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Loess Letter 23

LOESS-BRIEF UIT EUROPA

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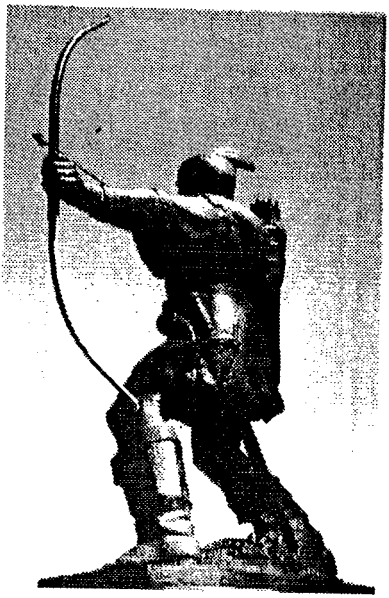

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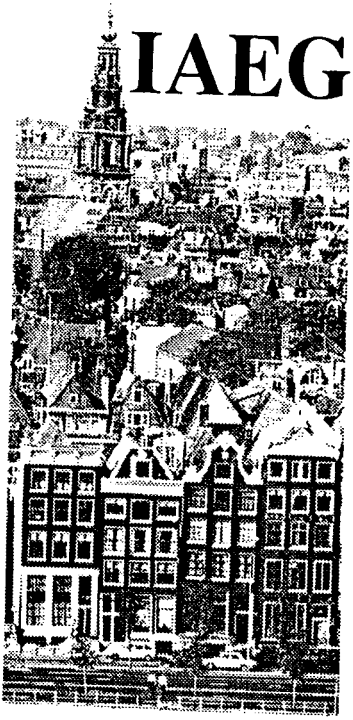

AMSTERDAM
AUGUST 1990

LOESS LETTER 23 APRIL 1990

LL23 is the second of the two special issues for the conferences of 1990. There can be no doubt that interest in loess is growing, there is a world-wide upsurge of activity in loess research and study, and this is reflected in the increasing number of meetings and conferences at which loess is discussed. LL22 reported the Lanzhou Field Workshop of 1989, LL23 offers a slightly more mixed package with a glance at the 2nd International Geomorphological Conference, held in Frankfurt in September 1989, some excerpts from the new book on Chinese and Central Asian loess by Larisa Uribe Osses, and a quick look at the loess excursions for Beijing 1991 INQUA.

GeoJournal has been fairly active in loess regions, LL readers should note the section on loess in vol.15 (1987) and vol.13 in the GeoJournal Library which is 'Taming the Yellow River silt and Floods' Proceedings of a Bilateral Seminar on Problems in the Lower Reaches of the Yellow River, China, edited by L. M. Brush, M. G. Wolman and Huang Bing-Wei, 1989. To look forward to: vol.24 (1991) section on Loess, another section on High Asia in the Pleistocene; vol.25 (1991) section on the Aral Basin. If you are interersted in GeoJournal - the editor is Wolf Tietze, Magdeburger Strasse 17, D-3330 Helmstedt, FRG; the publisher is Kluwer Academic Publishers, P.O. Box 322, 3300 AH Dordrecht, The Netherlands. Write to the publishers for a sample copy of GeoJournal.

Loess at IAEG & IAS: Loess discussions are being organized at IAEG by Dr. Rene Kroeniger, Delft University of Technology, P.O. Box 5028, 2600 GA DELFT, The Netherlands and at IAS by Drs. Ken Pye and Nick Lancaster, Postgraduate Research Institute for Sedimentology, The University, P.O. Box 227, Whiteknights, Reading RG6 2AB, England.

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"GEOMORPHOLOGY & GEOECOLOGY"

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SEPT 3 - 9,1989

ABSTRACTS OF POSTERS AND PAPERS

EDITED BY:

DETLEF BUSCHE, WÜRZBURG

BILLARD, Armelle[2], DERBYSHIRE, Edward[1] & MUXART, Tatiana[2]

Geomorphology and Land Use in the Lanzhou Region of Gansu Province, China

The geomorphology of the Lanzhou region of central Gansu Province bears a strong landslide imprint. The landslides occur in loess over 100 m thick which overlies tectonically-deformed Eocene sandstones and argillites. The region has long been affected by the uplift of the Qinghai-Xizang (Tibet) Plateau. This has stimulated severe incision by the Yellow River and its tributaries. On the flanks of the long, loess-covered interfluves between these streams (called "liang") there are many landslides activated by earthquake shock and heavy monsoonal rains.

Geomorphic processes and land use are mutually interactive. The spatial organisation of the rural land use is closely related to the geomorphology of this landslide-affected region. The fields, with the villages in their midst, consist of cultivation terraces established in the middle of this century (late 1940s) in this area. They are situated on the gentle slopes characteristic of the upper parts of the "liangs", on some secondary interfluves, and on slipped masses of loess on middle and lower valley slopes. Pasture land is generally situated on long, steep slopes not (or not yet) affected by landslides, on the slip-scar slopes, and on parts of loess landslide surfaces densely cut by tension cracks. Mass movements appear to be initiated by the combination of narrow-terracing and channel irrigation on the Yellow River valley-side slopes above Lanzhou in the loess-derived terrace alluvium.

As the landslide morphology has clearly affected the land use, so the question arises as to the possible effects of land use on the landslide activity. A particular aim of this study is to determine the general influence of the terrace cultivation on the percolation and detention of water, particularly during the wet season when the bulk density of the loess is such as to stimulate slope failure.

