwon, 2000). The primary mountain ranges are closely related to tectonic movement, while secondary mountain ranges have been formed by erosional processes upon old surface. The primary mountain ranges could well be defined since they lie along the Cenozoic uplift axis, while the secondary mountain ranges are low and less prominent; therefore it is hard to recognize their presence both in the field and laboratory. This fact causes a rare but pierce debate among the Korean geomorphologists, because a small number of professional researchers in government-supported institute doubt the presence of mountain ranges and maintained that mountain ranges are nothing more than remnants of past geological structure and westernized concept, and the Baekdudaegan which is traditional concept of mountains is more appropriate than the concept of mountain ranges developed in geological standpoint to explain the mountain landforms in Korea (Kim and Im, 2005). Park and Son (2005) concluded that they were able to prove the existence of most mountain ranges, which provides a useful framework to understand the geological evolution of Korean peninsula and formation of mountainous landscape of Korea. They also maintained that it is necessary to characterize the types of mountain ranges according the genesis, the purpose of usages and also the scale of maps.

Since the designation of the Jirisan National Park in 1967 for the first time, nineteen more parks have been designated as national parks; among them fifteen are mountain national parks. Since 1980s natural resources surveys mandatory in "Natural Park Law" of Korean government to develop park management strategies should be planned in every ten year, in which geomorphologists are actively involved, which is very helpful to enlist valuable geomorphological resources in national parks. Both nation-wide "The Natural Environment Survey" organized by the Ministry of

Environment and national park survey play a vital role in the development of Korean geomorphology (Kim and Yun, 2008).

2) Granite weathering landforms

Kwon (2007) originally summarized studies on granite weathering landforms in Korea. In his opinion, studies on weathering landforms are headed in two directions; studies on regolith and micro-topography induced by weathering. Regolith studies are focused on the paleo-climatic environments when that regolith is thought to be formed. Subjects for micro-landform studies include tor, tafoni, gnamma, bornhardt, groove, exfoliation joint, and flared slopes, many graduate students' papers and publications out of natural environment survey dealt with the micro-landforms in granite area (Figure 1).

Kang (2011) also reviewed the granite landform studies by Korean geographers as a work for the special publication. He classified two landform elements, which are a mountain or hilly element and low land or

valley environment. He argued that domes, cliffs and tor are typical mountain landscape elements of Korean granite landforms, which are derived from the differential weathering controlled by the density of joint system. Valleys covered with fluvial deposits are the other landscape elements.

Park in his 1999 article summarized many weathering-related papers in Korea and concluded that many workers have not reached the conclusion so far. The consensus, however, is that micro relief found in weathered granite resulted from salts derived from chemical weathering initiated along joints and fractures, especially those where water can reside temporarily at least. Remaining unsolved questions are as follows; firstly, whether tafoni are the results from the sub-areal or under-ground weathering. Secondly, tafoni may indicate climatic conditions of the past in some cases. Thirdly, basal rock properties may determine the development of tafoni. Fourthly, distributions are not restricted to coastal areas with ample supply of sea salt and actually they are plenty in granite area far from the coastal area. And finally, the textural properties of host



Figure 1. Insubong peak, which is a typical granite dome in Bukhansan National Park, Seoul.

rock can control tafoni.

4. Coastal Geomorphology

The research papers on coastal landforms in five major geography journals since 1990s are analyzed statistically and classified by Kim (2012) and Jang (2011). The study of coastal geomorphology in Korea started from 1970s and has made a significant progress both in methodology and in quantity since 1990s. Many of recent coastal studies focused on the formation processes of coastal dunes and their management reflecting public's high interest of environmental conservation.

1) Tidal flats

Studies on tidal flats have been started when geomorphology has become a main body of geographical studies in 1970s. From 1970s to 1990s as most of Korea's large scale reclamation projects have been contin-

ued, scientific concerns for the tidal flats increased. In 2000s, as most projects finished, quantity of researches on tidal flats diminished dramatically, however, researches adopting remote sensing techniques increased exceptionally. Researches on tidal flats can be divided into many sub-disciplines including sedimentary studies, topographic analyses using remote sensing techniques, Quaternary environmental changes in tidal flats, and bio-geographical studies (Jang, 2011).

Park (2001) compared two famous tidal flats in Korea, namely Suncheonman (bay) and Gangwhaman tidal flats, and ascribed the differences in mean particle size to the difference in tidal range. Ryu (2003) investigated the seasonal variation of particle size in Hampyeongman and Gwnagyangman areas. Lee and Cho (2005) did similar analyses in Beopseongman; Jang *et al.* (2010) did in intertidal zone in Baramarae beach, and Shin (2011) in his latest Ph. D. dissertation spatio-temporal variation of sedimentary characteristics in tide-dominated estuary area of Mosanman bay. One more thing worth mentioning is that much more researches are published in the field of Earth Science



Figure 2. Dongmak tidal flat in Gangwhado Island, Incheon.

area including Ryu's aforementioned article.

