Journal of Asian Earth Sciences 155 (2018) 1–7

Contents lists available at ScienceDirect

Journal of Asian Earth Sciences

journal homepage: www.elsevier.com/locate/jseaes

Preface

Introduction to the special issue of "Loess and Climatic Record": Memory of Professor Liu Tungsheng for his scientific contributions and his centenary birthday

ARTICLE INFO

Keywords:
Centenary birth
Liu Tungsheng
Loess deposits
Achievements
Paleoclimate

ABSTRACT

This special issue is to memory Professor Liu Tungsheng for his scientific contributions and his centenary birthday. Liu Tungsheng was the former President of the International Association for Quaternary Association (INQUA), and the Honorary President of the Chinese Association for Quaternary Research (CHIQUA). Liu's best known contribution to Quaternary research is his pioneering and systematic study of the extensive loess deposits of China, which has been regarded as the best terrestrial paleoclimatic archive on the Earth. He won many international awards including the Tyler Prize for Environmental Achievement in 2002 and the Alexander von Humboldt Medal in 2007. He was an inspiring leader, one of China's, and indeed one of the world's most outstanding Earth scientists. This introduction aims to explore the personal factors behind his great achievements and reviews the papers included in this special issue from his colleagues, friends, and students.

1. Introduction

Loess and loess-like sediments cover about 10% of the Earth's land surface and make up one of the most widespread surficial Quaternary sediments on the Eurasian continent (Liu, 1985). The thickest (more than a hundred meters) and the most widespread loess deposits occur on the Chinese Loess Plateau. Chinese loess was first systematically investigated in China on the purpose of water conservation works of the Loess Plateau led by Professor Liu Tungsheng in the mid-1950s.

A critical point for the paleoclimatic aspect of Chinese loess occurred in the year of 1961, when he participated the 6th INQUA Congress in Poland, during which a paper was presented by Liu Tungsheng and Zhang Zonghu with a remarkable figure showing multiple palaeosols intercalated in a thick loess section (Fig. 1). This founded the basis for paleoclimatic record of loess deposits, because the loess-paleosol alternations were latter demonstrated to reflect Quaternary glacial-interglacial climatic cycles. Another fundamental progress occurred in the year of 1982, when Liu and his colleague carried on a paleomagnetic polarity study of the Luochuan loess, central Chinese Loess Plateau (Heller and Liu, 1982). They firstly constrained a basal age of 2.4 Ma for the loess deposits, and indicated that the magnetic susceptibility curve clearly exhibits orbital time scale climatic fluctuations. This definitely opens a new field for paleoclimate studies of loess.

On 22nd November 2017, we celebrated the centenary birth of the father of Chinese loess researches, Professor Liu Tungsheng. Under the joint efforts of his colleagues, friends and students, this special issue dedicated in *memoriam* Professor Liu Tungsheng was finally finished. As guest editors we hope that this special issue can help to better understand and recall the outstanding scientific contributions of Professor Liu.

2. Personal endeavors that underpinned Liu's phenomenal achievements

Professor Liu Tungsheng was a famous Quaternary geologist. There were many aspects to what he managed to achieve during his lifetime in the field of geological research. As the first Chinese earth scientist to receive the Highest Science and Technology Prize of China, it is evident that his academic achievements were well recognized by the wider community. Now, when we recall Professor Liu Tungsheng's brilliant academic career, we must not forget the personal endeavors that underpinned his phenomenal achievements.

Above all, we think, his painful adolescent experiences and unique pathway through life gave Professor Liu Tungsheng a profound sense of history, and therefore of a historical mission to change Chinese long poverty and backward situation. Professor Liu grew up in the northeast of China. He personally witnessed the atrocities committed in China by the invading Japanese Army. In the summer of 1937, when he was preparing to go to university after having graduated from Tianjin High School, the Japanese launched a full-scale invasion of China. Liu traveled to Kunming in Yunnan Province via Hong Kong and Vietnam to study at the United Southwest University which had been founded as an amalgamation of Qinghua University, Peking University and Nankai University. When he was in his final year at university, he served in the Battlefield Service Corps, and

