

Interactive comment on “Soil organic carbon dynamics following afforestation in the Loess Plateau of China” by N. Lu et al.

Anonymous Referee #1

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The MS deals with an interesting issue for soil organic carbon change following afforestation at Northern Shan'xi Province in middle Loess Plateau areas. I think this article has the potential to be an interesting addition to the literature. But still needs improve huge. My comments as follow:

1. The Loess Plateau is the largest continuous area of loess in the world (about 70% of global loess distribution) covering an area of 640 000 km². However, the samplings were selected from six sites where were concentrated at Northern Shan'xi Province. Because the variety of climate and topography among the huge area, the limited samplings from a concentrated area can not illustrate the aim of the title. If you want to publish your paper, the title should be changed.

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2. Because there are many tree (and shrub) species been planted in Loess Plateau, monitor one vegetation (*Robinia pseudoacacia*) plantation is not suitable to illustrate the result of afforestation. If you want to publish your paper, the title should be changed, too. The follow reference may be useful to understand the afforestation in the study site:

(1) Shixiong Cao, Li Chen, Zhande Liu, Guosheng Wang. A new tree-planting technique to improve tree survival and growth on steep and arid land in the Loess Plateau of China. *Journal of Arid Environments* 2008, 72, 1374–1382.

(2) Shixiong Cao, Li Chen, Zhande Liu. Impact of three soil types on afforestation in China's Loess Plateau. *Landscape and Urban Planning*, 2007, 83, 208-217.

3. “Water stress is the main factor that limits seedling establishment in arid area”. And the results illustrate “The initial SOC stocks were significantly higher at the wetter (1 and 2) than the drier (3, 4, 5, and 6) sites ($p < 0.01$) (Figs. 6–8).” It implies there is a site SOC may decline continues after afforestation where the precipitation is a little.

There is some different sounds about afforestation in arid area (see follow reference). I think the tree establishment seems useful for wood product, greenway conservation, and so on. Please download the follow references and improve you discussion.

(3) Shixiong Cao, Li Chen, David Shankman, Chunmei Wang, Xiongbin Wang, and Hong Zhang. Excessive Reliance on Afforestation in China's Arid and Semi-arid Regions: Lessons in Ecological Restoration. *Earth-Science Reviews* 2011, 104, 240-245

(4) Chengli Xu, Huihai Ye, Shixiong Cao. Constructing China's Greenways Naturally. *Ecological Engineering* 2011, 37, 401-406

(5) Shixiong Cao, Guosheng Wang, Li Chen. Questionable value of planting thirsty trees in dry regions. *Nature*, 2010, 465, 31-31

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(6) Shixiong Cao, Li Chen, Xinxiao Yu. Impact of China's Grain for Green Project on the landscape of vulnerable arid and semiarid agricultural regions: a case study in northern Shaanxi Province. *Journal of Applied Ecology*, 2009, 46, 536-543.

(7) Jiang et al. Vegetation of the Chinese Loess Plateau since the Last Glacial Maximum and its implications for afforestation. *Journal of Applied Ecology*, 2012

(8) Shixiong Cao. Why large-scale afforestation efforts in China have failed to solve the desertification problem. *Environmental Science and Technology*, 2008, 42(5)1826-1831

(9) Shixiong Cao, Tao Tian, Li Chen, Xiaobin Dong, Xinxiao Yu, Guosheng Wang. Damage Caused to the Environment by Reforestation policy in Arid and Semi-arid Areas of China. *Ambio* 2010, 39(4), 279-283

(10) Yafeng Wang, Shixiong Cao. Carbon Sequestration may have Negative Impacts on Ecosystem Health. *Environmental Science and Technology* 2011, 45, 1759-1760

(11) Shixiong Cao, Ge Sun, Zhiqiang Zhang, Liding Chen, Qi Feng, Bojie Fu, Steve McNulty, David Shankman, Jianwu Tang, Yanhui Wang, Xiaohua Wei. Greening China Naturally. *Ambio* 2011, 40, 828–831

(12) Shixiong Cao . Impact of China's large-scale ecological restoration program on the environment and society: achievements, problems, synthesis, and applications. *Critical Reviews in Environmental Science and Technology* 2011, 41, 317–335

4. In my opinion, the discussion structure should different from results section and focus on the mechanism (the relation between your data and why you find different result from others'). Therefore, there are huge work wait you do.