LL22 October1989 ISSN 0110-7658

Loess Letter 22

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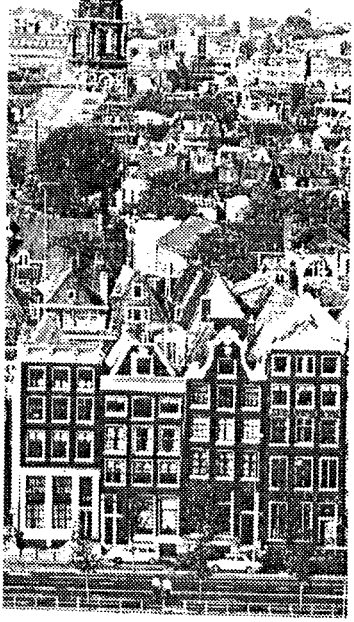

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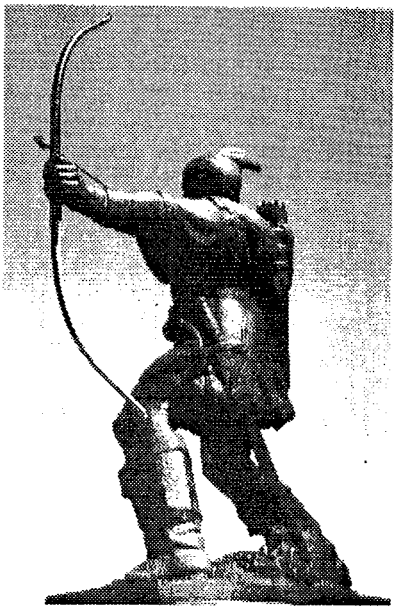

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LOESS-BRIEF UIT EUROPA

LOESS LETTER 22 OCTOBER 1989

LL22 is the first of two special issues for the conferences of 1990. In August 1990 there are two conferences with loess significance, these are the meetings of the International Association of Engineering Geology in Amsterdam (6-11 August) and the International Association of Sedimentologists in Nottingham (26-31 August). So the emphasis for LLs 22 and 23 is on the engineering and sedimentological aspects of loess, and LL22 is totally devoted to the Lanzhou Field Workshop on Loess Geomorphological Processes and Hazards which was held in May-June 1989. The proceedings were published in the Journal of Lanzhou University; we publish our usual collection of title pages and a few interesting diagrams, hopefully just enough to give the wider loess world a clear view of what happened at this important meeting. Actually there are many more conferences in 1990 which have some relationship to loess but LL can only cover a limited number of events so LL distribution for 1990 will be concentrated at the IAEG and IAS meetings.

Determined loess travellers may like to visit the meeting in Yakutia (13-21 July 1990; contact Dr. A. E. Dodonov at Geological Institute, USSR Academy of Sciences, Pyzhevsky per.7, Moscow 109D17, USSR, for details) or the Loess Commission meeting at Mar del Plata, Argentina (25 Nov.-1 Dec. 1990; contact Dr. Marcelo Zarate, Centro de Geologia de Costas y del Cuaternario - UNMDP, Casilla 722, Correo Central, 7600 Mar del Plata, Argentina, for details).

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LANZHOU FIELD WORKSHOP ON LOESS GEOMORPHOLOGICAL PROCESSES AND HAZARDS

IGU Commission on Measurement, Theory and Application in Geomorphology (COMTAG)

MAY 23–JUNE 5, 1989. XI'AN–LANZHOU–XINING
THE PEOPLE'S REPUBLIC OF CHINA

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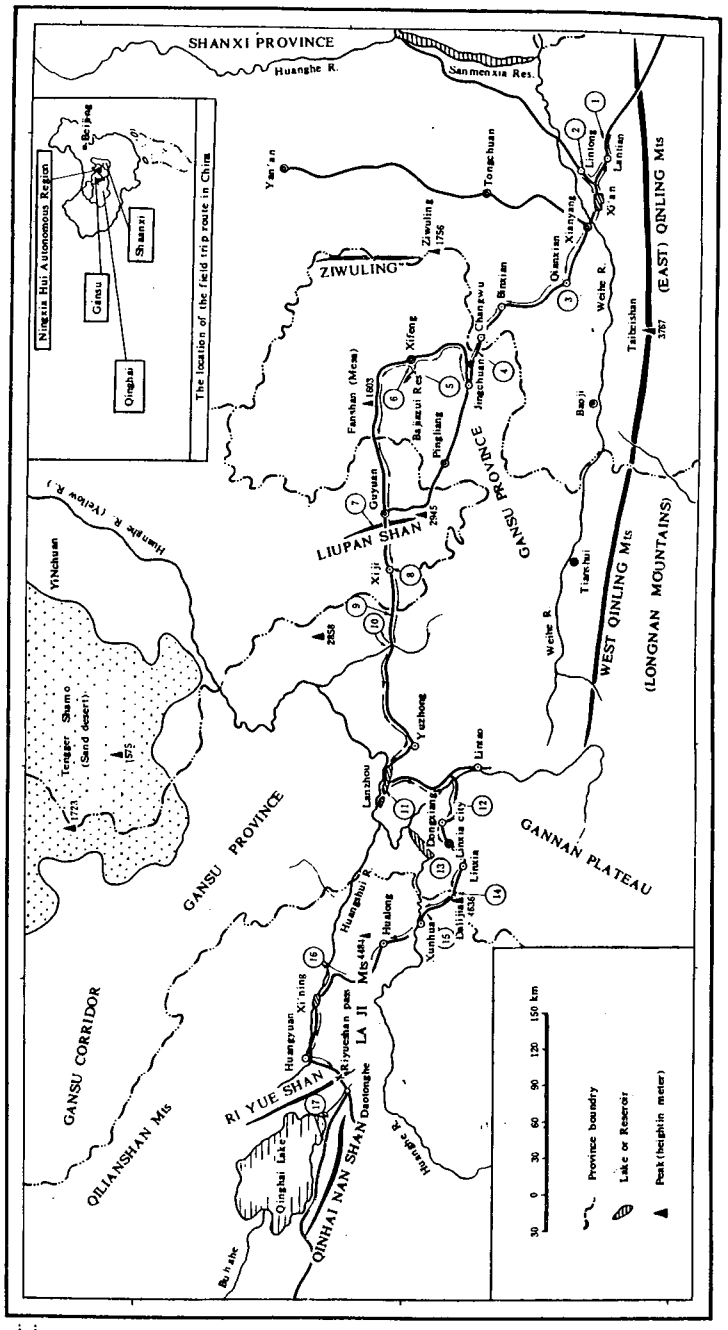