https://doi.org/10.1016/j.jseaes.2017.11.034

Available online 24 November 2017

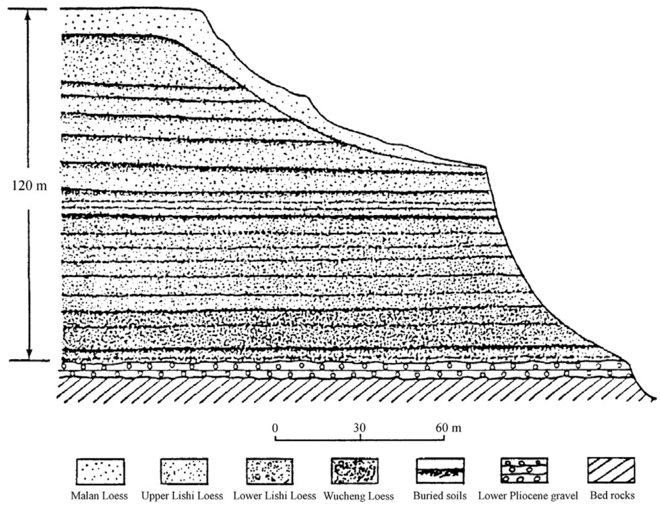

Fig. 1. Loess-paleosol sequences at Wucheng, central Chinese Loess Plateau from the pioneering pedostratigrahic works of Liu and Chang (1964).

became an English language interpreter for the 'Flying Tiger Division' that had been formed from American Air Force volunteers. At this time, he gained a deep and lasting impression of the way in which China was lagging behind scientifically and technologically, of the basic nature of China's weaponry, of the backward economic development of China's people and of the country's ineffectual and poorly organized societal structures. These experiences made him personally passionate about altering China's state of backwardness. As a result, once social order had been re-established, and when there were conditions conducive to scientific researches, he consciously put every fiber of his being into his work.

Second, Liu Tungsheng had an outstanding organizational ability and an all-absorbing passion for his work. It is of vital importance to mention that his 'most famous work' was to prove that loess had been transported by wind and deposited as sediments on the Chinese Loess Plateau. He also organized more than thirty young university graduates from the Institute of Geology of the Chinese Academy of Sciences to investigate ten large-scale trans-sections on the Loess Plateau, in particularly difficult conditions and without the aid of vehicles or any other forms of transport, walking on foot the entire way, and living in local farmers' houses. During this systematic stratigraphic survey of the ten large trans-sections, they collected a vast quantity of loess samples. After a full analysis of these field data, which focused in particular on the particle size distribution curves of Malan Loess, he convincingly put forward his evidence for the wind transportation and subsequent deposition of Chinese loess, thus laying solid foundations for the subsequent extraction of information about climatic and environmental changes from these loess deposits. Actually, this work could not have been conducted without the cooperation of a sizeable research team, this demonstrates his excellent organizational ability and personality charm.

Third, his open mind and modesty were important contributors to his success. For a comparatively long time, Chinese society had essentially closed itself off from the rest of the world, meaning that there had been very few opportunities to exchange information with those who lived beyond China's borders, not to mention opportunities for scientists to cooperate over their research. In spite of this, Professor Liu Tungsheng tried hard in reading literatures in order to realize the new international scientific progress. After Deng Xiaoping advocated 'Reform and Opening Up' policy, Liu became more or less the first Chinese geographer to work cooperatively with Western scientists. His first foray into international cooperation was with the team from the Australian National University led by Professors Donald Walker and Jim Bowler for salt lake research in western China, when Professor Liu was the head of the Chinese team. After this cooperative research, Liu's collaboration with foreign scientists included sending Chinese students abroad to study; this became a vital part of his work, and allowed him to collaborate with foreign scientists who became lifelong friends, like Jim Bowler, Edward Derbyshire, Friedrich Heller, George Kukla, Nat Rutter, Kerry Kelts, Ann Wintle, Ian Smalley, Stephen Porter, Frank Oldfield, Donald Walker, Ray Bradley, André Berger, Subir Banerjee, Devendra Lal, John Dodson and Denis-Didier Rousseau. When Professor Liu collaborated with foreign scientists, he adopted a very gentle and frugal Confucian approach; in other words, he was always softly spoken, and was always a modest and complete gentleman. It is precisely because of this that he gained a large number of international friends and thereby nurtured a fertile environment for the development of research into Chinese loess and the Quaternary geology. For example, when China successfully got the opportunity to organize the 1991 International Quaternary Association Conference, Professor Liu was elected chairman against fierce competition, having been supported and promoted by his international colleagues.

