

## Comment on **essd-2022-222**

Anonymous Referee #2

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Referee comment on "Long-time Series Dataset of Soil Conservation Capacity Preventing Water Erosion in China (1992–2019)" by Jialei Li et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-222-RC2>, 2022

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This study integrated spatial data of climate, soil, vegetation, and topography to establish a dataset of soil conservation potential related to soil erosion over China. This work is of interest in the community, and valuable for environmental protection. However, there are issues of uncertainty of the data, although they are validated over limited components, as there are complex combinations of vegetation, soil and climate over China.

(1) Regarding the framework of soil conservation capacity, the potential erosion (SE<sub>p</sub>) is defined by natural conditions for bare soil without vegetation, e.g. rainfall, slope, soil texture, which is calculated by Revised Universal Soil Loss Equation (RUSLE) model. After two more factors are included, the actual erosion (SE<sub>a</sub>) is obtained with modification of vegetation cover, and water and soil conservation measure, i.e. C and P. The issues of this method are,

(1) Effects of vegetation and climate (rainfall) are separated in SE<sub>p</sub> and SE<sub>a</sub>, but vegetation is actual determined by climate. SE<sub>p</sub> is higher while SE<sub>a</sub> is lower in wetter environment. This results in SC, the difference between SE<sub>p</sub> and SE<sub>a</sub>, is higher in the south than in the north. The capacity should be a term reflecting management, but this SC distribution in Fig 5(a) cannot replicate the highest potential of water and soil conservation in the Loess Plateau, the Northeast, etc.

(2) Both C and P elements are similar, including influence of management, and hard to quantify, especially over national scale. There are obvious simplifications of C factor using provincial coverage.

(3) RUSLE is a model for local scale, containing slope and length. It is difficult to calculate coarse grids over national scale.

It is advisable to modify the concept of SC and methods of calculation before the dataset can be accepted for published.