As remote sensing technologies are getting popular, tidal flat studies using these technologies are common and increasing, considering the vastness and limited accessibility of the tidal flat areas. As resolution of remotely sensed data is getting higher and spectral characteristics of satellite are diversified since 1990s, more researches adopting diverse remote sensing techniques are published in many geography and earth science journals. ISODATA technique, which is one of the unsupervised classification methods, has been proved to be fruitful in particle size analysis and has been widely adopted in tidal flat studies. Cho and Cho (1997) divided Gomsoman tidal flat area into mud flat, mixed flat and sand flat by ISODATA technique, however they found the limit of statistical approach and published another article adopting field survey data later (Cho and Cho, 2000). Later Jang *et al.* (2002) found out the limit of ISODATA technique when they discovered that mixed flats cannot be efficiently classified by this method, and suggested that this kind of methodology adopting multi-spectral satellite data will be

very useful for the environmental impact assessment and continuous monitoring for the coastal area (Jang 2011).

Precise and accurate DEM data is prerequisite to detect the changes happening in tidal flats quantitatively, considering diurnal changes in tidal flat during the time of ebb and sub-tide. Most of the studies are performed by the earth scientists, but one notable exception is a research done by Kim and Jang (2010), who used multi-temporal Landsat TM data in Baramarae beach in Anmyeondo, Chungnam, Korea.

2) General coastal geomorphology

Recently, Kim (2012) summarized the development of Korean coastal geomorphological studies. Erosional landforms including marine terraces, sea cliffs, and wave-cut platforms are the main topics in coastal geomorphology in 1980s. Oh K.H. is leading figure in that period, who classified marine terraces according to height and tried to examine closely the tectonic uplifting movement during the Quaternary. Choi S.K.



Figure 3. Coastal sand dune in Sinduri beach, Choongnam.

has been also prominent figure, Park *et al.* and Oh K.H. did a notable work during that period. 1990s saw the declining of the number of papers in coastal geomorphology comparatively.

The beginning of 21st century sees a big increase in this field of study, which comprises 20 % of all geomorphological researches. Researches on coastal sand dune are especially worth mentioning. Dune researches are done mainly by the graduates from the Seoul National University. Coastal zone management related researches are also increasing rapidly reflecting social demands. Main research topics include the change detection in coastal zone and chronological study of dune sands based on the recognition of interaction between beach and sand dune. GIS and remote sensing technique have been widely adopted to monitor the historical change of coast lines (Park, 2004; Seo and Son, 2006; Park and Park, 2009). OSL technique has been used by many scientists to investigate the age of formation of sand dunes (Munywka, *et al.*, 2004; Park and Son, 2007, Choi *et al.*, 2008).

Main topics for the researches on beach include the study of compositional material (Kang, 2003), researches on seasonal variation of beach shapes (Sung and Bang, 2005; Kim and Chang, 2011), and landform changes induced by the sedimentary environmental changes (Chang *et al.* 2003; 2010). This period also sees the emergence of coastal erosion studies on shingle beach in Geojedo Island (Son and Park, 2004). Unfortunately there are not many studies targeted for the sandy beach erosion, which is occurring broadly in coastal areas in East Sea, Korea.

21st century also sees the new trend in coastal researches which include the relationship between the construction of dikes and coastal environmental changes (Park and Seo, 2001; Park and Goo, 2003). As social recognition for the climate changes increases after IPCC fourth assessment report were published in 2007, finding of vulnerable areas to natural hazards

become major topics in coastal geomorphology (Jang and Kim, 2009; Park, 2009; Jang, 2010).

One notable and promising trend in this coastal landform study is an active submission of papers to the foreign journals since 2008, even though the number of papers is still quite low. Considering most researches, however, are known only to Korean readers, this increase makes the future of coastal researches bright. These include Munywka *et al.* (2008), Kim D. *et al.*(2008), and Choi *et al.* (2012) to name a few.

5. Structural and Karst Geomorphology

1) Structural landforms

As of today, only eleven out of 360 papers published in Journal of the Korean Geomorphological Association first published in 1994 can be broadly classified into structural geomorphology, and their main topics include linear structures found in river valleys and fault lines.