Fourth, in his research experience, Professor Liu Tungsheng possessed a robust work ethic and a highly innovative mind. A milestone in the study of loess came when he proved that Chinese loess was first deposited 2.5 million years ago, and that the history of climate change could be very closely compared with the deep sea record, further proving that the glacial-interglacial fluctuations which have characterized the Quaternary period are exhibit a global consistency. This work began in the early 1980s, when Professor Liu brought loess samples from China to the paleomagnetic laboratory run by the Swiss scientist Dr. Friedrich Heller to constrain loess chronology and thus lay the foundations for future research. Following this, as leader of his own team, he constantly expanded our knowledge of this particular field, and developed many climatic proxies. Based on spatial correlation, he proved the relative continuity of loess deposition, thus ensuring that loess becomes one of the best archives of global climate change. At a very early stage he made a direct correlation between the climatic record exhibited by loess and the tectonic uplift history of the Tibetan Plateau (TP). He proposed the view that the tectonic uplift of the Tibetan Plateau would have intensified the aridification of northern China, a view that was later proven by the late Tertiary eolian record of northern China, as well as by subsequent atmospheric modeling.

Fifth, Liu Tungsheng had an extremely broad range of academic interests. He was not only fascinated by Quaternary geology, but was also intrigued by philosophy, history, literature and archeology. He not only conducted research into geological questions, he also paid especial attentions to the social purpose of such research. In the 1960s, as a leader of his team, he conducted research into local diseases found in northern China, such as 'Keshan disease' (a form of myocardial necrosis), Kashin-Beck disease and fluoride poisoning. He innovatively suggested the concepts of the 'first environment' and the 'second environment', thereby distinguishing between environments free from human pollution and environments contaminated by manmade pollution, and establishing whether endemic local diseases were caused by the local water, soil, living conditions or

Fig. 2. Distribution of loess (light brown) in Asia from Muhs (2013). The red rectangles indicate the studied loess sites in Asia mentioned in this special issue. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

atmospheric environment. As for his work into the ecological management of the Chinese Loess Plateau and the conservation of its water and soil, Liu directly applied the results of his research including sporopollens, phytoliths and other paleo-vegetation results, proposed the theory that the Chinese Loess Plateau was unsuited to tree-planting, and that any ecological restoration work should be based upon the planting of herbaceous grasses and shrubs. Additionally, after his team had conducted research into the geological and vegetative evolution of sandy deserts in northern China, he came to the conclusion that the loss of vegetation in these sandy deserts had been caused by overgrazing and that, if the intensity of human activity were to be reduced, these sandy deserts would be able to recover naturally even under existing climatic conditions. This work provides a clear example of how basic research results can have relevant social applications.

The final vital point to make is that Professor Liu paid particular attention to nurturing young generation. He taught forty-one graduate students in total, the vast majority of whom became professional scientists after their graduation. Professor Liu had a few distinctive features when guided his students. First, he chose an academic direction according to the background and interests of each student and he required them to be proficient in handling at least one analytical laboratory procedure. Second, he insisted that every student should read a wide-ranging of relevant literatures and then identify research question, additionally he would help them to acquire research materials. Third, he asked that his students develop the practice of wide-ranging discussions and sharing of information amongst themselves so that they could learn from, and inspire, one another, thereby improving the structure and standard of their theses. It is precisely because of his nurturing of students in the field of Quaternary research that his students branched off into different areas of research. The great majority of them ended up working in research and educational institutions, ensuring that Liu always had a relatively large team who could work together, allowing him to make his ideas a reality. Professor Liu Tungsheng participated in much other work of note at the same time as he was working in the field of international and Chinese Quaternary research. He served for a long time as the Chair of the Chinese Quaternary Research Committee, and held the posts of Chair, Vice Chairand Chair Emeritus of the International Quaternary Association (INQUA), amongst others. This work also provided an important platform for his scientific research.