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Surface Crust Strength and Rainsplash Erosion of a Loess Soil, China

Recent studies have shown that soil strength is potentially an efficient measure of the erodibility of a variety of soils including those susceptible to crusting.Some success has been achieved in relating rainsplash and rainwash erosion to parameters of soil strength. In the present study, an attempt was made to determine changes in strength characteristics of a crustable soil from Lishi, China and to relate these changes to rainsplash detachment. In addition, the effect of antecedent crust development was evaluated. For these purposes, soil samples obtained from Wangjiagon, Lishi were subjected to laboratory simulated rainfall at intensities of 72 mm/h for a range of durations from 1 to 30 minutes. Measured rainsplash detachment (D_S) was found to relate to a soil strength index I_s:

$$D_S = 1.764 + 1.472/I_S - 16.36/I_S$$

were D_S is in g min^{-1}, $I_S = 1/P_{15}$ and P_{15} is defined as penetration by a fall-cone penetrometer at a moisture content of 15% and estimated from penetration-soil moisture regression equations. Similarly, subsequent rainsplash detachment over a 10 minute period is significantly related to the antecedent strength index I_S. As a result of crust development, strength of the soil is increased by as much as 11 times, while splash detachment is reduced by 75%. The results of these experiments suggest that contrary to established theory, surface crusts developed during an initial rainfall period (15 mm of rainfall in the present study) are typically unstable. Both formation and destruction of crust occured during this period. However, beyond this rainfall threshold, surface crusts become relatively stable and show no signs of further changes in soil strength.

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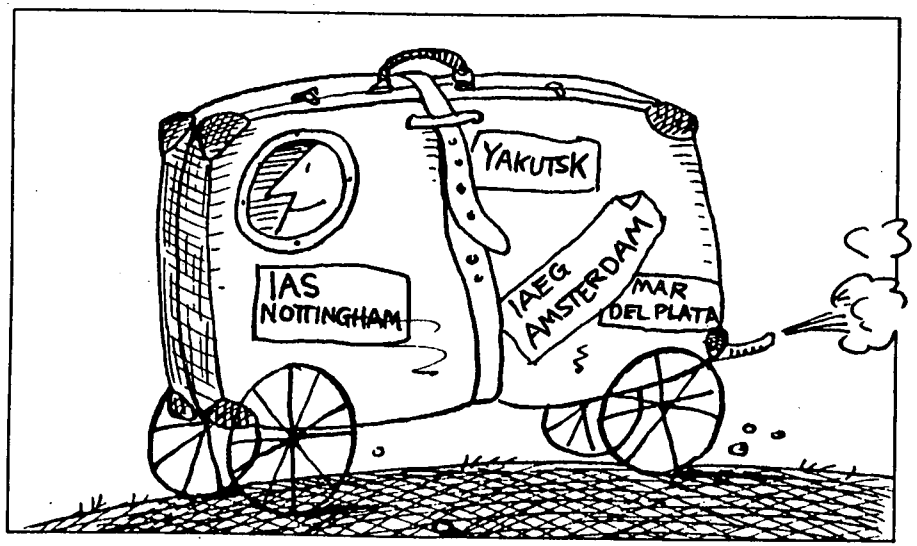

GOOSSENS, Dirk

The Effect of Topography on Aeolian Dust Deposition: Laboratory Experiments and Field Verifications

Many authors have discussed the effect of topography on aeolian dust deposition. The great majority of these studies, however, deal with ancient dust deposition (loess accumulation, loess distribution or loess stratigraphy) and not with actual dust deposition. The effect of topography on the sedimentation of dust has therefore merely been studied in an indirect way, without a thorough investigation of the proper physics of the process itself.
In the Laboratory of Experimental Geomorphology (University of Leuven), dust transport and dust deposition are investigated in a wind tunnel which is connected to a laboratory dust cloud producer. Dust storms can be generated under controlled wind and dust conditions. This enables one to study the effect of different geomorphological and atmospherical parameters on aeolian dust transport, dust deposition and dust erosion. Thus far, main attention has been paid to dust deposition.
The effect of topography on aeolian dust deposition has been investigated theoretically by GOOSSENS (1988). The results of this study are controversal to the widely accepted wind shadow concept, as an increased dust deposition is predicted on the windward sides of topographic obstacles (especially the concave parts) and an only very restricted dust deposition on the leeward side. Wind tunnel experiments on scale models of isolated hills have confirmed this theory. To test the sedimentation theory at full scale, two different approaches (ancient and actual dust deposition) have been followed. Ancient dust deposition has been investigated in a 40 km^2 test area in the Belgian loess belt, actual dust deposition in a 0.5 km^2 test area in the Israelian Negev Desert. From both of these areas, topographic scale models have been constructed. Dust storms were simulated over these models in the wind tunnel. The obtained deposition patterns were then compared with the observed (or, in the case of ancient deposition, reconstructed) deposition patterns. The results of the experiments indicate two important facts:
1. Dust deposition in a particular topography can adequately be simulated by means of scale model experiments in the wind tunnel, on the condition that attention is paid to the simulation requirements during the experiments. This holds both for ancient and for actual dust deposition.
2. The theoretical model of GOOSSENS (1988), describing and predicting the effect of topography on aeolian dust deposition, may also be applied to full scale deposition (not only scale model deposition).
The effects of meteorological, other geomorphological and vegetational factors are planned to be studied in the near future.