Route and Localities for Investigation

① Gongwangling, Latian County; ② Lintong; ③ Qianxian; ④ Qianjiagou Gully; ⑤ Bajiazui Reservir; ⑥ Nanxiahegou Gully; ⑦ Shibeiyuan; ⑧ Xifi; ⑨ Gangpingqiao; ⑩ Baicaoyuan; ⑪ Jiuzhoutai; ⑫ Saleshan; ⑬ Beiyuan; ⑭ Dalijiashan pass; ⑮ The mouth of Qiaigou Gully; ⑯ Caojiapu; ⑰ Riyueshan and Qinghai Lake;

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May 23 to June 5, 1989, Lanzhou, P. R. China
Journal of Lanzhou University

THE LOESS PLATEAU AND ITS FORMATION AND EVOLUTION

Zhang Linyuan and Dai Xuerong

1. INTRODUCTION

The Loess Plateau is well known in the world as both the largest distribution area and the thickest deposition area of loess. Seeing that the loess posseses the loose and permeable characters appropriate for farming, and contains more than 60 kinds of minerals, included many trace elements indispensable to the growth of plants, the Loess Plateau has ever been considered as one of the ancient four farming–cultural places of origin in the world, and it has made a lot of immeasurable impacts on the development of the Chinese nation and on the advance of civilization.

The Loess Plateau covers an area of 400, 000 km^2. Most of the area is covered with loess, and has become one of the national important centralized regions of agricultural and pastoral lands. On the other hand, every year as much as 1, 600, 000, 000 tons of silt, which is carried to and deposited in the lower reaches of the Huanghe (Yellow) River, mainly originates from the Loess Plateau. Therefore, it is of great significance to both the Loess Plateau itself and the country for us to bring the improvement of natural ecological environment and the rational utilization of natural resources to the Loess Plateau, which lies in the geographical centre of our country. Nevertheless, to achieve this aim, we must first of all make further approaches as a base to the process of the forming of the Loess Plateau and to the evolution of its natural environment, then predict its developmental tendency, and formulate a long–term rational development strategy, so as to make it play an important and due role both today and in the future.

The eco–system of the Loess Plateau has been examined, and drawn some crutial problems mainly described as the soil erosion, the damages of natural eco–environment system, and the increasing population preasure. The natural factors are thought, at different levels, relative directly and indirectly to the process of the formation and evolution of the Loess Plateau.

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A STUDY ON LOESS GEOMORPHICAL PROCESSES AND DISASTERS IN XI'AN AREA

Li Zhaoshu

1. INTRODUCTION

Xi'an located in the centre of Guanzhong Basin in Shaanxi Province with totally 9,683 km^2 in area. The administrative regions including city districts, Zhouzhi, Huxian, Chang'an, Lantian, Lintong and Gaoling counties. Xi'an is one of the most famous ancient cities and where once had been the capital for more than ten dynasties during Chinese history. In the whole ranges, there have a pleasent climate, abundant products and convenient communication systems.

2. THE TYPIES OF LOESS LANDFORMS

The loess which covering Loess Plateau is one kind of the youngest, widely distributed and with considerable thickness continental deposits eolian formed during Quaternary Period. Generally speaking, the average thickness of the loess is about 80—120 m with the thicknest in 318 m. The lithologic features are of silt with the uniform texture, loose and porous, developed vertical joints, rich in carbonite and with the wet–collapes character. During long period of the time in the part, the earth's endogenic and exogenetic stress reaction to each other and the special natural landforms with vallies and scattered microlandforms have been formed. Loess Plateau in centre China is famous in worldwide for its broad area, thick layer of earth and varous of landform types.

Xi'an City, situated on the southern fringe of Loess Plateau, is the typical place where loess landforms are mostly developed in Guanzhong Basin, Shaanxi Province. Various landforms are appeared in there and can be regarded as an idea place to carry on loess landform research works. The complex landform types in Xi'an area include mountains, loess hills, loess platforms, loess ridges piedmont and loess alluvial plains.

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QUATERNARY SYSTEM IN GONGWANGLING AREA, LANTIAN COUNTY, SHAANXI

Zhang Linyuan and Zhang Hucai

1. INTRODUCTION

After the fossils of mandible and some other stonewares of Homo erectus Lantianensis or Sinanthropus Lantianensis woo had been discovered in Chenjiawo Village, Xichuzheng Town, Lantian County in 1963. The fossils of skull, mandible and tooth also have been discovered at Gongwangling, which located on the south bank of Bahe River in east of Lantian County in 1964. (Fig.3–1, 3–2).

Lantian County Located at the southwest edge of Loess Plateau and Cenozoic Guanzhong Fault Basin. The surface of Loess Plateau in the place has been serviously cut and the wide loess platforms have beem formed (Fig. 3–3). One of these loess platforms is Henglingyuan Platform which situated on the right bank of Bahe River and another one, Bailuyuan Loess Platform on the left bank of Bahe River. On the southeast it connected by the fault with Huashan Mountain which belongs to Qinling Muntains(Fig.3–4).

During the movement processes of Bahe River from north direction to the south during Quaternary period, it has formed five grade terraces. The highest altitude in the area is the peak of Lishan Mountain with 1,300 m a.s.l. and the lowest place is located near Bahe River Bridge that is just 390 m a.s.l. The average altitude of the area is 500–800 m a.s.l. (Fig.3–5)

Bailuyuan Loess Platform is 25 km in length by 10 km in width. The highest altitude of it is 791 m a.s.l. and the altitudes of the surface of the loess platform decrease from southeast to northwest and stretches in the direction to the Xi'an City. Generally, it is 300–320 meters higher above the water level of Bahe River.

In the point of view of tectonics, Lantian situated at the south edge of Fengwei Graben Basin and the Cenezoic strata completely exist in the area. Because of the downcutting processes in late periods, the outcrops of these strata are well exposured.