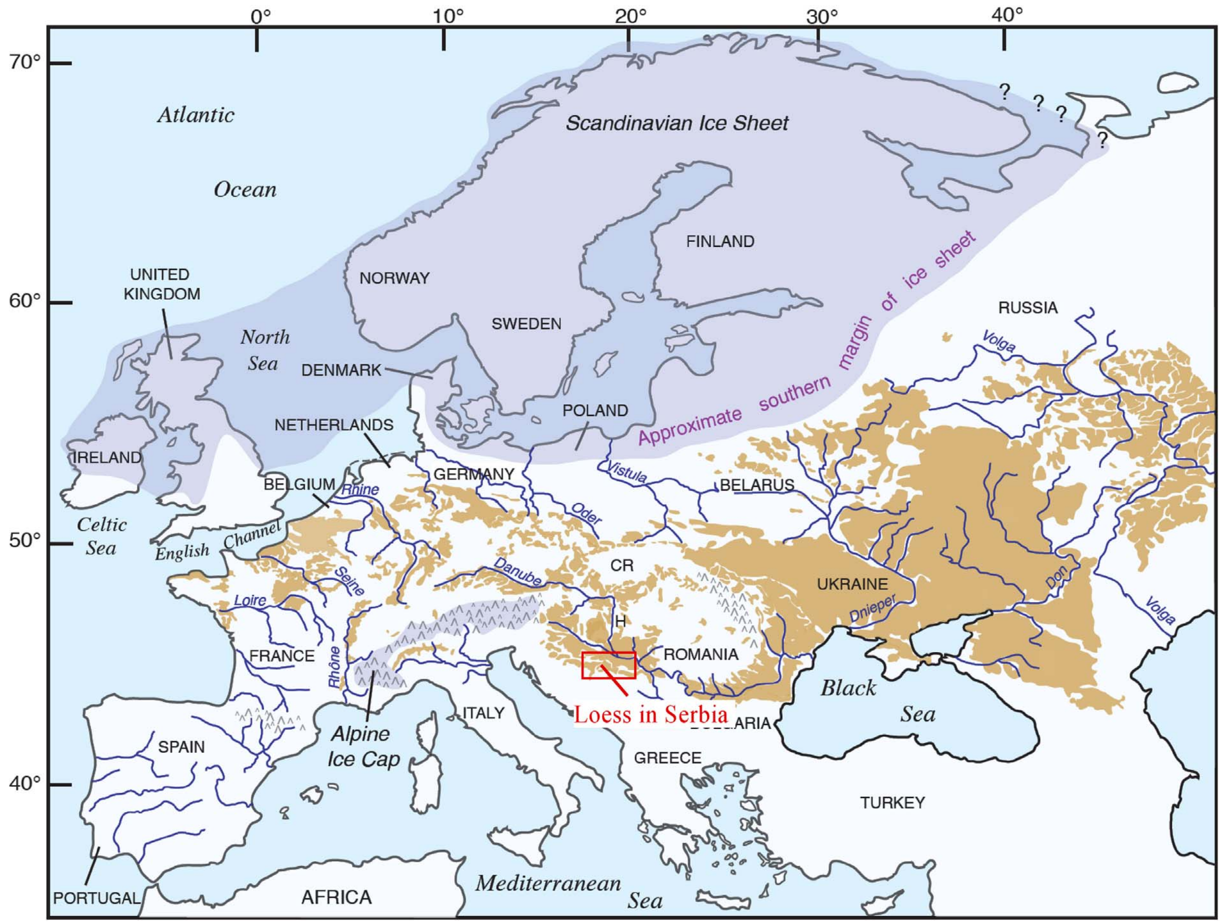

Fig. 3. Distribution of loess (light brown) in Europe from Muhs (2013), redrawn in simplified form from Haase et al. (2007). The red rectangle indicates the mentioned loess sites in Serbia. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

3. Loess research papers included in this special

At present, this volume includes a total of eighteen papers. This special issue starts with a memory paper about the whole life-time of Professor Liu Tungsheng (Zhang et al., 2017a), the authors introduced not only his scientific achievements, but also his family, study, and work experiences. It's a detailed and comprehensive description about the 91-year life of Professor Liu Tungheng.

The following paper aims to use detrital zircon U-Pb ages to trace dust provenance of the Chinese loess deposits (the location of the Loess Plateau is shown in Fig. 2). Combined with knowledge of topographic features and wind patterns, Sun et al. (2017a) suggested that there are three potential sources for the loess on the Loess Plateau. The first is the deflation and transportation of dust materials derived from the Central Asian Orogenic Belt. The second source is the loess-sized materials generated by mountain processes of the Qilian Mountains in the northeastern margin of the Tibetan Plateau. The third minor source is clastic debris derived from the neighboring mountains of the North China Craton.

The next three papers focus on long-term and/or orbital time scale paleoclimatic changes by using multiple climatic parameters of the Quaternary loess-paleosol sequences in Chinese loess deposits. Wu et al. (2017) discussed terrestrial mollusk fossils found in the Chinese Loess Plateau. They suggested that modern mollusks fall into four ecotypes in the Chinese Loess Plateau and surrounding regions, and the long-term mollusk records reveal orbital-scale monsoonal fluctuations. Wang et al. (2017c) reported hydrogen isotopic records from the central Chinese Loess Plateau over the past 250 ka and concluded that the δD_{wax} records can be used to infer orbital scale arid/humid alternations related to the Asian summer monsoon circulations concentrated at 100 ka, 40 ka and 20 ka cycles. Another paper by Song et al. (2017a) deals with abrupt climatic fluctuations recorded by the Ili loess (see Fig. 2 for the location of the Ili Basin) during the last glaciation in northwestern China. Based on granularity and mineralogical analyses, they reported abrupt climatic events (such as Dansgaard-Oeschger events and Heinrich events) in northwestern China and suggested that the shifting trajectory of westerlies across Central Asia played an important role.

