

# A THINKING COMING AFTER A DYNAMIC MONITORY GIS

Hong-Jing Chen, NLREIS of institute of Geography, Chinese Academy of Sciences, Beijing, 100101. P.R. CHINA  
Wen-Li Chen, The Center of State Information of China, Beijing 100045, P.R.CHINA

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## KEY WORDS:

1	K001	Geomatics / GIS
2	K003	Remote Sensing
3	K018	Geography
4	K037	Soil
5	K122	DEM / DTM
6	K136	Information
7	K...	Information_Geography

## ABSTRACT

This paper will discuss basic characters of digital terrain patterns on the hilly and gully landform in the typical area of the loess plateau of China made use of remote sensing information. It will also discuss information revolution problem of Geography based on the our work and result. They are 3 I problem including information revolution, information technology and information sciences with relationship between them.

## Résumé

Ce papier recherche le caractère du terrain digital, par exemple les caractères de revin, d'altitude, de pente et d'aspect, d'après l'image de télédétection, sur les croupes du plateau de loess.

Sur la base d'étude, il encore discute le problème sur la révolution de géo-information, ce sont la révolution d'information, la technologie d'information, la science d'information et la relation entre eux.

## INTRODUCTION

Soil erosion is a serious problem in the world and especially on the loess plateau of China. So therefore, we used modern information technology—remote sensing and GIS to research the basic character and the process of the dynamic change on the soil erodent environment in a typical area on the loess plateau of China. About the introduction and the analysis of the dynamic change process in the experimental site. seeing [chen 1994].

### THE CHARACTERS OF DIGITAL TERRAIN PATTERNS ON THE MODERN SOIL ERODENT ENVIRONMENT

#### 2.1 Developed Information Resources of the High Accuracy

We flew and captured aerial remote sensing images of color infrared (scal 1:20000).

We made pre-processed to aerial remote sensing images including two orthoimage maps in color infrared by Z<sub>2</sub> othocomp (Scal 1:5000 and 1:10000) and a topographical map (Scal 1:5000) to make by c-120 planicomp from the image.

We made a series maps based on ortho-images in color infrared including the map of gully and gully network and gully edge line and so on.

We digitized these maps above and established basic data base for the analysis of the digital terrain patterns with the support of micro-computer Dynamic Monitory GIS (DMGIS).

#### 2.2 The Practice and Analysis Under the Support of DMGIS

##### 2.2.1 The Statistics and Analysis about the Characters of the Gully Network

The total quantity of gully are 281 piece and the total length of gully is about 75km and the mean length of gully is 267m in the experimental site of total area 8.79 km<sup>2</sup>. Seeing table 1.

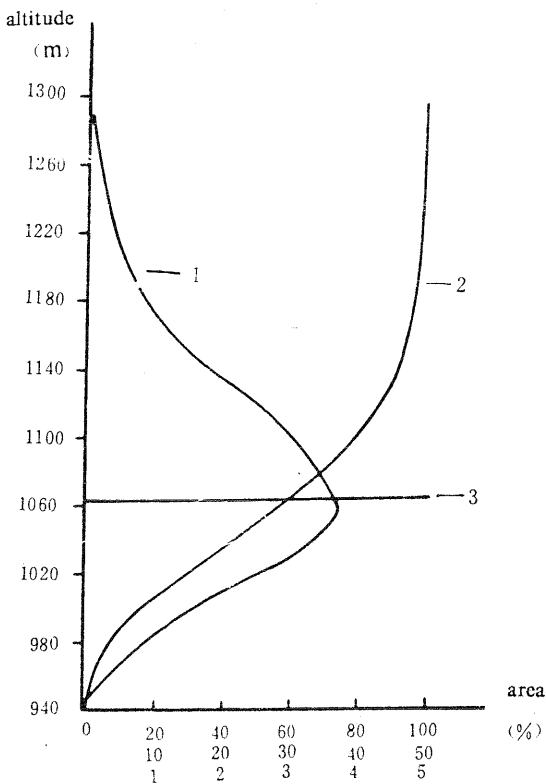
**Table 1. The character-of gully length**

Level	Length (m)	quantity (piece)	mean length (m)
1	35240	213	165
2	20820	55	379
3	10594	11	963
4	2626	1	2626
5	5692	1	5692
Total	74972	281	267

The mean rate of gully gradation is 4.316.