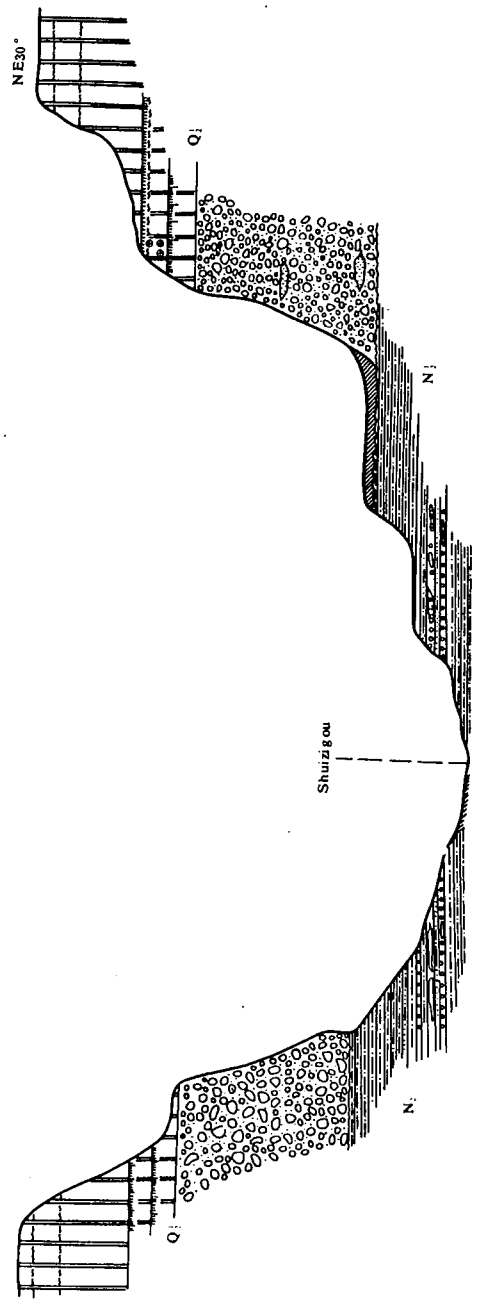

Fig.3–6 Cross section at the mouth of Shuizigou where fossil Lantian Man was found (modified after Jia Lanpo et al, 1966)

1— slope deposit; 2— calcareous nodule; 3— gravel; 4— sandy mudstone; 5— sandstone; 6— sanstone lens; 7— ape-man fossils; 8— Quaternary vertebrata fossils; 9— loess-like clayey (buried soil A); 10—red soil; 11—mudstone; 12—mudy sandstone; 13—conglomerate; 14—conglomerate lens; 15—Tertiary vertebrata fossils; 16—loess-like sandy soil (buried soil C).

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THE COMPREHENSIVE TREATMENT AND BENIFIT OF WATER AND SOIL CONSERVATION IN QIANJIAGOU GULLY DRAINAGE

Fan Chingwu

SUMMARY

The Qianjiagou Gully drainage is in the hill area of the Loess Plateau nearby the middle reach of Huanghe (Yellow River) the total area reaches 53. 78 km^2. It has been very serious of water and soil erosion in this drainage before, the area 44 km^{2}of the drainage has been treated and the water blocking ratio has been reached 74. 03%, the mud-blocking ratio 77. 7%, since the comprehensive treatment was lounched 1983, the obvious benefit of economy, ecology and society has been gained. It has been becoming a successful case of catchment treatment.

1. INTRODUCTION

The Qianjiagou is the first branch of the Weihe River which is the Jinchuan Rivers tributary (Fig. 4-1).

It is in the Loess Plateau and hill area, the total area of it addes up to 53. 78 km^2. the altitude of gully mouth is 940 m a. s. l and gully source 1, 230 m a. s. l. The drainage acrosses two provinces of Gansu and Shaanxi, most of it is in Jinchang county. The drainage is in the semi-humid climatic area of warm temperature zone. The annual average temperature is 9. 1℃, the annual precipitation is 587. 8 mm, the distribution of rainfall here is uneven. The rainfall in summer (June to August) takes up 45—53% of the annual precipitation, most of them appears in rainstorm. In the area around the gully the loess platforms are plain and wide, and the gully are deep. the land surface is cluttered. The fluvial erosion and mass movement are serious, the modulus roundes off 8, 000 T / km^2.