The subsequent three papers are all about loess deposits out of China. Song et al. (2017b) performed a detailed magnetostratigraphic investigation of a composite Titel-Stari Slankamen loess section in the Vojvodina, northern Serbia (see Fig. 3 for the location of loess in Serbia). They constrained the Matuyama-Brunhes paleomagnetic polarity boundary (0.78 Ma) within the eighth paleosol layer of S8. Based on the new time scale and magnetic susceptibility data, they suggested that the pedostratigraphy and climatostratigraphy of loess-paleosol sequences can be well-correlated between Serbia and China. In another paper, Muhs (2017) attempted to compare the geochemistry of loess from Asia and North America (loess sites in North America in Fig. 4). His results indicate that both the major and trace elements of loess deposits in Asia and North America are distinguishable that reflect different highly diverse source sediments. Wang et al. (2017a) reported optically stimulated luminescence study of the loess deposits in southern Tajikistan (see Fig. 2 for location of the Tajik loess), which was deposited during MIS 2. Based on grain-size analyses and the new chronology, they calculated dust accumulation rates and suggested that the LGM indicated a 'cold-dry' climatic pattern, rather than a 'cold-humid' pattern.

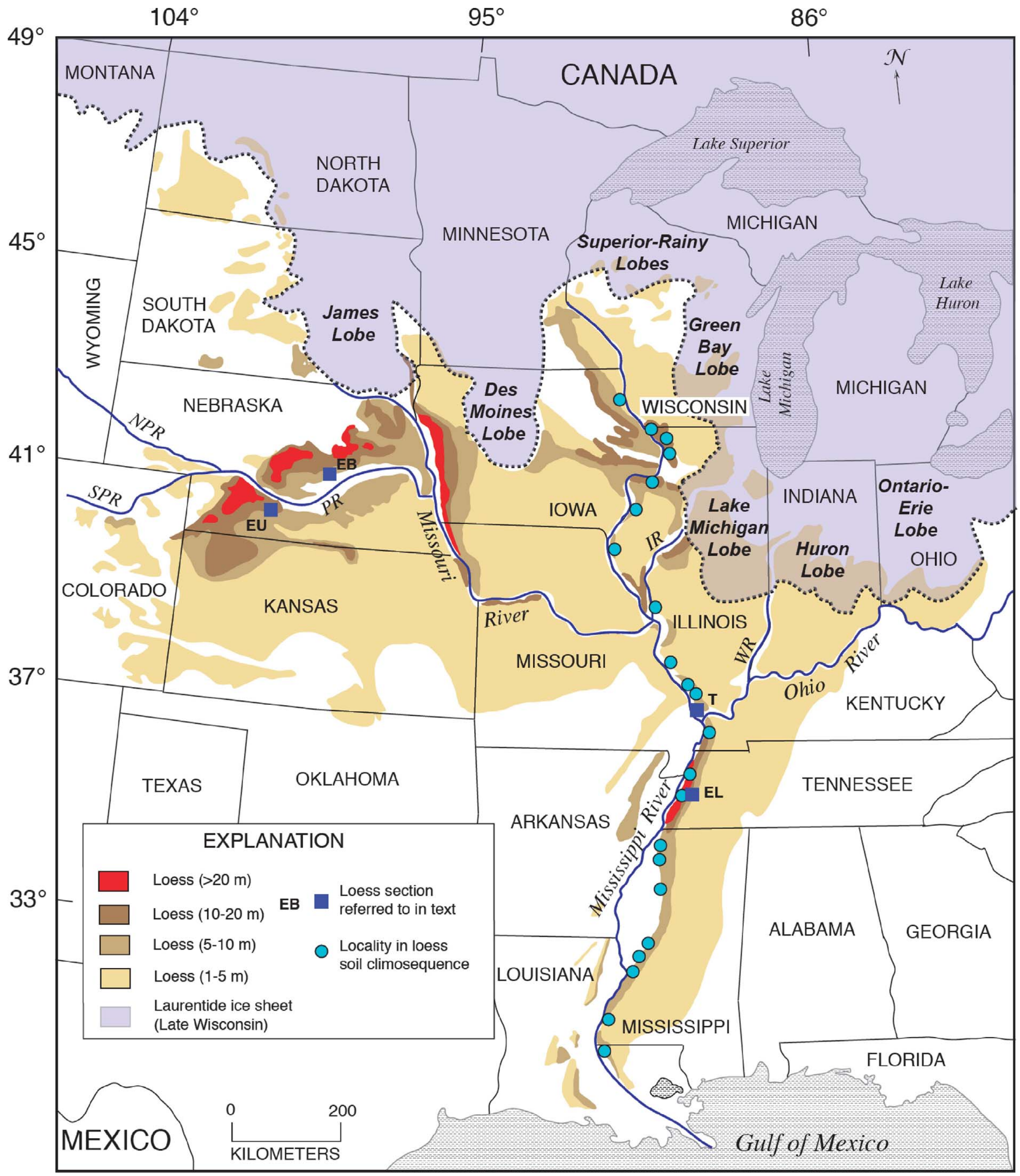

Fig. 4. Distribution and thickness of loess, mostly Peoria Loess of last-glacial age, in central North America from Muhs (2017), in this special issue). Filled blue circles show locations of loess-derived soil climosequence (see also Muhs et al., 2001). Loess thickness and distribution taken from compilation in Bettis et al. (2003) and references therein. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

The next two papers deal with paleoclimatic records of eolian Neogene Red Clay in the Chinese Loess Plateau. Yang et al. (2017) firstly established a paleomagnetic polarity time scale for the Pianguan section. Based on chemical weathering index, they constrained two periods of enhanced East Asian summer monsoon at the early (5.2–4.3 Ma) and the latest Pliocene (3.7–2.9 Ma), respectively. Another paper by Peng et al. (2017) compared the spatial differences in heavy mineral assemblages between the Quaternary loess and the Neogene Red Clay. They suggested that the precipitation gradient on the Chinese Loess Plateau was more east-west during the Late Miocene-Pliocene rather than northwest-southeast as it was in the Quaternary.

