

## ***Interactive comment on “Water erosion research in China: A review” by Haiyan Fang***

**Anonymous Referee #2**

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This paper summarizes the research history of water erosion of China in past nearly one hundred years, which has suffered from the disaster since ancient times. It is mainly based on the growth of research power and achievements led by the government, such as the amount of relevant articles and talents, the changes of government regulations and specific actions. The Chinese research findings and scientists in that field have changed from scratch, from less to more. The related application technology has also experienced the process of gradual modernization, rapid transition and interdisciplinary. The achievements and limitations are illustrated in different periods and methods, including different regions and land use types. The different research levels results have been refined and compared from the aspects of water erosion divisions, erosion process and variation mechanism, water erosion modeling, sediment source identification, global change and water erosion, and impacts of water erosion. A chronology of the development of the discipline is presented to readers, and the new

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development directions are pointed out at the end. As a brief introduction to the development history, this paper points out the majority important milestones. A large number of references, which can provide guidance for the follow-up research of scholars, are collected.

Nevertheless, as a high-level scientific review to be published in the international journal HESS, there is still a way to go. China has a complex unique ecological environment, and a long cultural history. That makes it distinctive characteristics in the study of soil erosion, which is reflected in the article. However, it is relatively lack of the comparison at that research area between China and other parts of the world in the same period. This paper almost not describe the connection between this discipline and other important related ones, such as hydrology, ecology, geology, economics, etc. It should not merely summarize the development of research methods and techniques of this discipline, or the promotion to soil erosion from other ones in individual cases. In terms of soil erosion research alone, the scope is still wide. If you only list the scattered research results according to the time line, it will be difficult to get a systematic conclusion. And you can not obtain the purpose of looking forward to the future with history as a mirror. Since it is difficult to cover all aspects, you can get more efficiency only by concentrating on the main points. The progress of theory and the change of technology could be the key.

According to relevant research and reports, China's work to prevent soil erosion has achieved good results, especially in the past decade. However, as an academic research, it needs to be commented on the results rationally and objectively. Not only the achievements in related research fields need to be mentioned, but also the deficiencies and the lessons should be described. It will be very meaningful, if the script can play a role in other countries, particularly in many developing countries, in soil erosion control and ecological environment protection.

Some specific questions and suggestions are as follows

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1. The title of the paper is lack of information, although it is brief. There's too much content to handle. It could be more appropriate after adding some determiners, such as In the last hundred years, a brief history of development, achievements and prospects, etc. You don't need to add them all, just follow your thoughts and your needs.

2. I think it remains to be discussed that the rationality of dividing the study of soil erosion into three stages in China. For example, it is too rough to simply divide it into one stage because of the small number of employees and articles, although those years belong to the initial stage of research from 1922 to 1980. As we all know, China's social progress was relatively slow lasted at least 100 years before 1980. The total economic volume and the number of college students were in a low range, and then the indicators had explosive growth. It may also make sense to apply the dividing method in this paper to other fields. The progress of scientific research is often marked by the innovation of theory and technology. It is suggested that the above factors should be taken into account when dividing.

3. China's scientific and technological progress is inseparable from the development of the world, which is partially reflected in the paper. I would suggest that China's research progress in each period should be connected with the world's research environment for proper comparison. It can be classified and counted on the time scale, and compared with other major countries to show whether China has its particularity. It is necessary to summarize the complementary and promoting role of China's soil erosion research in related fields of the world. China's topography and soil types should be focused on for further exploring the characteristics of related fields. It will be very interesting, such as the soil erosion control process, and environmental evolution of the Loess Plateau.

4. In terms of the progress of observation technology, it is suggested to summarize the status of the main research methods in different periods in history, such as gauging stations, estimation of sediment erosion with radionuclide or magnetic minerals, sediment fingerprinting method and so on. It should also be pointed out that new technologies and new methods can partly replace the old ones to make up for their shortcomings,

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what demerits still exist, and how to evolve in the future, rather than simply citing by years and researchers.

5. The evidence is not enough, by only describing the progress of scientific research and regulations. It is suggested to supplement the actual effect, such as the situation of wind and sand control, the change of erosion and sediment yield of big rivers and so on. Where is it still getting worse? What is the future development direction?

6. It can be tried to increase the actual effect after taking reasonable soil erosion protection, and describe quantitatively, in addition to the improvement of commonly used indicators like water erosion and sediment yield. Such as the content of soil organic matter rising, the fertility increased, the days of dust storms decreased, and the farmers' income growth.

7. The development history of scientific research institutions and government organizations in relevant fields in China is also worth mentioning, such as the Chinese Academy of Agricultural Sciences, the Institute of soil and water conservation of the Ministry of water resources of the Chinese Academy of Sciences, and Cold and Arid Regions Environmental and Engineering Research Institute Chinese Academy of Sciences, etc. As far as I know, most of the relevant researches and measures were carried out with the government as a leader in the past. How do non-governmental organizations and private enterprises participate in them, such as the annual tree planting activities? These are Chinese characteristics all of the above.

8. The research on soil development process and local climate evolution should also be mentioned. For instance I think the viewpoints from Tang Ke li are valuable. That on bio climatic environmental evolution in Quaternary were proposed based on analysis of physical, chemical, mineralogical composition, spore pollen and micro morphology studies on soil samples.

9. The paper revised according to the above opinions may add some content. Please pay attention to the limitation of space, and choose the content of the article.

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There are also some purely technical corrections

1. The full text is easy to understand, but there are several spelling mistakes that need to be corrected. For example, "loss plateau" in line 86 should be "loess plateau", and "a test of t he pollen" in line 821 has an extra space in letters. The sentence pattern is slightly single, such as the repeated use of the word "however".
2. There are lots of Chinese scientists appeared in the list of references, they sometimes have the same family name. It is difficult to find the corresponding line, especially when published in the same year. In this case, whether the full name can be written in the quotation of the text (This is also a suggestion to the editorial department)?
3. About Fig.3, the curves in Fig.3b seem to be inconsistent with the Figure captions.
4. The position of small sticks, circles and other symbols in Fig.4 is irregular. The same problem also appears in other figures. Please pay attention to the beauty of the picture and make some adjustments.
5. About Fig.5a, the curves are fuzzy, it is recommended to add the number units near the drawing, and change the line type or color. In Fig 5b, does the symbol "m" of different color lines stand for "meters"? It should be indicated in the drawing. And the Fig.5d, are the right end of the number axis able to reach 100? Is the unit percentage (%)?
6. Line 173 says "mainly include five aspects, which are described below", but there are more than five parts below. The part 3.6 may not be a summary, but just one of them.

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