Ref.:
GOOSSENS, D.(1988): The effect of surface curvature on the deposition of loess: a physical model. Catena, vol. 15, pp.179-194.

Laboratory for Experimental Geomorphology, Redingenstraat 16bis, 3000 Leuven, Belgium

CHEN, Zhiqing

Etude Comparative de Quelques Loess d'Eurasie
in English: Comparative Study of Some Eurasian Loesses

Pour comparer les résultats des analyses des loess dans les différents pays, nous avons disposé 45 échantillons venant de Chine, de France et de Belgique. Nous avons analysé des échantillons au moyen des méthodes suivantes: granulométrie, calcimétrie, minéraux denses et rayons X. Les résultats des analyses que nous avons effectuées nous ont conduit à émettre quelques idées générales: Au pont de vue de la granulométrie, tous les loess étudiés sont bien classés, il n'y a pas de grande différence entre les loess de Chine et ceux d'Europe. Au point de vue de la teneur en carbonates, dans nos analyses, les loess chinois sont calcaires (environ 10 %), parmi les loess d'Europe, les deux types sont representées: loess calcaires et loess non-calcaires. En ce qui concerne les minéraux denses, ils comprennent toujours une certaine quantité de minéraux ubiquistes, mais aussi, dans tous les échantillons analysés d'autres minéraux plus spécifiques de la source du sédiment. Quant à la composition des minéraux argileux, dans les échantillons étudies, l'illite est souvent bien représentée, cependant, les loess de Chine présentent une composition des minéraux argileux plus variés que celle d'Europe.

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DERBYSHIRE, E.[1] & JINGTAI, Wang[2] & BILLARD, A.[3] & JONES, D. K. C.[4] & MUXART, T.[3] & GUYOT, L.[5]

Research and Control of Landslides and Debris Flows in the Loess Region of Gansu Province, China

Gansu Province is situated in the north-western part of China, where natural hazards are frequent, amongst which those due to loess landslides and flows are the most serious. The area subject to this hazard is about 30% of the total area of Gansu Province. According to preliminary studies, more than 2000 landslides and over 1000 debris flow valley systems have been found in the loess region. The most seriously affected areas lie in eastern Gansu. The trigger mechanisms include torrential monsoonal rains and earthquake shock. The region is situated close to the margin of the Qinghai-Xizang (Tibet) Plateau, an area of very active uplift for millions of years, and one still subject to periodic earthquakes. The region being investigated lies on the sub-humid semi-arid transition. The rainfall is unreliable and unpredictable, up to 70% of the annual precipitation being concentrated in the period July to September.

In Gansu Privince landslides and debris flows are a major hindrance to land husbandry. Between 1965 and 1979, over 1000 large landslide events took place in the loess highlands of eastern Gansu, more than 2000 people being killed. The Sala Shan landslide, which happened in 1983, was a loess landslide of the rapid type, in which four villages were destroyed, 227 people were killed and 200 ha of farmland became a sea of loess instantaneously.
Although some research has been done, and some construction has been designed to prevent such failures, resolution of the problem has been hampered by inadequate finance, and lack of wider experience in the scientific community.
The objectives of the research reported here are to determine the distribution and classification of landslides and debris flows in the Gansu loess region, to evalute the category of risk posed by landslides and debris flows and, by means of modelling studies and geotechnical and geomorphological mapping, to predict the landslide and debris flow events so as to arrive at a strategy for their control, remedial measures, and adjustments to land use practices where appropriate.

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Larisa Uribe Osses

Lößböden der VR China und Sowjet-Zentralasiens und ihre Genese

1989

In Kommission bei

DUNCKER & HUMBLOT · BERLIN

Osteuropastudien der Hochschulen des Landes Hessen

Reihe I

GIESSENER ABHANDLUNGEN
ZUR AGRAR- UND WIRTSCHAFTSFORSCHUNG
DES EUROPÄISCHEN OSTENS

Band 164

herausgegeben

vom

Zentrum für kontinentale Agrar- und Wirtschaftsforschung
der Justus-Liebig-Universität Gießen

in Verbindung mit der Kommission für Erforschung der Agrar- und
Wirtschaftsverhältnisse des europäischen Ostens e.V.

1989

In Kommission bei

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1 EINLEITUNG

Die vorliegende Arbeit befaßt sich mit Untersuchungen der Lösse und Lößböden von vier Standorten in Lößgebieten der VR China und der Sowjetunion.
Lösse sind mächtige, carbonathaltige, relativ lockere, schluffige, porenreiche, nicht geschichtete Ablagerungen von gelblicher Farbe, die eine hohe potentielle Fruchtbarkeit aufweisen.
Lösse sind auf großen Flächen in Europa, Zentralasien, China, Nordamerika und Argentinien verbreitet (SCHEIDIG 1934; SCHÖNHALS 1952a; MAULL 1958; FRENZEL 1959; KRIGER 1965).
Aufgrund der weltweiten Verbreitung der Lösse und ihrer wertvollen Eigenschaften werden Lösse und Lößböden intensiv landwirtschaftlich genutzt. Im Hinblick auf den wachsenden landwirtschaftlichen Produktionsbedarf, bei gleichzeitiger Abnahme der vorhandenen Nutzflächen (u.a. durch Erosion, Städtebau usw.), wird der Gewinnung von Erkenntnissen über die Genese von Lößböden ein hoher wissenschaftlicher Wert beigemessen.

