Historical Evolution of Sandy Desertification in Ancient China: Postprint

Authors: Zhang Lianwei

Date: 2018-11-13T00:00:00+00:00

Abstract

Desertification is a global environmental issue that threatens human survival and development, and China is a country severely affected by desertification. Based on historical records and modern scholarly research, this paper examines the evolution of sandy desertification in China across three historical stages: the Qin-Han, Wei-Jin, and Northern and Southern Dynasties period; the Sui-Tang, Song, and Yuan Dynasties period; and the Ming and Qing Dynasties period. Research indicates that during the Qin-Han, Wei-Jin, and Northern and Southern Dynasties period, sandy desertification in China was mainly concentrated in the northwestern region, such as the Ordos Plateau, the Hexi Corridor, and Xinjiang; during the Sui-Tang, Song, and Yuan Dynasties period, desertification expanded to the northeastern region, such as the Hulunbuir Sandy Land and the Horqin Sandy Land; during the Ming and Qing Dynasties period, the government' s construction of the Great Wall and closure policies objectively suppressed reclamation and cultivation in border regions, but under population pressure, rapid agricultural development in the northern border areas during the late Ming and late Qing accelerated the desertification process in regions such as the Ordos Plateau and the Horqin Sandy Land. Therefore, climate change and human activities over thousands of years, particularly unreasonable land use practices such as indiscriminate cultivation, overgrazing, and excessive fuelwood collection, have caused desertification in China' s northern arid and semi-arid regions to become increasingly severe.

Full Text

Abstract

Desertification is a global problem that threatens the survival and development of human beings, and China is seriously impacted by this phenomenon. Based on historical literature records and modern scholarly research, this paper systematically examines the evolution of sandy desertification in China across three

historical periods: (1) from the Qin and Han Dynasties through the Wei, Jin, and Northern and Southern Dynasties; (2) from the Sui and Tang Dynasties through the Song and Yuan Dynasties; and (3) the Ming and Qing Dynasties.

Research indicates that China' s desert coverage did not exceed 10% before four millennia ago. During the Spring and Autumn Period and the Warring States Period (770 BC–221 BC), the climate was warm and humid, and the ecological environment in most parts of northern China remained in equilibrium. In the first period, population growth in northwestern China led to large-scale reclamation and deforestation, destroying the natural ecological environment, reducing surface vegetation, and causing soil desertification. Consequently, sandy desertification during this era concentrated primarily in western regions such as the Ordos Plateau, Hexi Corridor, and Xinjiang.

During the second period, desertification extended to northeastern China, affecting areas like the Hulunbuir Sandy Land and Horqin Sandy Land. Meanwhile, the early Tang government vigorously developed the Hexi Corridor and western regions, while ancient cities in the southern Tarim Basin of Xinjiang were gradually abandoned and overtaken by desert. Simultaneously, desertification in the northern Ordos Plateau intensified, leading to the formation of the Mu Us Sandy Land and the Hobq Desert.

In the third period, the Ming and Qing governments attempted to control borderland reclamation through Great Wall construction and prohibition policies. However, under population pressure, agricultural expansion in the northern frontier accelerated rapidly during the late Ming and late Qing periods, exacerbating desertification in the Ordos Plateau and Horqin Sandy Land.

Over long timescales, climate change and natural conditions have played fundamental roles in the desertification process. Over shorter periods, human activities—particularly agricultural reclamation and deforestation that destroyed surface vegetation and degraded plant communities—have significantly impacted desertification in specific areas. For millennia, climate change combined with human activities, especially unsustainable land-use practices such as indiscriminate reclamation, overgrazing, and firewood collection, have progressively worsened desertification in China' s arid and semi-arid northern regions.

Keywords: ancient China; sandy desertification; Hexi Corridor; Ordos Plateau; Horqin Sandy Land

References

[1] Ge Jianxiong. *Population History of China (Volume Two)* [M]. Fuzhou: Fujian People' s Publishing House, 1997.

[2] Ai Chong. A study on the distribution range of Kubuqi Desert in 7th–9th century AD [J]. *Collections of Essays on the History of Tang Dynasty*, 2009, 11(1): 251–260.