**2.2.2 The Characters-of the Elevation Change**

The category of the elevation change is 945–1289m and the mean elevation is 1064m and the one-half area of the change category of relative elevation is between 50m and 120m. So we can clearly know change degree which the landform has been deteriorated. Seeing figure 1.

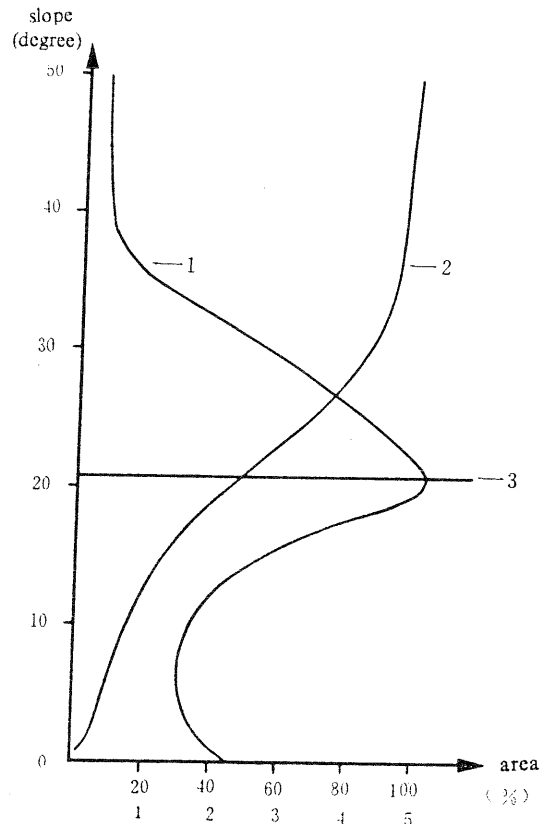


1. The percent of area in different elevated zone.
2. The integral curve of area in different elevated zone.
3. The mean elevation in the basin.

Figure 1. Map of the elevation change analysis

**2.2.3 The Character-of the Slope Change**

The mean slope is 21° in the site and that grid-cell within 10m × 10m accuracy. The slope of one-third area is 19°–25° and the slope of sixty percent area is 16°–30°. So we can clearly know breakup degree which surface has been deteriorate. Seeing figure 2.



1. The percent of area in different slope
2. The integral curve of area in different slope
3. The mean slope in the basin

Figure 2. Map of the slope change analysis

**2.2.4 The Character-of the Slope Aspect Change**

The slope aspect has great meaning for researching landuse and development of ground surface. We analysed the change of sixteen slope aspect based on the grid-cell accuracy same above. The sum of slope aspect area of south-west is one-fourth of total area and the sum of slope aspect area of south and south-west and west is one-half of total area. This character is a result of the landform

change in geology age and it is better for human used. Seeing Figure 3.

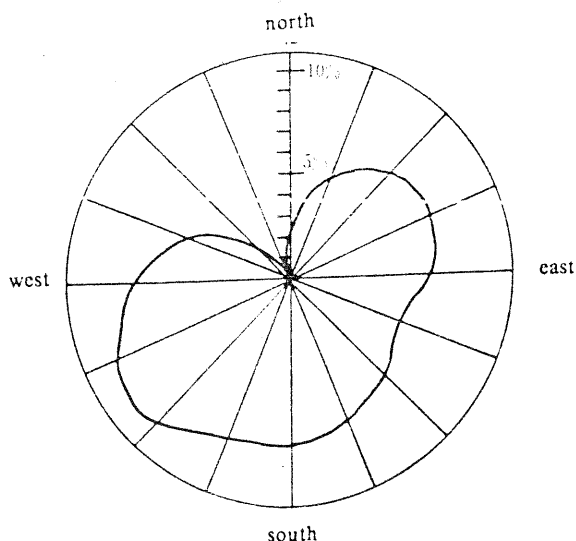


Figure 3. Map of the slope aspect analysis

### A THINKING COMING AFTER A DMGIS

We established a DMGIS and researched the basic character of digital terrain patterns and dynamic change process with DMGIS. We found many problems in the studying process and result. They are 3 I problems (Information Revolution, Information Technology, Information Sciences) and the relationship between them in studying Geography.