Nach dem Alter unterscheidet man:
Neogen-Löß und Alt-Löß oder Malan-Löß, Lishi-Löß und Wucheng-Löß (FRENZEL 1959; LIU DONGSCHENG u.a. 1964; GONG ZITONG u.a. 1987).
Heute werden von chinesischen Wissenschaftlern (GONG ZITONG u.a. 1987) folgende hypergene geochemische Lößtypen unterschieden:

1. Typischer carbonathaltiger Löß (Typical carbonate Loess).
2. Stark carbonathaltiger Löß (Cumulic carbonate loess).
3. Löß-Lehm (Luvic carbonate loess).
4. Gipshaltiger carbonathaltiger Löß (Gypsic carbonate loess).
5. Löß mit Carbonatresten (Relict carbonate loess).

Über die Lößentstehung gingen früher die Meinungen sehr stark auseinander, aber auch heute noch ist man sich in diesem Punkt nicht einig.
Die Mehrheit der Autoren schließt sich der Theorie der äolischen Entstehung der Lösse von RICHTHOFEN (1886) an. Nach dieser Theorie ist der Löß eine äolische Staubablagerung, die aus den Wüsten und Salzsteppen ausgeblasen und in Grassteppen am Gebirgsrand abgelagert worden ist (OBRUČEV 1930, 1948; FRENZEL 1959; BOULL u.a. 1981; ZHU XIANMO u.a. 1983).

A. PENCK (1894) hat eine andere Theorie der Lößentstehung entwickelt. Er hält den Löß für eine Ablagerung des Flußschlammes in deluvialen Hochwasserbetten. Diese alluviale Theorie der Lößentstehung teilten auch GRAHMANN (1932), THORP (1936), SKVORCOV (1957); KOVDA (1959), YANG CHIEN (1959).
Insgesamt gibt es über 20 verschiedene Theorien der Lößentstehung. Außer der Theorie der äolischen Entstehung, die heute immer mehr als einzig richtig angesehen wird, und der Theorie der alluvialen Entstehung, könnte man die Verwitterungshypothese von BERG (1964) erwähnen. Nach dieser Hypothese ist der Löß ein Verwitterungsprodukt kalkhaltiger Gesteine, das durch lößbildende Prozesse entstanden ist. Außerdem gibt es fluvioglaziale, kolluviale, deluviale Hypothesen, die Hypothese der Lößablagerung in Seen und im Meer, die Hypothese der Frostverwitterung und viele andere. Alle diese Theorien haben sich heute als falsch erwiesen, da es sich bei den als Beweis herangezogenen Sedimenten zum größten Teil um umgelagerte Lösse handelt (MAULL 1958; FRENZEL 1959; KRIGER 1965).

Die vorliegende Arbeit beschäftigt sich ausschließlich mit Lössen und Lößböden der VR China und Sowjetzentralasiens und will auf der Basis von experimentell gewonnenen Ergebnissen einen Beitrag zur Klärung der Genese von Lößböden leisten.
Für die Untersuchungen wurden vier Standorte ausgewählt, die die wichtigsten Lößregionen in China und in Sowjetzentralasien repräsentieren:

1. Houmon im Szezen-Gebiet im nord-westlichen Teil der Inneren Mongolei.
2. Manas in der Provinz Sinkiang im zentralasiatischen Teil Chinas.
3. Wugong, unmittelbar auf dem Lößplateau, etwa 100 km westlich der Stadt Xi'an.
4. Achangaran, etwa 80 km von Taschkent entfernt, in den Ausläufern des Tschatkal-Bergkamms in Sowjetzentralasien.

Die Bodenproben aus Wugong wurden von der Verfasserin während eines Forschungsaufenthaltes am Institut für Boden- und Wassererhaltung der Academia Sinica in Wugong/VR China entnommen. Andere Bodenproben wurden von Mitarbeitern des Instituts für Bodenkunde in Nanking zur Verfügung gestellt.
Die experimentelle Arbeit wurde im Institut für Bodenkunde und Bodenerhaltung der Justus-Liebig-Universität in Gießen durchgeführt.

2 ANGEWANDTE UNTERSUCHUNGSMETHODEN

1. **pH-Wert:** elektrometrisch in 1 n KCl-Lösung
2. **Carbonatgehalt:** nach Scheibler (SCHLICHTING und BLUME 1966)
3. **Gesamter Kohlenstoff (C_t):** konduktometrisch mit dem Gasanalysegerät der Fa. Wösthoff nach SCHLICHTING und BLUME (1966) an feingemahlenem Boden.
4. **Humusgehalt:** wurde aus dem gesamten (C_t) Kohlenstoff- und Carbonatgehalt errechnet.
5. **Gesamte Austauschkapazität und austauschbare Kationen:** nach PFEFFER (1956) Ca, Mg, K, Na, Mn - mittels AAS.
6. **Wasserlösliche Kationen:** aus dem Wasserauszug (1:5) nach MAČIGIN. Ca, Mg, K, Na - mittels AAS (Im Buch "Metody agrochimičeskich analizov počv i rastenij Azii", 1977).
7. **Gesamtaufschluß des Bodens:** nasse Oxidation mittels HNO_3 + $HClO_4$ und HF nach JACKSON (1960), Modifikation H. WEGENER.
8. **Vorbehandlung der Böden für die Korngrößen - und Röntgenanalyse:** Die Carbonatzerstörung wurde unter pH Kontrolle mit verdünnter HCl so lange durchgeführt, bis der pH-Wert konstant bei 4,5 lag.
   Humuszerstörung: mit 10 % H_2O_2 bei max. 80°C im Wasserbad. Eisenentfernung erfolgte durch die Na-Dithionit-Citrat-Extraktion (JACKSON 1958). Zur Erreichung einer optimalen Dispergierung wurde die Suspension in Kunststoffschläuchen dialysiert, bis die Leitfähigkeit weniger als 30μS (Mikrosiemens) betrug. Zu diesem Zweck wurden die Schläuche ca. 10 Tage im Wasserbad ständig durch eine Schüttelmaschine in Bewegung gehalten.
9. **Korngrößenanalyse:** Im Bereich von 2 000 bis 20 μm - durch Naßsiebung und von 20 bis 2 μm - durch Pipettmethode nach Köhn. Erweiterte Korngrößenanalyse der Tonsubfraktionen bis 0,02 μm erfolgte mittels Zentrifuge und Pipettanalyse (TRIBUTH 1972).
10. **Röntgenographische Untersuchungen der Tonfraktion (<2 μm):** Die Gewinnung der Tonfraktion wurde aus der nach der Korngrößenanalyse verbliebenen Suspension im üblichen Sedimentationsverfahren durchgeführt. Die Subfraktionen wurden mit Hilfe der erweiterten Tonfraktionierung mittels Zentrifuge (Christ UJ IIIS) gewonnen (TRIBUTH 1970).