[3] Ma Zhenglin. Human activities and the expansion of China' s desert regions [J]. *Journal of Shaanxi Normal University: Philosophy and Social Sciences*, 1984, (3): 39-48.

[4] Fan Baomin, Dong Yuan, Zhang Juncheng, et al. Impact of forest destruction on flood and drought in Chinese history [J]. *Forestry Science*, 2003, (3): 136-142.

[5] Shen Jingqi, Gao Qianzhao, Hu Zhiyu. Preliminary study on desertification in the southern Tarim Basin [J]. *Journal of Desert Research*, 1982, 2(1): 21-28.

[6] Jing Ai. Reclamation of Horqin Region in the Qing Dynasty [J]. *Collections of Essays on Chinese Historical Geography*, 1992, (3): 155-173.

[7] Huang Enxi. *Annals of Zhongwei County in Qianlong Period of Qing Dynasty* [M]. Nanjing: Phoenix Press, 2008: 16.

[8] Zou Yilin, Zhang Xiugui, Wang Shouchun. *Chinese Historical Geography* [M]. Beijing: Science Press, 2013: 668.

[9] Hou Renzhi. Several ruins of ancient cities in the west desert of Inner Mongolia Autonomous Region [C] // *Department of Geography Peking University Papers (First Edition)*, 1981.

[10] Hou Renzhi. An exploration of changes in the East Desert of Yellow River in Ningxia based on the remains of human activity [J]. *Science Bulletin*, 1964, 9(3): 226-231.

[11] Cheng Hongyi. The desertification of the Hexi area in historical time [D]. Lanzhou: Lanzhou University, 2007: 220.

[12] Li Bingcheng. Study on the damaged desert vegetation in oasis edge of Hexi Corridor during ancient times [J]. *Collections of Essays on Chinese Historical Geography*, 2003, 18(4): 124-133.

[13] Zhang Lianwei, Lang Jie, Li Li. Historical evolution of sandy desertification in ancient China [J]. *Arid Land Geography*, 2018.

[14] Gao Hongyi. The desertification of the Hexi area in historical time [D]. Lanzhou: Lanzhou University, 2007: 220.

[15] Li Bingcheng. Study on the damaged desert vegetation in oasis edge of Hexi Corridor during ancient times [J]. *Collections of Essays on Chinese Historical Geography*, 2003, 18(4): 124-133.

[16] Zhang Lianwei, Lang Jie, Li Li. Historical evolution of sandy desertification in ancient China [J]. *Arid Land Geography*, 2018.

[17] Ma Zhenglin. Human activities and the expansion of China' s desert regions [J]. *Journal of Shaanxi Normal University: Philosophy and Social Sciences*, 1984, (3): 39-48.

[18] Li Bingcheng. Study on the damaged desert vegetation in oasis edge of Hexi Corridor during ancient times [J]. *Collections of Essays on Chinese Historical Geography*, 2003, 18(4): 124-133.

[19] Zhang Lianwei, Lang Jie, Li Li. Historical evolution of sandy desertification in ancient China [J]. *Arid Land Geography*, 2018.

[20] Cheng Hongyi. The desertification of the Hexi area in historical time [D]. Lanzhou: Lanzhou University, 2007: 220.

[21] Li Bingcheng. Study on the damaged desert vegetation in oasis edge of Hexi Corridor during ancient times [J]. *Collections of Essays on Chinese Historical Geography*, 2003, 18(4): 124-133.

[22] Cheng Hongyi. The desertification of the Hexi area in historical time [D]. Lanzhou: Lanzhou University, 2007: 220.

[23] Li Bingcheng. Study on the damaged desert vegetation in oasis edge of Hexi Corridor during ancient times [J]. *Collections of Essays on Chinese Historical Geography*, 2003, 18(4): 124-133.

[24] Zhang Lianwei, Lang Jie, Li Li. Historical evolution of sandy desertification in ancient China [J]. *Arid Land Geography*, 2018.

Note: Figure translations are in progress. See original paper for figures.