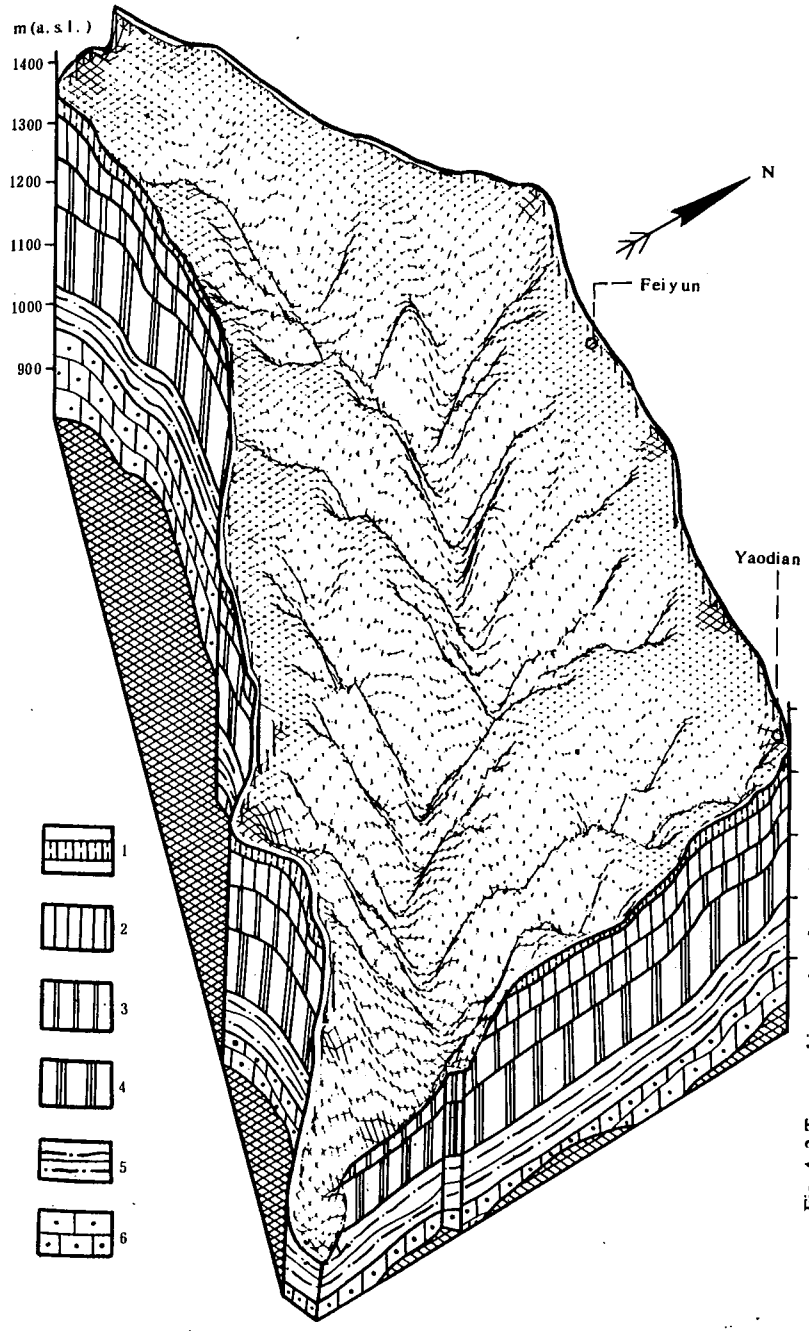

Fig. 4-2 Topographic trend surface and block-diagram of Qianjiagou Catchment (After Zhao, Chongkai and Zhany, Dexuan)
1. Holocene Loess; 2. Malan Loess (Upper Pleistocene); 3. Lishi Loess; 4. Wucheng Loess; 5. Pliocene redbed; 6. Cretaceous sandstone

SOIL EROSION FEATURES AND ITS AFFECTING FACTORS IN NANXIAOHE VALLEY IN XIFENG, GANSU PROVINCE

Zhang Dexuan and Wang Dexian

SUMMARY

The Nanxiaohe is a typical valley of serious soil erosion in east Gansu Loess Plateau. Conservation works have been done in the valley early since 1951 by the Xifeng Water and Soil Conservation Experimental Station of the Yellow River Hydraulic Commission. For the purpose of ascertainning the soil erosion features and its affecting factors, a series of experiments and observations have been done on slope runoff plot, artificial rainfall, hydrology and meteorology etc. and lots of materials have been obtained. The affecting factors of soil erosion in the valley have been analysed based on above mentioned materials and the features of erosion landforms and their controlling factors have been recounted in the paper.

1. GEOLOGICAL FOUNDATION

The Nanxiaohe valley is located at 37° 41—35° 44' N and 107° 30'—107° 37' E and it is situated on the left bank of Pu River which is a tributary of Jingchuan River. It is under the governing of Xifeng City (Fig. 5–1).

From the view of geomorphology , it is situated on the Xifeng platform. The Xifeng loess platform which is located at southwest part of Shaan–Gan–Ning Basin and lies between Liupanshan Mountains and Ziwuling Mountains with a major axis of North to South. Its palaeotectonic foundation was a North–South trough and it became a depression in Neogene with a direction of Northwest to Southeast. The Xifeng loess platform inherited the red soil and palaeo landform of Tertiary. Its channel has developed quickly and the valley beds have been eroded beneath the boundary between Tertiary red–layers and loess for they have suffered from contemporary erosion seriously since Holocene. Therefore it supplies a favourable condition for mass movement on slope such as land-

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BAJIAZUI RESERVOIR

Wang Dexian and Liu Lishi

Bajiazui Reservoir is a river valley typed reservoir which has been built on Puhe River and located between Xifeng City and Zhenyuan County. It is 16 km away from Xifeng City (Fig. 6–1).

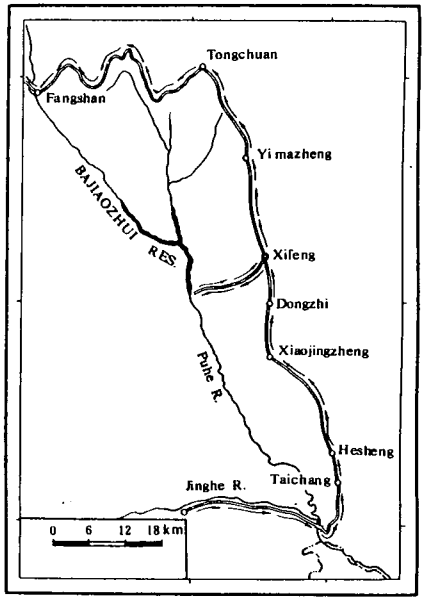

Fig. 6–1 Location of the Bajiazui Reservoir

Though the reservoir was built in 1962, the electrical water piping engineering was completed in 1981. and it is the first water piping engineering to the farmland on the surface of Loess Plateau. This engineering makes more than 9, 000 ha. farmland irregated and has shown the significant economic, ecological and social benefits.

GENTLE AND LARGE SCALE LANDSLIDE AT THE EDGE OF SHIBEIYUAN LOESS PLATFORM

Bai Mingxue

1. INTRODUCTION

The geomorphic charactoristics of Loess Plateau is that platform ridge and slope morphological types appear everywhere. Many villages are located at the edges of loess platform or slopes of ridge and hill. Loess has large porous ratio, collapsbility and low static and dynamic strngth, etc. , so the landslides can be easily occur in loess area, and often destroy the villages. Mean while, many active earthquake areas are distributed over loess platform and many times of strong earthquakes had been occurred in history. Disastous earthquakes happened in the history. Earthquake accelerated geomorphic process of loess, formed many landslides and slides, destroyed or buried the villages and the earthquake has become one of the important factores of disaster over the loess platform.

Through the investigation of Haiyuan serious earthquake with 8. 5 Maguitude earthquake in 1920, it has been found that at gentle slope of Shibeiyuan Platform, which located on the south in Qingshui River valley and in meizoseismal area of 10 maguitude, large landslide happened, seriously damaged the local villages. In this paper, the loess slide problem has been discussed.

The statistic material shows that most landslides happened at the area which the gradient was more over 15%, only few with 5–15%, no landslide happened in this area which the gradient is less than 5%. But in this slide area, the angle of original landform surface was less than 3 (belong to the slope with less then 5), and slide occured just on such slope gradient with low angle. After sliding, the surface appears wave–like characteristic. Therefore, we can call it as gentle slide, in order to distinguish it from the slide which happened at the area where slope gradient is more over 15%. This is a landform formed by strong earthquake.