5 LÖßBÖDEN SOWJET-ZENTRALASIENS; STANDORT ACHANGARAN

5.1 Untersuchungsgebiet und Faktoren der Bodenentwicklung

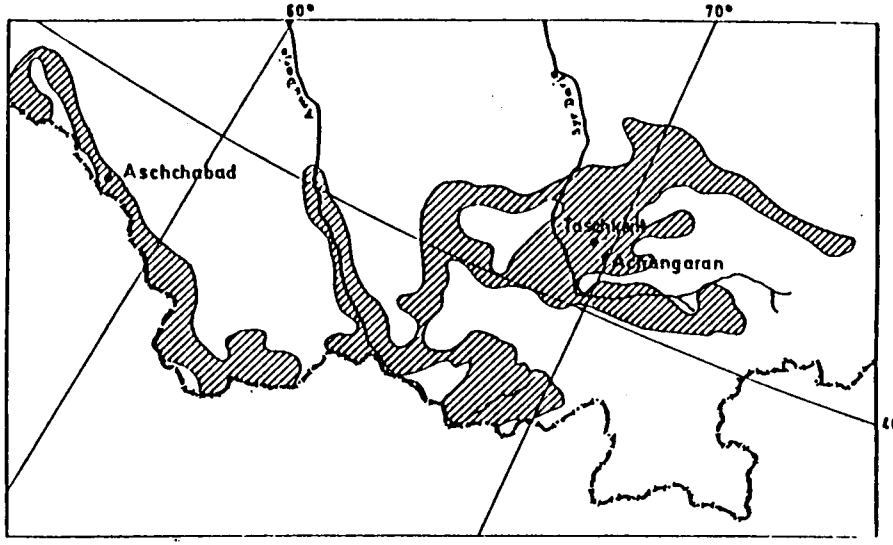
5.1.1 Geographische Lage, Geomorphologie

Das untersuchte Profil wurde in Lößvorgebirge des westlichen Tjan-Schans entnommen (s. Abb. 20). Es liegt im Taschkenter Verwaltungsgebiet im nord-östlichen Teil von Uzbekistan, zwischen 42°17' und 40°15' NB und 68°31' und 71°02' ÖL.

Das gesamte Gebiet liegt im Becken des Mittellaufes des Syr-Darja-Flusses. Es wird als selbständiges Tschirtschik-Angren-Einzugsgebiet eingestuft. Tschirtschik und Angren sind große rechte Nebenflüsse des Syr-Darja-Flusses, die im West-Tjan-Schan entspringen. Zur Tschirtschik-Angren-Region zählt man die heutigen Becken von den Flüssen Tschirtschik und Angren, die im Unterlauf zu einem Delta zusammenfließen. Im NO grenzt das Gebiet an die Ausläufer der Tschatkal-, Kuramin-, Pskem-, Ugam- und anderer kleiner Bergzüge. In Richtung Westen fallen die Berghöhen schnell ab. Die Berge enden mit Lößhügeln und gehen weiter in Lößebenen über. Im Westen wird dieses Gebiet vom Syr-Darja-Fluß begrenzt. Die Höhen liegen zwischen 600 und 900 m über NN.

Die zwischen den Gebirgsketten liegenden Becken der beiden Flüsse sind eine tektonische Senke zwischen den verzweigten Gebirgsausläufern des Talass-Alataus und des Tschatkals. Diese Zwischengebirgsbecken weisen gut ausgeprägte Terrassen auf. So hat der Tschirtschik-Fluß im Vorgebirgsteil sieben Terrassen gebildet und der Angren-Fluß fünf Terrassen. Das Relief der Terrassen ist im allgemeinen hügelig-wellig bis breitwellig. Die Erhebungen, überwiegend Kämme, laufen parallel zu den gesamten Beckenneigungen und wechseln mit Depressionen ab. Diese Terrassen sind von mächtigen Lößakkumulationen des Taschkent-Zyklus (Q_2) gebildet (GORBUNOV; KONOBEEVA 1975). Die Lösse liegen auf Neogenkonglomeraten, Sandsteinen und tertiären Buntsteinen (KIMBERG 1964).