The next three papers report new dating results of loess deposits by using multiple optically stimulated luminescence (OSL) methods. Zhang et al. (2017a) used optically stimulated luminescence dating on potassium feldspar for the loess deposits at Luochuan in the Chinese Loess Plateau, they found that the age of the potassium feldspar from the calcrete nodules along the S1/L2 boundary is significantly older than those of the paleosol and loess samples lying above and below the boundary. They attributed this age overestimation to the underestimation of the dose rate caused by the "dilution" of the carbonate accretion. Qin and Zhou (2017) reported results of a multiple-procedure luminescence dating of the Zeketai loess section in the Ili Basin (see Fig. 2 for the location of the Ili Basin), northwestern China. They suggested that the OSL ages of fine-grained quartz are ~30% younger than the pIRIR295 ages of both fine and medium grained polyminerals and thus recommended polymineral or potassium feldspar pIRIR signal for dating loess in the Ili Basin. Lü et al. (2017) reported the OSL dating results of a sand-loess-soil sequence from the northern margin of the Chinese Loess Plateau. Quartz-based SAR-OSL dating was used to the younger samples whereas the MET-pIRIR age dating of K-feldspars was used for the last interglacial paleosol (S1). Based on the new OSL chronology, the studied eolian deposits were broadly correlated with the last glacial-interglacial cycle but with several sedimentary hiatuses occurring at 94.4 ka, 35.9 ka and 5.8 ka, respectively.

There are two papers deal with the loess deposits in northeastern China (see Fig. 2 for the location of loess in northeastern China), a locality far from the Chinese Loess Plateau. Sun et al. (2017b) reported magnetostratigraphic and particle size analysis of loess deposits since Early Pleistocene. They yielded a basal age of ~1 Ma for the loess deposits and discussed the desert evolution trends in northeastern China based on particle size variations. Lyu et al. (2017) also studied a loess section in northeastern China, but focused on long-term vegetation variations by using stable carbon isotopes. They suggested that the δ^{13}C values are higher between ~1.1–~0.9 Ma and after ~0.35 Ma, and lower between ~0.9 and ~0.35 Ma, which may be attributed to a long-term temperature variation.

The last two papers focus on the loess deposits distributed in the lower reaches of the Yangtz River, named as Xiashu Loess (see Fig. 2 for the location of the Xiashu Loess) in southeastern China, also a locality far from the Chinese Loess Plateau. Wang et al. (2017b) reported the magnetostratigraphy and detrital zircon U–Pb age results of the Xiashu Loess, proposed a basal age of 0.88 Ma and suggested two mixed potential provenances including proximal coarse sediments and distal fine eolian dust from arid northwestern China. Yi et al. (2017) used quartz single-aliquot regenerative (SAR) dose optically stimulated luminescence (OSL) and K-feldspar post-infrared infrared stimulated luminescence (post-IR IRSL; pIRIR290) methods to date the ages of the Xiashu Loess. Based on high resolution OSL dating, they constructed a new age model for the Xiashu Loess since the penultimate interglacial period.