Not many structural landform analysis have been done with regard to the landforms on the mountain systems of the Korean Peninsula and the uplift of the Taebaek mountains in spite of the importance of that uplifting. Kim S.H. (1980) in early stage tried to explain the geomorphologic developments related to the uplift of the Korean Peninsula since the Cenozoic Era. He explained that the landforms on a high plateau, which was considered to be an elevated peneplain, is actually a denudated surface that has gone through the Tertiary and Cretaceous Period, and the present landform of the Korean Peninsula created by the crustal movements took place sometime later.

The studies on the geological structure line were mostly done in 1970s. Kim J.H. tried to analyze the

geological structure line of the Korean Peninsula through the studies of joint system. Park D.W. and Kang P.J. (1977) and Park D.W. (1985) did similar researches on the relationship between the geological structure line and drainage network (Oh, 1996). Since then, initiative for the structural landform studies went to the geologists.

Studies on fault topography were concentrated in the southeastern region of Korea, where arguments for the existence of active fault are hot. Woo B.Y. in his 1984's article reported that the east block of the Yangsan fault line was displaced about 25km to the south. But trench surveys done by Korean and Japanese geologists including geomorphologist Jo H. R.(1998) claimed that the Yangsan fault line and Pulguk-sa fault line are active by measuring their displacement speeds. Yoon and Hwang (1998), through outcrop surveys and morphometry, studied the displacement speed of the Pulguk-sa fault line and the direction of the fault line movement. Their findings suggested that it was an active fault that was active after the Quaternary period (Son, 2000).

In his consecutive papers dealing with circular structures in Korea, Park K. discussed four types of circular structures widely distributed in whole peninsula. The first erosional type structures can only be found in geological map and stream patterns. The second type can be found in both satellite image and topographic maps. The third type is originated from ring dikes, and the last one is originated from differential weathering between granite and resistant surrounding rocks (Park, 2006).

In 2012, Shin and Sandiford maintained in their article through the analysis of paleo-shoreline records and seismic data that the uplift of Korean Peninsula during the late Neogene may be attributable to lithospheric failure related to faulting movements, and provides the link between dynamic mantle upwelling at slab edge in the back-arc system and lithospheric

responses driven by plate boundary forces.

Studies on the volcanic landforms began with the formation of Cheju Island, its lava plateau, central cone, and scoria cones being the main landforms of island. Volcanic landforms has been regarded somewhat unusual topography in Korea (Kim, 2011), even though many of both edifice of constructive processes and crater generated by destructive processes are distributed around the Korean peninsula. The studies of Korean scientists on volcanic landforms focused on Jeju Island in 1970s, Ulleung Island in 1980s, and on Mt. Baekdu in 1990s. Compared with other traditional field of geomorphology, both the number of researches and researchers in volcano study group are very few in Korea. The expectations for the role of geomorphologists are becoming higher considering the imminent and possible eruption of Mt. Baekdusan in near future.

2) Karst landforms

Park S. (2011) summarized the karst researches done by Korean geographers. As of 2009, there are no more than 145 professors in Korea, of which physical

Table 1. Karst researches by subject since 1960s (after Park, 2011).

Category	Number
Karst general	16
Doline	3
Pedogenesis	4
Speleology	10
Karst evolution	2
Landcover	3
Climate change	1
Geological structure	1
Solution process	2
Limestone weathering	1
Other	3

geographers make up 20.8 % and not more than five geomorphologists are specialized in karst landforms (Park, 2011). Instead of professional papers published in periodicals by professors, Karst landform researches are rather led by graduate student's thesis. There are seven theses submitted after the year 2000. Not everybody in this field is students. Seo M.S. is one of the greatest karst scientists in Korea, even though he has not held position in the university. After more than fifty years of work on karst, he published a monumental book in 2010, of which title is "A Study of Karst Landform and Cavern", in which he also included a dictionary of speleology and organized his lifelong karst study results from Korea, Japan and China.

6. Applied Geomorphology

The development of applied geomorphology is heavily influenced by the social needs. The research paper in this area of study is only 0.6 percent of total geography-related papers and 18.3 percent of geomorphology papers according to previous studies (Kim, 2011).

Among the papers in applied geomorphology, the most popular topics are geotourism related papers followed by environmental conservation and natural disasters. Kwon D. H. also published a review paper in 2009. Kwon divided 47 papers in this category into six sub-categories: tourism resources, geographical philosophy & geography education, environmental conservation and disaster, settlement location, geomorphological classification and maps, and land use (Kwon, 2009). He pointed out the need for the publication of geomorphological maps as a basic tool for "The National Natural Environment Survey."