Abbildung 20: Lößverteilung in Sowjet-Zentralasien (STEPANOV; ABDUNAZAROV 1977, S. 7)



5.1.2 Klima

Obwohl das Klima dieser Region als subtropisch bezeichnet wird (KIMBERG 1964; GORBUNOV; KONOBEEVA 1975), ist es durch einen unbeständigen Witterungsverlauf mit starken Kontrasten gekennzeichnet (URIBE OSSES 1980).
Nach einem relativ kurzen Frühling kommt ein langer und sehr trockener Sommer (Abb. 22) mit Temperaturen über 40°C. Die Luftfeuchtigkeit ist entsprechend niedrig. Die Verdunstung zeigt bis spät im Herbst ebenfalls extreme Werte, was mit dem Begriff "extremkontinental" allgemein benannt wird.

Die frostfreie Periode erreicht 195 Tage (s. Tab. 11). 210 Tage haben Temperaturen über 10°C, was günstige Voraussetzungen für eine lange Vegetationszeit schafft, so daß in dieser Region eine intensive Bewirtschaftung fast das ganze Jahr über möglich ist. Der Winter ist allgemein unbeständig und von zyklischen Polarluftmassen abhängig (KIMBERG 1964).

9 SUMMARY

Using chemical, micromorphological, textural, and X-ray analysis, it was possible to reach conclusions regarding the genesis as well as a detailed view of the present condition of the loess soils in the two study areas. It should be noted that the texture analysis, especially the clay fractionation, were of great importance. It was possible to determine the different loess layers in the soils by means of the clay fractionation which, together with the X-ray analysis of the clay minerals, enabled an elucidation of the pedogenetic development of these soils. The results do not only show the differences of the studied areas but also contribute to the further research of the loess soils.

Considering the geographical situation and comparing the weathering data of the four studied areas, the following large loess regions were identified:

1) Central Asian area, including Soviet Central Asia (Achangaran study site), and Chinese Central Asia (Manas study site), and
2) the loess Plateau (Wugong study site) and the loess regions of Manchuria and Szezen (Houmon study site).

The chemical analysis indicated distinctly higher values of organic substances in loess soil than stated in literature.

The mica content in the soils of the loess plateaus is very high (up to 59 % in the fine sand fraction).

The soils of the studied areas of Achangaran (USSR) and Manas (People's Republic of China) exhibit equal contents of quartz and felspar. Although the loess plateau soils contain more quartz than felspar, quartz/felspar ratios are very low (hardly more than 2).

It can be concluded that:

a) the loess of both loess regions consists of weakly weathered sediments;
b) the loess of Central Asia is less weathered than that of the loess plateau.

The soils of Inner Mongolia (M I, M II) and of Manas (S I) are characterized by a high content of fine clay (>0.02 μm),

which comprizes up to 47 % of the total clay. This is the result of a very advanced stage of weathering.

The Q_3 loess of Wugong contains a distinctly higher clay fraction than the younger Q_4 loess, but it does not exhibit characteristics of clay illuviation.

The soils of Achangaran and Manas contain remarkable high amounts of kaolinite.

The Chinese and Middle Asian loess has lower smectite levels than the West European loess.

Two types of chlorite are found in the soils of the loess plateau, namely:

a) pure Mg-Chlorites whose peak at 14 Å is not shifted after heating up to 550 °C;
b) lable Mg-Chlorites whose peak shifted to 11-13 Å after heating. This can certainly be attributed to weathering, as Al-Chlorite was not identified in the studied soils.

In the soils of Inner Mongolia (M I, M II) and of Manas (S I) a mineral with a peak of 11.3 Å has been obtained which had not been described in literature before. Besides, an other one with 15.3 Å had not been identified before this study.

In the subfraction <0.06 μm of the B_c-horizons of Serozems in the Manas area, a mineral similar to an other one found by TRIBUTH (1985) in Tropical Latosols and in Podsol of Hessia was observed. Tributh (op cit.) identified this mineral as originating from kaolinite.
This mineral reflects at 7.33 Å with or without glycerine treatment, but after KCl treating the peak shifts to 11.3 Å.

In the profiles T I of Achangaran and P II of the loess plateau a mineral with 7.33 Å was found in the <0.06 μm subfraction. In contrast to the mentioned peak of serosems, this peak does not shift to 11.3 Å with KCl treatment.

A mineral with a peak ranging from 7.33 to 8.0 Å from profiles P II, P III and P V was also not identified.

The studied loess, especially this of the loess plateaus, is strongly affected by many hypergenetic processes.

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XIII
INQUA
1991
CHINA
Homo erectus pekinensis

II. Loess Plateau and Quaternary Basins in Northern Temperate China

EXCURSION No.6 (A) Neotectonic and paleo-earthquakes in the Loess Plateau

Trip starts from Xi'an and ends in Yinchuan.

This trip is designed to review the neotectonically active areas around the Orerduosi (Ordos) Platform. Sites will include the intensively active fault zone at the northern piedmont of Qinling Mt., the fault zone related to the famous 1920 Haiyuan earthquake (M=8.5) along with the faulted geomorphic features (faulted valleys, etc.) the newly developed faults on diluvial fans in the east part of Helan Mt. and the faulted Great Wall in Yinchuan area. While passing through the Loess Plateau, participants will observe loess landscape and loess-palcosol profiles. Sights of historical interest to be seen in Xi'an area include the locality of the Lantian man, Banpo Museum of the neolithic dwellings (6,000 y BP), Terra Cotta Warrior and Horse Figures of Qin Dynasty (221 y BC), etc.