The research in this area shows that the slide is closely related with phenomenon in

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SOME TYPES OF SEISMIC LANDSLIDES IN LOESS AREA IN CHINA

Zhu Haizhi

SUMMARY

The western part of Loess Plateau is one of frequent seismic areas in China, and loess is an earth that could be destroied by earthquake easily. Haiyuan earthquake with M = 8. 5 in 1920 caused large scale falls and landslides in Xiji area. By the shapes and geological background, the seismic landslides can be divided into four types and each type has its own characteristics in distributions.

1. NTRODUCTION

The middle part of Shanxi and northern part of Shaanxi Provinces, the middle and eastern part of Gansu Province, and a part of Ningxia and Inner–Mongolia Automous Regions in China are all belong to famous Loess Plateau with about 275, 600 km^2in area. This vast area is also a frequent seismic active area, where is surround Eerduosi Fault Block. Analysis from deposit environment of loess and petrology characters of loess, east of Liupanshan Mountains differs greatly from west of it. Comparatively, the earthquakes disasters are much more frequently in the area of the west of Liupanshan Mountains.

2. CHARACTERS OF EARTHQUAKE DESTRUCTIONS IN LOESS DEPOSIT REGION

Most of the areas in east of Liupanshan is covered with thick loess layer, which are Wucheng Loess (Q_1), Lishi Loess (Q_2) and Malan loess (Q_3). There are widespread interlayer palaeosol layers in Lishi loess, the eluvial layers developed in each soil layers (especially from the first layer to the fifth layer). The eluvial layers have less calcium carbonate and more clay particle (size < 0. 005 mm) than in loess. There are many buried palaeosol layers (general more than 10 layers) in the profile, it had a nature of consolidation and cohesion in loess layer, strengthened stability and anti–erosion. From distribu-

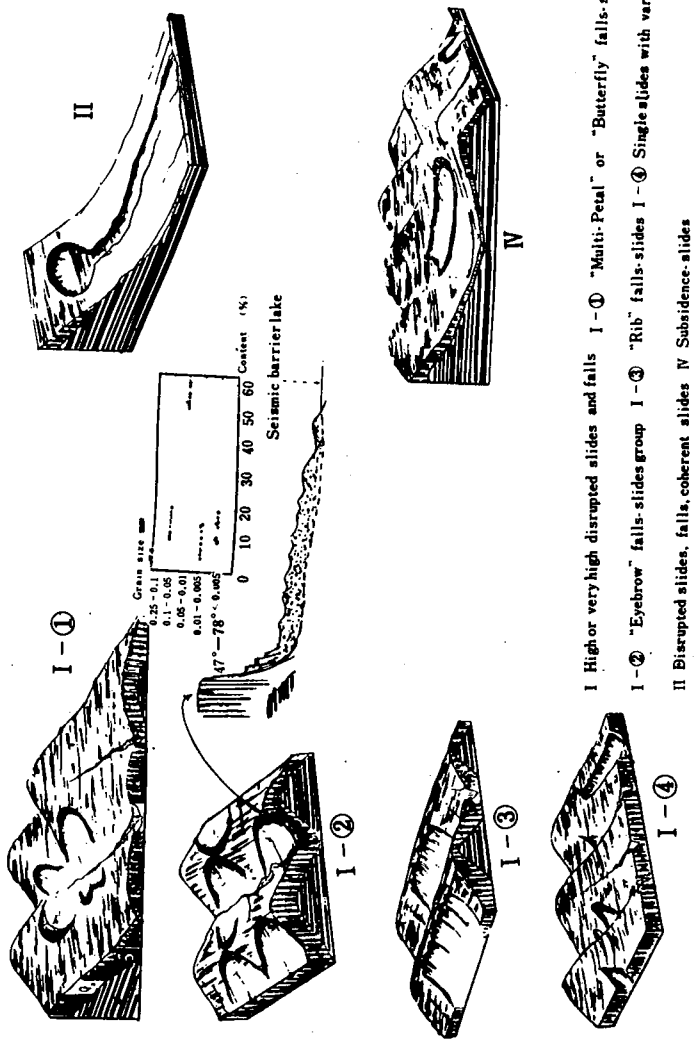

Fig. 8–2 Some types of landslide caused by earthquake in loess area

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JIUZHOUTAI LOESS PROFILE IN LANZHOU, GANSU, P. R. CHINA

Zhang Hucai and Chen Fahu

1. INTRODUCTION

Jiuzhoutai loess profile in Lanzhou, which being 318. 2 m in thickness is so far the thicknest loess profile in the world that has been discovered and comprehensively studied. The profile, 5km northwest away from Jincheng City (Ancient Lanzhou Town)(Fig. 9–1), is situated on the unconformitic plane of Precambrian metamorphic rocks which nomenclatured as Gaolan Group locally and Tertiary red–beds which named Xianshuihe Group. Jiuzhoutai actually is a small relic loess platform(or small relic loess plateau) with the altitude of 2, 067 m a. s. l. and 560 m above the water level of the Yellow River. The very thick eolian loess accumulated on the sixth terrace gravel layer of Yellow River and topped by alluvial loess or secondary loess as being called (Fig. 9–2). Comparison the whole section it can been seen that the loess in the lower part of the profile from bottom to 21 m upward is the light brown alluvial loess which composed of silt clay or clayey silt and relatively more hard and with the ambiguous horizontal beddings.Comparatively, this part of secondary loess contains a little more of blind fine vein gypsum and some of the undeveloped carbonaceous nodules. From 21 m upward to the top of the profile are all eolian loess sequences. However, considering about the on site visible characteristics of the whole profile, it can be got the impression that Jiuzhoutai loess is light in colour which mainly being yellow–grey and light yellow–grey and there are any sharp changes in the whole sequence. According to recent field studies, Jiuzhoutai profile interbedded thirty–one palaeosol layers in eolian loess sequence and three indicative palaeosol layers in alluvial loess sequence. The colours of the palaeosols are ranged from light red brown to light grey brown, and are composed of clay, silt clay and even clay silt., It has not been found so far that there exist deposit break or hiatus in Jiuzhiutai loess profile according to our repeated fields observations and investigatons. However, generally speaking, from bottom to the top of the section, the colour gradually