Jeon Y. G. is one of the pioneers, who introduced the concept of geotourism into Korea in 1994 (Jeon, 2000). He focused his research in Daegu region, and

discovered Palgongsan, Apsan, and other mountains in Daegu region etc. possessed many invaluable geosites. Kim C. H. is also a passionate advocate of geopark, whose idea and wish to set up DMZ Geopark finally got results when his idea of DMZ Geopark finally was materialized and financed in 2010. In reality, even though the first Jeju Island Geopark was designated in 2010, the participation of geographers, especially of geomorphologists, is very weak at best so far. Another interesting paper in this area is Kee's paper on valleys where the concept of Confucian ideal place has been materialized. Intellectuals in Joseon Dynasty tried to find their ideal places for peaceful retirement lives in valleys which resembled their masters's places such as Confucius's hometown (Kee, 2008). Several papers have been published regarding the wetlands, which is the outcome of national wetland surveys initiated by Korean government in 2000s. During the survey and monitoring, new aspects of wetlands are discovered and public awareness for the wetlands also increased so much in 21st century.

7. Soils in Geomorphology

As is the case with the structural geomorphology, soils in geomorphology did not draw much attention from the majority of geomorphologists. This situation is getting worse after Kang Y. P. retirement, his last paper came in 2004 (Kang and Kim, 2004). Soil erodibility factor determination in experimental plots, geochemical properties found in regolith and pedo-geomorphological studies on alluvial plains are the only few papers published in Journal of the Korean Geomorphological Association.

Kim asserted citing Park's 2010 research that less than two percent of soil in Korea is actually reddish or reddish-yellow colored soil and red soils or laterized

regolith in Korea drew relatively too much attention from geographers (Kim, 2012), who tend to regard reddening as a product of chemical weathering characteristics of tropical region.

8. Discussion: Statistical Analysis on Journal of the Korean Geomorphological Association

Many of the important papers and authors may have not been mentioned in this review paper partly due to the negligence and intention of author. It is entirely my intention, however, the author tried to remain his focus centered on papers published in the Journal of the Korean Geomorphological Association, because it is arguably the main channel for the geomorphological researches. A large number of papers have been published in other scientific journals including Journal of the Korean Geographical Society, Journal of the Korean Association of Regional Geographers and Journal of the Association of Korean Photo-Geographers, etc.

As mentioned in introduction chapter, the readers may refer to the summary papers published in 2011 and 2012 in the Journal of the Korean Geomorphological Association.

Statistical analysis of 368 papers published in the “Journal of the Korean Geomorphological Association” since its launch in 1994 revealed that the most popular subject is applied geomorphology (85 papers), in which the natural disaster and geomorphology education are the most. The paleo-environmental reconstruction or Quaternary landscape evolution is the second-most popular topic, of which the number is 65. And sixty-four fluvial landform researches follow, and mountain/weathering and coastal landforms equals in numbers, which numbers 45 papers each (Figure 4).

Other papers include three papers on plant geography, two articles regarding the landforms on Mars and one paper on climatology. <Figure 4> summarizes and shows the classification results for 368 papers published in Journal of the Korean Geomorphological Association by subjects since first publication in 1994.

As was discussed already in Kim’s 2011 paper, poor

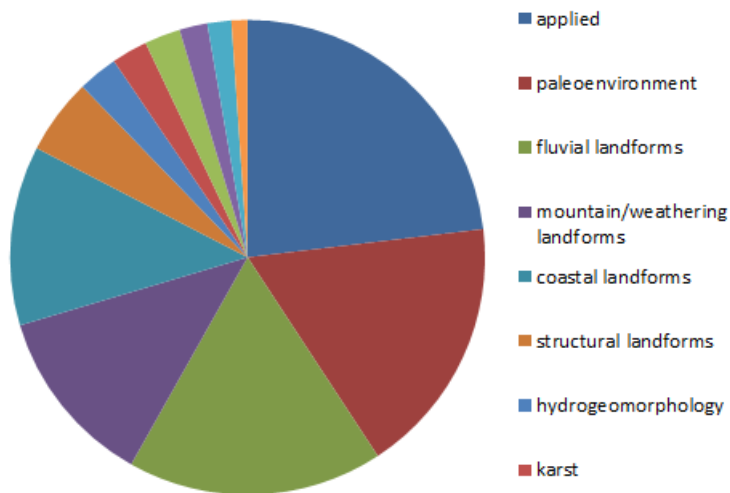


Figure 4. Classification results for 368 papers published in Journal of the Korean Geomorphological Association by subjects.

financial support for the geomorphological researches in Korea is partly due to the fact that majority of geography departments belong to social science division, which slows down the development not only of coastal researches but also geomorphological researches in general which requires relatively large sum of money for the experiments and field surveys. But, continuous participation of geomorphologists in nationwide landforms survey as a part of “The National Natural Environment Survey”, which is initiated and funded by the Ministry of Environment of the Republic of Korea, shall be very helpful to enlist and study the numerous landforms worth of protection.

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