Maximum number of participants: 30
Transportation: bus
Duration: 8 days
Leaders: Ding Menglin, Zhang Weiqi, Zhang Anliang Cost: $800

EXCURSION No.7 (A) Quaternary geology between central Loess Plateau and Mu Us Desert

Trip starts from Bantou and ends in Xi'an.

Trip will pass through an area between Mu Us Desert and the central Loess Plateau to observe the Luochuan loess profile, the loess profile near Xi'an with human fossils and archaeological sites, and to visit soil and water conservation installations.

Participants will examine active dunes, Holocene stabilized and semi-stabilized dunes with paleosols in the Hobq Desert and Mu Us Desert, an alternating sequence of eolian sand, paleosols and lacustrine deposits for the last 130 ky, the ancient castle buried in the Yulin area indicative of desertification. Special emphasis will be given to the Luochuan loess profile covering the last 2.5 my which contains fossil snails, mammalian fossils, relics of ancient cultures and marker beds such as silt layers and paleosols; and to the Lantian loess sequences near Xi'an with human fossils: Gongwangling (1.15 my BP), Chenjiawo (0.65 my BP), Tonghuagou (0.30-0.10 my BP) and Fengjiacun (3-1 ky BP). This trip also includes visits of the mausoleum of Kanghis Khan, the first emperor of the Mongol dynasty, and historical places in Xi'an (see No.6).

Maximum number of participants: 40
Transportation: bus
Duration: 8 days
Leaders: An Zhisheng, Dong Guangrong Cost: $760

EXCURSION No.8 (A) Paleontological and paleolithic sites, and Quaternary stratigraphy in the middle reaches of the Yellow River

Trip starts from Taiyuan and ends in Xi'an.

This trip will focus on paleoanthropological and paleontological sites in Shaanxi and Shanxi provinces, North China. Participants will examine the sites of recent findings of paleolithic man and his historical culture: late Pleistocene *Homo sapiens* in Dingcun Man site with paleolithic culture at Kehe; middle/early Pleistocene *Homo erectus* in Lantian Man Sit at Chenjiawo and Gongwangling; and prehistoric village and cultural remains in the Neolithic Banpo site (Banpo Museum). The associated loess, alluvial and lacustrine deposits, Neogene *Hipparion* Red Clay and the geomorphic features of the Loess Plateau may also be examined. The trip will include visits to the Qin Dynasty Terricotta Warriors and other historical places.

Maximum number of participants: 40
Transportation: bus
Duration: 5 days
Leaders: Zhang Senshui, You Yuzhu Cost: $475

EXCURSION No.9 (A) Quaternary geology of the western part of the North China Plain and the Loess Plateau

Trip starts from Zhengzhou and ends in Xi'an.

This trip involves on-site examination of Quaternary sequences in North China: alluvial deposits of the Yellow River in core samples from deep boreholes near Kaifeng, and early Pleistocene fluvio-lacustrine deposits of the Sanmen Group with Villafranchian fauna and a loess sequence near Xi'an. Participants will observe features indicative of neotectonic movements in the Qinling Mt., overview the Yellow River fluvial fan from the top of Mt. Mang, and visit the reservoir on the Yellow River at Sanmen rapids where a silting problem has arisen. The excursion region is the cradle of ancient Chinese culture with the three ancient capitals of China: Kaifeng, Luoyang and Xi'an, and the trip will include visits of several sites of historical interest.

Maximum number of participants: 40
Transportation: bus
Duration: 7 days
Leaders: Shao Shixiong, Chen Yun Cost: $765

EXCURSION No.10 (B.A) Comparative study tour of Quaternary fluvio-lacustrine and loess deposits in North China

Pre-Congress field trip starts from Xi'an and ends in Beijing. (B)

Post-Congress field trip starts from Beijing and ends in Xi'an. (A)

This trip is designed for a comparative study of classical Villafranchian fluvio-lacustrine deposits over 150 m thick in Nihowan Basin and loess profile in Loess Plateau. Interbedded loess and fluvial deposits with late Pleistocene human and other fossils at Dingcun; lower Pleistocene loess at Wucheng; and the loess-paleosol sequence covering a time span of 2.5 ma at the typical locality Luochuan will be observed. On the excursion route participants will observe Quaternary volcanic cones with intercalating basalts in loess and fluvial deposits at Datong, specific loess landforms, river terraces and gorges of the Yellow River, and the waterfall at Hukou. In the Xi'an area, visits will be arranged to the Lantian Man site and other places of historical interest.

Maximum number of participants: 80
Transportation: bus and train
Duration: 10 days
Leaders: Yuan Baoyin, Cao Jiaxin, Ma Zhizheng, Cui Jiuxu Cost: $950

EXCURSION No.11 (A) Quaternary volcanoes, glacial deposits and stratigraphy in Northeast China

Trip stars from Changchun and ends in Haerbin.

This trip will begin with profiles of primary and reworked loess at Changchun. Special emphasis will be given to Quaternary volcanism in the Changbai Mountain with repeated eruptions since late Cenozoic and containing the largest and deepest (375 m) crater lake in the world. Visits will be made to glacial vestiges of the late Pleistocene at the volcanic cone and periglacial phenomena of the Changbai Mountain, river terraces of the Songhua River, the middle Pleistocene loess profile and late Pleistocene profile with abundant *Mammuthus-Coelodonta* Fauna at Haerbin (Harbin), both being types sections for NE China. Altitudinal zonation in vegetation from temperate to tundra environment in the Changbai Mountains and various historical places will also be seen during the trip.