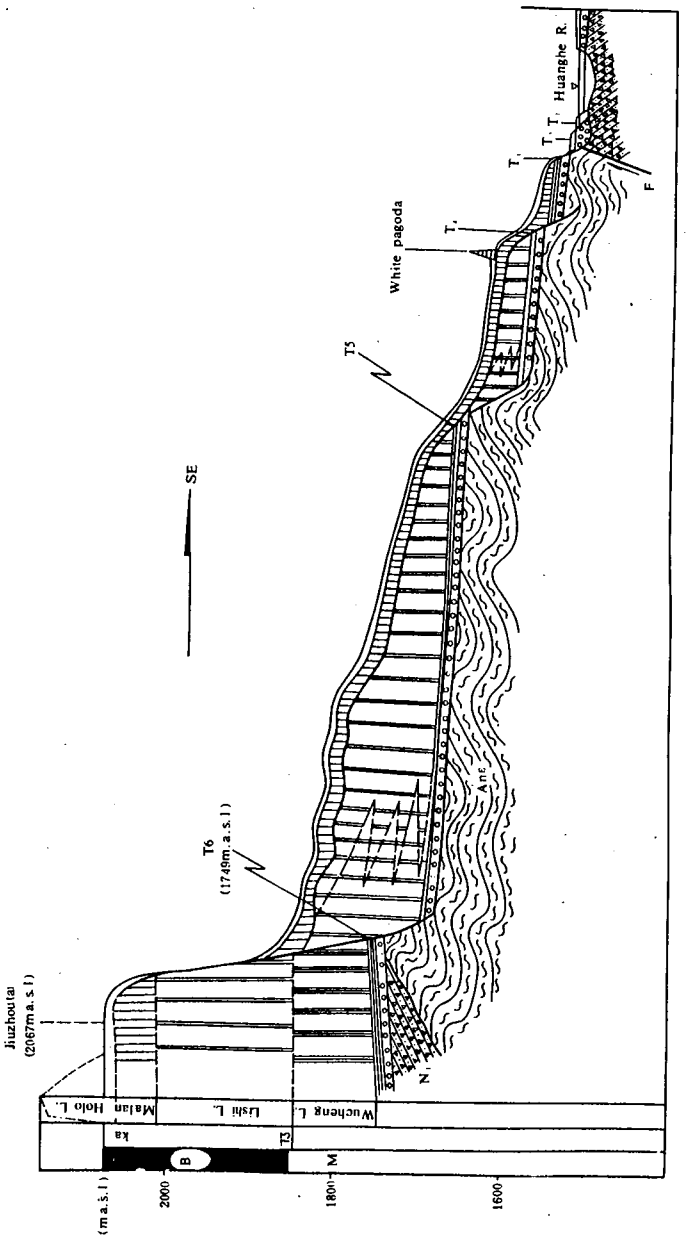

Fig. 9–2 Geomorphic section of Lanzhou Jiuzhoutai–Huanghe River (the original sketch was Kindly supplied by Prof. Zhang Linyuan)

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THE LANDSLIDE HISTORY AND LATE CENOZOIC ENVIRONMENTAL FOCTORS IN SALESHAN AREA, DONG XIANG COUNTY, GANSU

Zhang Linyuan

SUMMARY

The disastrous landslide of saleshan ridge in Manch 7, 1983 was a recent and most serious event in the long landslide history of the area. The palaeoenvironmental foctors played an important role in this landsliding. The landslide history of the area can be divided into three stages: palaeolandslide stage during the late Pleistocene, old–landslide stage during the most time of Holocene and the new–landslide one during the history–recorded period.

1. INTRODUCTION

The 1983 Saleshan landlslide is located 3 km to the west of Guoyuan village (Fig.10–1).

According to the analysis on the seismogram recorded at the Linxia Seismic Station, the large landslide happened precisely at the Beijing time 17:40, on March 7, 1983. There were two times of seismic shock with only 65. 5 seconds interval between them. The first one just took 55 seconds and much stronger than later one, which is equal to 1. 4 grade in the Richter Scale.

The sliding area is 1. 6 km long from backwall to front rim of the sliding body, 0. 5 —0. 9 km wide along W–E direction, and the widest part at front is 1. 4 km. The volume of the sliding body is about 40—50 million m^3. It can be characterized as landslide of huge sliding body, gentle angle of the sliding plane and high sliding velocity which reached about 40 m per second in maximum. The shape of lankslide looks like a piedmont expanded–foot glecier, so it was called "glacier–like landslide" (Zhang and Zhang, 1983).

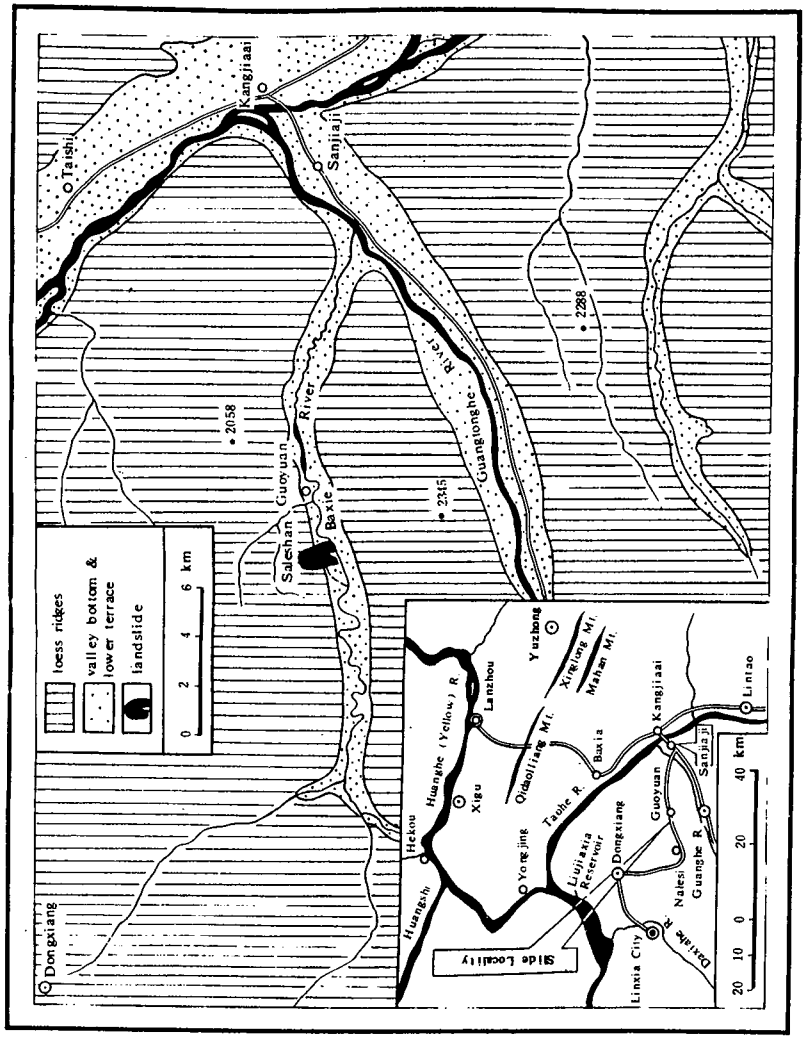

Fig. 10—1 Location of the saleshan landslide

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BEIYUAN LOESS PROFILE NEAR LINXIA CITY AND RECORDS OF CLIMATIC FLUCTUATION SINCE LATE PLEISTOCENE