The first we should know the process of information revolution in Geography. The second we should must know our now main studying object, contents, methods and problems in the process. The third we should must also probe the theory and future of information revolution in Geography. [Good child 1992] [Rhind 1994]. So therefore, we proposed a new conception—Information Geography— in 1991 year. we think that Information Geography is a science which it is to know and use geographical information by the support of information technique with theory and method of information sciences. [chen 1993]. We are now writing a book—A Guide to Information Geography

(Chinese). A thinking about Information Geography as follows:

### 3.1 The Process of Information Revolution in Geography

Information is the third basic concept of modern sciences after the matter and energy in human knowing nature. Human being came into information age from the forties of the twentieth century because a breakthrough of information technology and to be founded the information theory.

The information revolution of Geography was began after the beginning of the information age. The first step was a quantitative revolution of Geography for 50's–60's. The second step was to be developed and to be completed GIS and other Information technique for 70's–80's. The information revolution of Geography is now coming into the third step that is developing information Geography.

So therefore, geography is greatly changing to be from traditional qualitative described and simply statistics analysis to fixed position, quantitative, dynamic and integrate analysis. This changing is a second scientific revolution of Geography. We can call it as "information revolution of Geography". We can also call it as the rise and developing of Information Geography according to its objective and characters and contents view.

Information Geography is a result of information age deeply developing and GIS day by day ripeness and step by step came into pragmatized stage. So Information Geography is must a trend of developing geographical sciences in information age. Information geography needs supported of GIS and other geographical information technique and GIS needs furthermore guide of theory and method of Information Geography.

### 3.2 Present Main Problem in the Process of Information Revolution of Geography

We know that the information revolution in Geography is a important part in the information revolution of mankind. The quick development of information technique propel information revolution forward of mankind. But information technique—for example RS, GIS, GPS, TS (Telemetering System) to be call 4S—is only a tool to the Geography. So therefore, Geography has must it self studying object, content and method and look for geographical main problem in the process and particularly present.

We think that the studying object of Information Geography is a geographical system of large capacity and multilayer and integrate in geographical environment. The main studying content of Information Geography are geographical information and geographical information flow in the geographical system. The studying tools of Information Geography are modern information technique that they are RS, GIS, GPS and TS same above. The studying theory and method of Information Geography are used principle of the information sciences. The studying target is the sustainable development of the geographical system.

So the heart of the process is now to develop geographical information and geographical information flow resources and is particularly remote senses information resources including quantity and quality.

### **3.3 The Theory and Future of Information Gevolution in Reography**

The theory and method of information revolution in geography will be completed through studying geographical information in a geographical system. Though different geographical system has their own characters and probles, however they have a lot of common characters from studying contents and methods view yet. So therefore, through these common characters we can probe basic theoretical problems of universal useful value for Information

Geography.

They are:

**3.3.1 Information characters of geographical environment** The studying object in a geographical system—energy, resources, environment and so on information—they are all of information resources and can generalize a element to be called geographical information and to be expressed all information character of different type in Information Geography.

**3.3.2 Spatial characters of geographical environment** Any realistic things in a geographical system occupies a spatial position and has a spatial form and between it with other shape has a relation spatial position. All of the characters reflect basic spatial characters in a geographical system.

**3.3.3 Time characters of geographical environment** Any realistic things in a geographical system don't stop changing. Any character of the every thing is only a its specific moment. Therefore, its dynamic changing process is really a concentrate of time sequence of the things.

**3.3.4 Intergrate characters of geographical environment** Geographical system is an integrate body. Each other depend on as well as and each other restriction between every element is compose a world of multi-type and multi-changing in a geographical system. It has exchanged to outside of the system and has integrated at inside of the system. The integration reflects overall characters of a geographical system.

**3.3.5 Feedback characters of geographical environment** Every elements in a geographical system are interaction of never stopping. This interaction is a feedback character of delaying to nature of a geographical system. Mankind can control changing direction in a geographical system with the feedback nature.

Geographical information technique is a tool. Geographical information sciences is a theory and method. Information revolution in Geography is a process for developing geographical information and geographical information technique and geographical information sciences.

We can study many characters of information, spatial, time, integrate and feedback in a geographical system according to geographical information of most quantity and high accuracy. we can develop geographical information theory through studying common characters in different geographical system.

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