Maximum number of participants: 40
Transportation: bus
Duration: 8 days
Leaders: Quo Shanwen, Zhu Yanming, Xu Yanqiang Cost: $720

EXCURSION No.12 (B.A) Coastal geomorphology along the Bohai Gulf and the preserved ruins of the Tangshan Eartquake 1976

Trip starts from and ends in Beijing.

Passing through the eastern part of the North China Plain, the excursion will include sites of the four cheniers, from 4,700 to 1100 y BP, on the coastal plain, as evidence of shoreline migration; the geomorphological features of marine erosion at the point where the Yanshan Mt. terminates at the Bohai Gulf. Participants will see the seven ruins carefully preserved as reminiscence of the 1976 disastrous earthquake (M=7.6) in the rebuilt city of Tangshan, and the eastern starting point and the "First Gate" of the Great Wall.

Maximum number of participants: 80
Transportation: bus
Duration: 6 days
Leaders: Chen Ming, Li Fenglin, Zhao Yongbo, Li Jianfen Cost: $570

EXCURSION No.13 (A) Changing courses of the Yellow River Valley and their historical evidence

Trip starts from Luoyang and ends in Xuzhou.

The modern Yellow River is distinguished by having the highest silt content in the world (over 34 kg/m^3 in average) and suspended river channel (12-14 m above the surface). This trip will examine the deposition sequence and old channel of the Yellow River with its crevasses splaying-fan to give an overview of its changing courses in the North China Plain. Sights to be seen include the recently discovered ruins of the ancient Xuzhou city that was repeatedly buried in the sediments of the Yellow River, and geomorphological features showing Quaternary evolution of Hongze Lake. On route, participants will visit the Confucian Mausoleum and Mansion.

Maximum number of participants: 40
Transportation: bus
Duration: 8 days
Leaders: You Lianyuan, Gao Shanming, Yi Qingchang Cost: $760

XLLQG

News'letter December 30, 1989

An interdiscipline symposium on paleomonsoon records in China convened at Xian of China

Sponsored by Xian Laboratory of Loess and Quaternary Geology, Academia Sinica, the symposium lasted 8 days from December 22nd to 29th. Attending the meeting were specialists from disciplinary sciences, including astronomy, meteorology, pedology, paleooceanography, paleobotany, paleoglaciology, sedimentology, Quaternary geology, paleohydrology and isotopic geology etc., from various institutes in China, as well as the members from the Xian Laboratory, all together counting up to 30.

The symposium organization was encouraged by Prof. Liu Tungsheng and Prof. Ye Duzheng.The convener , Prof. An Zhisheng, gave the opening remarks which indicated the importance of the paleomonsoon in featuring the China's paleoclimate and therefor paleoenvironment which had not been fully understood and hence its study should be very much emphasised so as to predict the future trend of the Asia monsoon variation derived from " green House " effect, and would be now inevitably put into the schedule of study on the Quaternary paleoclimate; and since the monsoon is a tracer of the interaction process between the continent, the ocean and the atmosphere and in turn an important linkage between the three, its study should be the interdisciplinary one. Prof. An also suggested that the identification of paleomonsoon records is the first task for paleomonsoon study in China.

There were 10 speeches specially invited, and 11 talks on special themes, covering subjects of various aspects related to the study of paleomonsoon records. For example, Prof. Zhang De'er talked about the status of art of the study on China's monsoon and the recent progress made; Prof. Wu Shouxian explored the paleomonsoon variation from the astronololgical point of view; Profs. An Zhisheng, Dong Guangrong, Wang Sumin, Wu Xihao, Sun Xiangjun, Wang Pinxian, Zhu Xianmo, Liu Rongmo, Assistant Profs. Zhu Yizhi, Zhou Weijian, Mr. Zhang Xiaoye, Mr. Liu Yu and Mr. Xiao Jule respectively talked about the information from the records of loess, desert, lake, mountain glacial, vegetation, ocean, soil, stable isotope composition, environmental archaeology, dating sequence by C-14, aerosol, tree ring and dust flux.

An important topic of the symposium was the records of Asian monsoon contained by the loess-paleosol sequence in the Loess Plateau of which the region is very susceptible to monsoon variation. The loess layer indicates a period dominated by winter monsoon and the paleosol layer represents a period dominated by summer monsoon. Their alteration in the sequence may record the variation history of Asia monsoon.

On the speeches and talks, the following questions were focused and fully discussed: 1.the marker and the identification of paleomonsoon record; 2.the declining and flourishing of the summer monsoon against winter monsoon and its influence to the environment; 3.the relation of the glacial-interglacial cycles to the Asia monsoon variation; 4.the developing stages of Quaternary monsoon and the mechanism of paleomonsoon variation; 5.the role played by the paleomonsoon in the interaction between the continent and the ocean and the atmosphere; 6.extraction of the information from short-term and high resolution records and its significance in forecasting the climatic change.

The symposium discussed the preliminary plan of the interdisciplinary studies on the paleomonsoon and made the decision that a book named <<The Quaternary monsoon records in China>> will be written by the symposium participants and published before August of 1991, i.e. before the 13th INUQA conference.

Prof. An Zhisheng
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Ordnance Survey is an Equal Opportunities Employer and is fully committed to equal opportunities policies. Applications are welcome from all suitably qualified individuals, irrespective of sex, racial origin or disability.

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