Li Jijun, Chen Fahu and Kang Jiancheng

SUMMARY

Loess in China is an excellent and reliable recorder of climatic changes in continent. The accuration and detail of climatic change recorded by it can be compared with ice core and deep-sea deposit. Late Pleistocene loess, also called Malan Loess, is the best recorder of climatic fluctuation in loess of China. Malan Loess of Lanzhou is well known by its great thickness, high deposit rate, complete series of loess -palaeosol and much more accurate reord of climatic fluctuation (Li, Jijun et al, 1989). Beiyuan loess profile near Linxia City located in southwest of Lanzhou is so far the best one of Late Pleistocene.

1. INTRODUCTION TO BEIYUAN LOESS PROFILE

Beiyuan loess profile is located at Beiyuan in north of Linxia City (Fig. 11-1). It is the second terrace of Daxiahe River which is a tributary of Yellow River. The widest part of this terrace surface is up to 8 km with hight of more than 120 m above water lever of Daxiahe River. the profile is situated on a 20 m gravel layer below which is the Pliocene red bed. The profile that totally is 35—40 m thick, consists of Lishi Loess with thickness of 7. 2 m (low part), Malan Loess with thickness of 27—42 m (middle part) and Holocene Loess with thickness of 1. 4 m (upper part). Samples were taken from an artificial profile for loess being 27. 4 m thick. So its exposure is very fresh. Howerve because the top of this profile is eroded partly by human plough and partly by nature processes, some other samples were taken from another profile which surface is 8 m high than the top of the former one. Therefore, the total thickness of sampled profile is 35. 4 meters.

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QUATERNARY GLACIATION IN THE DALIJIA MOUNTAIN ON THE NORTHEAST BORDER OF QINGHAI –XIZANG PLATEAU

Li Jijun and Pan Baotian

SUMMARY

Field investigation and aerial photograph interpretation revealed that three glaciations occurred in the Dalijia Mountain on the northeast border of Qinghai–Xizang Plateau during Quaternary. Those are last glaciation (83, 000—13, 000 a. B. P.), last second glaciation (14, 000 years ago) and the glaciation occurring 560, 000 years ago. In last glaciation, a paleo–ice cap characterised by certain degree activities with area of 150 km^2 and 350 meters thick in the center was formed. The correlation between the relics of Quaternary glaciation and the terraces of the Daxiahe River, a tributary of the Yellow River, is Realized in this paper.

1. INTRODUCTION

The Dalijia Mountain is located on the northeast border of Qinghai–Xizang Plateau and the boundary between Xunhua County of Qinghai Province and Linxia County of Gansu Province. The highest peak of it is 4636 m a. s. l. and there exist a planation surface being 4, 000—4, 300 m a. s. l. (Fig. 12–1). Quaternary glaciations were took place there. But, up to now, there are only a few reports on the relics of Quaternary glaciation (Li Jijun, 1989). Because the Dalijia Mountain is situated in the transition region between Loess Plateau and Qinghai–Xizang Plateau, the study on the relics benefits to expound the relationship between galciation series, landform development and loess sedimentation. Some new results of research on the Quaternary glaciation in the Dalijia Mountain are reported in this paper.

2. QUATERNARY GLACIATION RELICS

Main types of the relics on the Dalijia Mountain are as following:

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CORRELATION OF THE ICE AGE AND LOESS DEPOSIT SEQUENCE IN THE REGION OF THE MOUNT DALIJIA, GANSU, CHINA

Shen Yongping, Kang Jiancheng and Harry L. Zilliacus

The Mount Dalijia, situated at northeastern fringe of the Qinghai–Tibetan Plateau, provides us an ideal place for the study of the correlation between glaciation and loess, since this is where the Quaternary glacial and interglacial deposits sequence with the loess stratigraphic formation of the loess plateau in Linxia region form an interconnectively transitional zone and comparable sequences from top to bottom.

1. QUATERNARY GLACIAL REMAINS

The Mount Dalijia stands at the juncture of Linxia of Southwest Gansu and Xunhua of Qinghai Province in the northeastern fringe of the Qinghai–Tibetan Plateau, its highest peak is 4, 630 m a. s. l.. At the altitudes of 3, 800 to 4, 000 m exist a large extent of planation surface, exhibited a notable inclination from north to south due to tectonic uplift. There is no glacier developed at present, but there used to be many times of large–scale paleo–glaciers and left a lot of remains of glaciation.

a. Neoglaciation Moraines: They are mainly distributed around the crest of the Mount Dalijia, being the results of small valley glaciers.

b. Last Glaciation (68, 000 to 10, 000 B. P.): With the planation surface at high place of the mountain as the base, it formed a ice cap of 150 km^2 during the prevailing glaciation period. Calculated by the formula: $H = \sqrt{2H_0 S}$ where $H_0 = 11$ m, S is the radius of ice cap, the central thichness of this ice cap reached up to 350 m.

c. Glaciation of the Mount Dalijia Pass: Its moraines mostly appeared on nearby ridges of the Mount Dalijia. These moraines consist of such as boulders of granite from bedrock of the highest peak of the Mount Dalijia. Such boulders, distributed at altitude of 3, 750 to 3, 900 m, with a diameter from 3 to 5 m. Judged from distribution of

DANXIA LANDFORMS IN NORTHEAST AREA OF QINGHAI PROVINCE

Zhang Linyuan and Zhang Hucai

Danxia landform is one kind of landforms which developed on the horizontal red strata. Due to their unique landscapes and attractive natural sceneries, they posess high value for sightseeing. Therefore, it becomes one kind of famous landform in China. The terminology of Danxia becomes from Danxiashan Mountain in Renhua County, north in Guangdong Province, where the typical Danxia landforms are developed on the Tertiary arid inland deposit strata. Through fracturing, erosion, solution and collapse, in addition to this area is being controlled under warm–humid climatic condition, overhanging cliffes, dissolution caves, clear flowing water, and beautiful sceneries which composed by fantastic appearing stones, secluded pathes and green woods are being formed.