4. Concluding remarks

It was just because of the birth of a great geologist of Professor Liu Tungsheng 100 years ago, we can have now the best long-term terrestrial paleoclimatic record on the Chinese Loess Plateau. Since his pioneering loess investigations, the basal age of the eolian dust has been extended from 2.6 Ma (Ding et al., 1994) to 8 Ma (Ding et al., 1998; Sun et al., 1998) or even 24 to 22 Ma in China (Guo et al., 2002; Sun et al., 2010; Qiang et al., 2011). Today, the loess deposits, together with the deep-sea sediments and the polar ice-core, have been regarded as the most important paleoclimatic archives. We should not forget Professor Liu's outstanding scientific contribution in promoting loess paleoclimatic researches.

Acknowledgements

The principal sponsors of this special issue are Professors Sun Jimin, Zhou Liping, Meng Xingmin, and Zheng Hongbo. We thank Edward Derbyshire Jr for his kind helps in improving the language of the papers. Finally, the guest editors would like to thank all contributors to this special issue, to thank all reviewers for their insightful and timely reviews, and to thank the Editor-in-Chief Professor Mei-Fu Zhou and the highly professional and superefficient editorial team he leads, without their helps the speedy organization and publication of this special issue is impossible.

References

Bettis III, E.A., Muhs, D.R., Roberts, H.M., Wintle, A.G., 2003. Last glacial loess in the conterminous USA. Quat. Sci. Rev. 22, 1907–1946.
Ding, Z.L., Sun, J.M., Liu, T.S., Zhu, R.X., Yang, S.L., Guo, B., 1998. Wind-blown origin of the Pliocene red-clay formation in the central Loess Plateau. China. Earth Planet. Sci. Lett. 161, 135–143.
Ding, Z.L., Yu, Z.Y., Rutter, N.W., Liu, T.S., 1994. Towards an orbital time scale for Chinese loess deposits. Quat. Sci. Rev. 13, 39–70.
Guo, Z.T., Ruddiman, W.F., Hao, Q.Z., Wu, H.B., Qiao, Y.S., Zhu, R.X., Peng, S.Z., Wei, J.J., Yuan, B.Y., Liu, T.S., 2002. Onset of Asian desertification by 22 Myr ago inferred from loess deposits in China. Nature 416, 159–163.
Haase, D., Fink, J., Haase, G., Ruske, R., Pésci, M., Richter, H., Altermann, M., Jäger, K.-D., 2007. Loess in Europe–its spatial distribution based on a European Loess Map, scale1:2,500,000. Quat. Sci. Rev. 26, 1301–1312.
Heller, F., Liu, T.S., 1982. Magnetostratigraphic dating of loess deposits in China. Nature 300, 431–433.
Liu, T., Chang, T., 1964. The 'Huangtu' loess of China. Rept.6th INQUA Congress Warsaw vol. 4, pp. 503–524.
Liu, T.S., 1985. Loess and the Environment. China Ocean Press, Beijing, pp. 251.
Lü, T.Y., Sun, J.M., Gong, Z.J., 2017. Optical dating of eolian deposits since the last interglacial along the northern margin of the Chinese Loess Plateau. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.017. in press.
Lyu, A.Q., Lu, H.Y., Zeng, L., Zhang, H.Y., Zhang, E.L., Yi, S.Y., 2017. Vegetation variation of loess deposits in the southeastern Inner Mongolia, NE China over the past ~1.08 million years. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.013. in press.
Muhs, D.R., 2013. Geologic records of dust in the Quaternary. Aeolian Res. 9, 3–48.
Muhs, D.R., 2017. The geochemistry of loess: Asian and North American deposits compared. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.10.032. in press.
Muhs, D.R., Bettis III, E.A., Been, J., McGeehin, J., 2001. Impact of climate and parent material on chemical weathering in loess-derived soils of the Mississippi River Valley. Soil Sci. Soc. Am. J. 65, 1761–1777.
Peng, W., Nie, J., Wang, Z., Qiang, X., Garzanti, E., Pfaff, K., Song, Y., Stevens, T., 2017. A major change in precipitation gradient on the Chinese Loess Plateau at the Pliocene-Quaternary boundary. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.10.031. in press.
Qiang, X.K., An, Z.S., Song, Y.G., Chang, H., Sun, Y.B., Liu, W.G., Ao, H., Dong, J.B., Fu, C.F., Wu, F., Lu, F.Y., Cai, Y.J., Zhou, W.J., Cao, J.J., Xu, X.W., Ai, L., 2011. New eolian red clay sequence on the western Chinese Loess Plateau linked to onset of Asian desertification about 25 Ma ago. Sci. China (Earth Sci.) 54, 136–144.
Qin, J.T., Zhou, L.P., 2017. Luminescence dating of the Zeketai loess section in the Ili Basin, northwestern China: methodological considerations. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.018. in press.
Song, Y.G., Zeng, M.X., Chen, X.L., Li, Y., Chang, H., An, Z.S., Guo, X.H., 2017a. Abrupt climatic events recorded by the Ili loess during the last glaciation in Central Asia: evidence from grain-size and minerals. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.10.040. in press.
Song, Y., Guo, Z., Marković, S., Hambach, U., Deng, C., Chang, L., Wu, J., Hao, Q., 2017b. Magnetic stratigraphy of the Danube loess: a composite Titel-Stari Slankamen loess section over the last one million years in Vojvodina, Serbia. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.012. in press.
Sun, D.H., Shaw, J., An, Z.S., et al., 1998. Magnetostratigraphy and paleoclimatic interpretation of a continuous 7.2 Ma Late Cenozoic eolian sediments from the Chinese Loess Plateau. Geophys. Res. Lett. 25, 85–88.
Sun, J.M., Ding, Z.L., Xia, X.P., Sun, M., Windley, B.F., 2017a. Detrital zircon evidence for the ternary sources of the Chinese Loess Plateau. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.10.012. in press.
Sun, J.M., Ye, J., Wu, W.Y., Ni, X.J., Bi, S.D., Zhang, Z.Q., Liu, W.M., Meng, J., 2010. Late Oligocene-Miocene mid-latitude aridification and wind patterns in the Asian interior. Geology 38, 515–518.
Sun, M., Zhang, X.J., Tian, M.Z., Liu, R., He, Z.X., Qi, L., Qiao, Y.S., 2017b. Loess deposits since Early Pleistocene in Northeast China and implications for desert evolution in East China. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.09.013. in press.

