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Supporting Information for

·Determining the drivers and rates of soil erosion on the Loess Plateau since 1901

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Introduction

The supplementary information provides a graphic introduction to the principle of double mass curves, study area and erosion rate changes over time series, examples of RUSLE inputs and double mass curves of cumulative precipitation versus erosion rates. It includes four figures.

Figure S1 shows six geographical subregions of the Loess Plateau and catchments used for model validation and, annual time series, 10-year average value and CUSUM of mean soil erosion rates for the entire Loess Plateau and its six subregions between 1901 and 2016.

Figure S2 displays some examples for the input parameters of the RUSLE model, including the average R for 1970-2000, C and P for 2016 and K, L, S.

Figure S3 presents a sketch of the double mass curve of precipitation versus erosion rates.

Figure S4 presents double mass curves of cumulative precipitation versus erosion rates during 1901-2016.

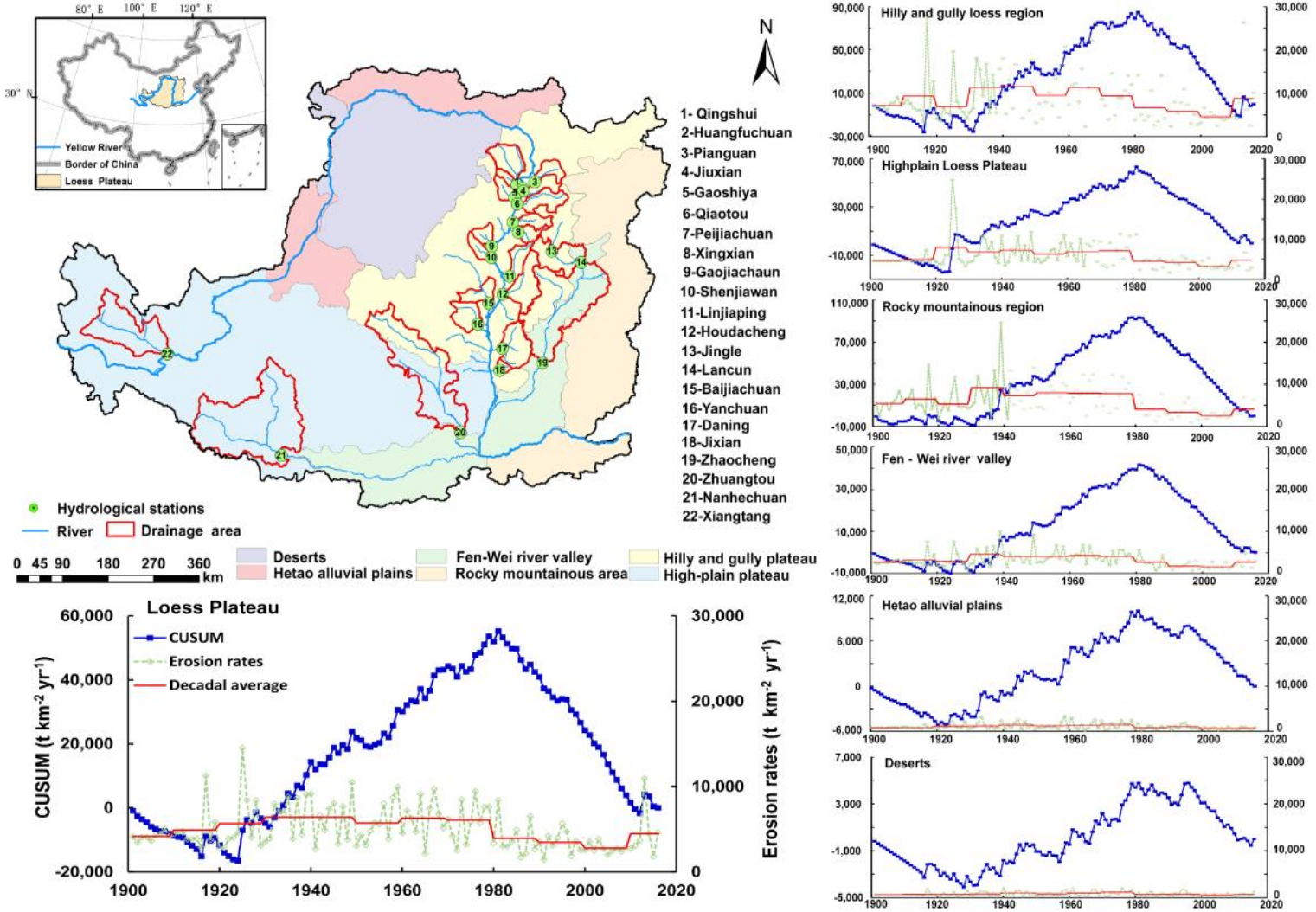


Figure S1. Six geographical subregions of the Loess Plateau and catchments used for model validation, and annual time series, 10-year average value and CUSUM of mean soil erosion rates for the entire Loess Plateau and its six subregions between 1901 and 2016.