During last two decades, it is not just in the south China, but also in semiarid area in north China Danxia landforms have been discovered in succession. Danxia landforms distributed in the east part of Qinghai Province are majorly made up by Palaeogene red strata, but also include some Cretaceous strata which have been weakly altered by tectonic movements and nearly horizoneal in occurrence, and even some Miocene loose red strata. These strata that majoritly composed by detrital rocks contain considerable amount of gypsum, carbonate and other kinds of soluble salts which had been formed under arid climatic condition, while just these soluble salts are the material foundations for Danxia landform formation. In the area, Danxia landforms are scattered in the Tertiary inland lacustrine basins like north Guide Basin, on the rim of Ledu Basin and in Xunhua–Hualong Basin which is just on the field invistigation route (Fig. 14–1) where this kind of landform can be seen.

The Danxia landscapes at the west side of Qitaigou gully's mouth in east of Xunhua County are made up by Miocene bright red strata. There also have some scattered Danxia landforms composed by palaeogene dull red strata on the relatively uplifted precambrian metamorphic rocks distributed on the highway between Xunhua County

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WET COLLAPSIBLE LOESS AND ITS REINFORCEMENT WORK IN EAST QINGHAI

——TAKE THE CAOJIAPU AS A EXAMPLE

Lang Yuhua, Jin Qiming, Wang Yajun and Sun Fan

SUMMARY

The features of collapsible loess and its reinforcement work by water injected dynamic compaction were discussed based on the construction experiences in Caojiapu . The distribution features in horizontal and vertical direction of physical–mechanical factors of loess were expounded and their interrelation were clarified while the features of collapsibility was taken as a focal point. As for the reinforcement work of wet collapsible loess, the process of water injected dynamic compaction was introduced. The optimum depth and distance of water injection hole and water capacity were got. The effectivenesses of reinforcement on collapsible loess in different water injection capacities, different reinforcement depthes and different energy of dynamic compactions have been studied.

1. LANDFORMS AND STRATA

The engineering project is located 30 km from Xi'ning city and is situated on the third terrace of north bank of the Huangshui River. The terrace was transversed by six gullies which have a "V" shaped cross section. Landforms are mainly loess ridges and loess hills. The relative height between hills and gullies are about 45—56 m.

Loess deposited in the area are mainly Malan Loess of Late Pleistocene which have two types of eolian loess and alluvial loess and they distribute in different geomorphological unit. There is a disordant plane between the Malan Loess and underlying Miocene Xining Groups (N_{1x}) (Fig. 15–1).

(1) Miocene Xining Groups (N_{1x}) is a set deposition of fluvio–lacustrine facies which

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FORMATION, EVOLUTION AND ECO-ENVIRONMENT OF QINGHAI LAKE AND RIYUESHAN MOUNTAINS

Zhang Linyuan, Zhou Dujun and Jiang Zhaoli

SUMMARY

Qinghai Lake is neotectonic fault lake which appeared in Early–Middle Pleistocene. With uplifting of Riyueshan Mountain, The Qinghai Lake became an inland lake in Pleistocene. Owing to the climate changing obviously into arid, Qinghai Lake entered a new stage in which the lake level declined since the begining of Holocene. Recently, with the occuring of the serious eco-environmental problems day by day caused by the acceleratively declining of the lake level, more and more people have payed attention to Qinghai Lake area.

1. INTRODUCTION

The Riyueshan Mountains, one of the Qilian Mountain system, is located to the east of the Qinghai Lake which is a fault- block mountain extending in the direction from NNW to SSE (Fig.16-1).

The average elevation of Riyueshan Mountains is 4, 000 m a.s.l.The highest peak is Aleduwimshan which elevation 4, 455 m a.s.l. The relative height is 800 to 1, 000 m. The body of Riyueshan Mountains, being about 90 km long and 45 km wide, is mainly composed of crystalline rocks (schist, gnesis. etc.) of Presinian and Sinian, granite and granite pophyry of Late-paleozoic. The red strata in piedment belongs to paleogene.

Riyue Mountains was formed by uplifting intermittently of fault block in neotectonic period. Nowdays it still keeps mountain peneplanes, which average altitude is 4, 200—4, 300 m a.s.l. on southern part and 3, 500—3, 600 m a.s.l. on northern part. The modern permafrost has been developed on it, the altitude of its lower limit is about 3, 500 —3, 600 m a.s.l.

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AN APPROACH TO THE WEST BOUNDARY OF THE LOESS PLATEAU

Wang Runlan and Lang Yuhua

SUMMARY

Delimitting the west boundary of Loess Plateau is not only a important matter for the determination of loess distribution in China, but also a significant foundation for developing, harness and programing on Loess Plateau as well. For decades, the problem of west boundary of Loess Plateau has not been settled. Authors of this paper have the opinion that the area with loess covered may not belong to Loess Plateau and the area without loess covered may belong to the part of Loess Plateau. Loess Plateau and Tibet Plateau are two giant geomorphological units and their boundary is restricted by many factors. The authors delimited Riyueshan (sun and moon) Mountains as the west boundary of Loess Plateau from the view of distinct disparity between two sides of Riyue mountain in tectonic foundation, geomorphological features and natural landscapes.

1. TECTONIC FOUNDATION

Tibet Plateau has begun to uplift in large scale in Pliocene and uplifted extensively in Quaternary (Li et al 1979). Then the contemporary geomorphological features formed. As a neighbour of Tibet Plateau, the plane where Loess Plateau located at present was a vast erosion plane with the gentle slopes in Late Pliocene. There were bed rock hills of different period and different kind of rocks. Red clay and grables of fluviatile facies, lake facies and alluvial facies distributed in the depression near erosion plane. Effected by the rising of Tibet Plateau, it also changed its landform seriously and all kinds of changes were controlled by tectonic foundation. According to the distribution map of main faults in Qinghai Province after Mr. Li Changhui, there are two groups of faults which are NWW and NS. Among them, the fault of east Qinghai Lake-East Maqin is the controlling fault of different activities between Tibet Plateau and Loess Plateau. A distinct feature of aeromagnetic survey discovered that there is a concentrated abnormal district in


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