Wang, L.B., Jia, J., Li, G.Q., Li, Z.J., Wang, X., Chen, F.H., 2017a. Fine-grained quartz OSL dating chronology of loess sequence from southern Tajikistan: implications for climate change in arid central Asia during MIS 2. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.001. in press.
Wang, X., Lu, H., Zhang, H., Wu, J., Hou, X., Fu, Y., Geng, J., 2017b. Distribution, provenance, and onset of the Xiashu Loess in Southeast China with paleoclimatic implications. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.022. in press.
Wang, Z., An, Z., Liu, Z., Qiang, X., Zhang, F., Liu, W., 2017c. Hydroclimatic variability in loess δDwax records from the central Chinese Loess Plateau over the past 250 ka. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.008. in press.
Wu, N.Q., Li, F.J., Rousseau, D., 2017. Terrestrial mollusk records from Chinese loess sequences and changes in the East Asian monsoonal environment. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.003. in press.
Yang, S.L., Ding, Z.L., Feng, S.H., Jiang, W.Y., Huang, X.F., Guo, L.C., 2017. A strengthened East Asian Summer Monsoon during Pliocene warmth: evidence from 'red clay' sediment at Pianguan, northern China. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.10.020. in press.
Yi, S., Li, X., Han, Z., Lu, H., Liu, J., Wu, J., 2017. High resolution luminescence chronology for Xiashu Loess deposits of Southeastern China. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.027. in press.
Zhang, J.J., Li, S.H., Sun, J.M., Hao, Q.Z., 2017a. False age hiatus in OSL dating of loess section indicated by calcrete nodules and adjacent materials. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.016. in press.

Further reading

Zhang, Y., Guan, L., Liu, Q., 2017b. Liu Tungsheng: A geologist from a traditional Chinese cultural background who became an international star of science. J. Asian Earth Sci. http://dx.doi.org/10.1016/j.jseaes.2017.11.002. in press.

Zhongli Ding[a,b,*], Edward Derbyshire[c], Jimin Sun[a,b]
[a] *Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, P.O. Box 9825, Beijing 100029, China*
[b] *University of Chinese Academy of Sciences, China*
[c] *Center for Quaternary Research, Department of Geography, Royal Holloway University of London, Egham, Surrey TW20 0EX, UK*
E-mail address: zlding@mail.iggcas.ac.cn

* Corresponding author at: Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, P.O. Box 9825, Beijing 100029, China.