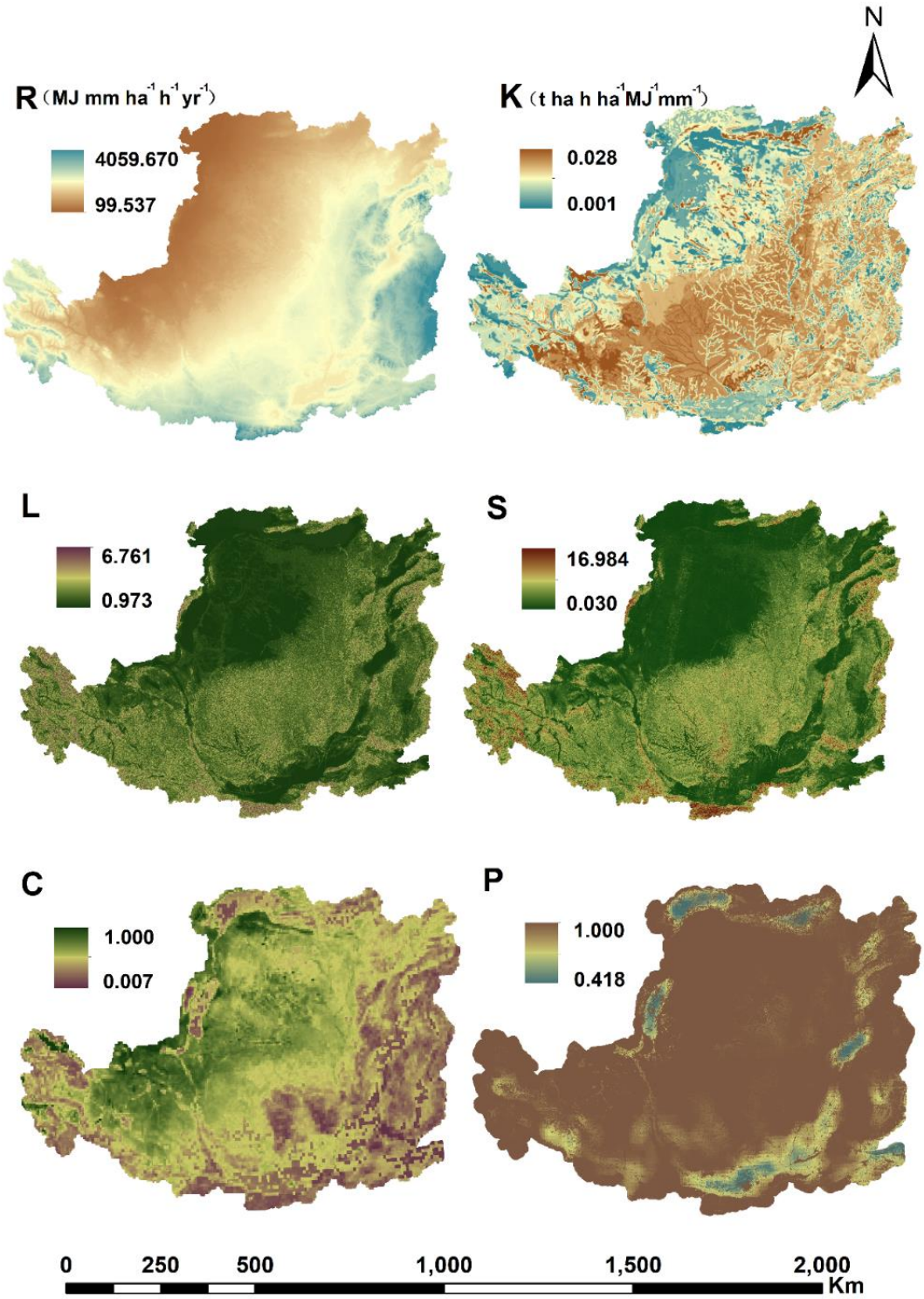


Figure S2. Input parameters of the RUSLE model, including the average R for 1970-2000, C and P for 2016 and K, L, S.

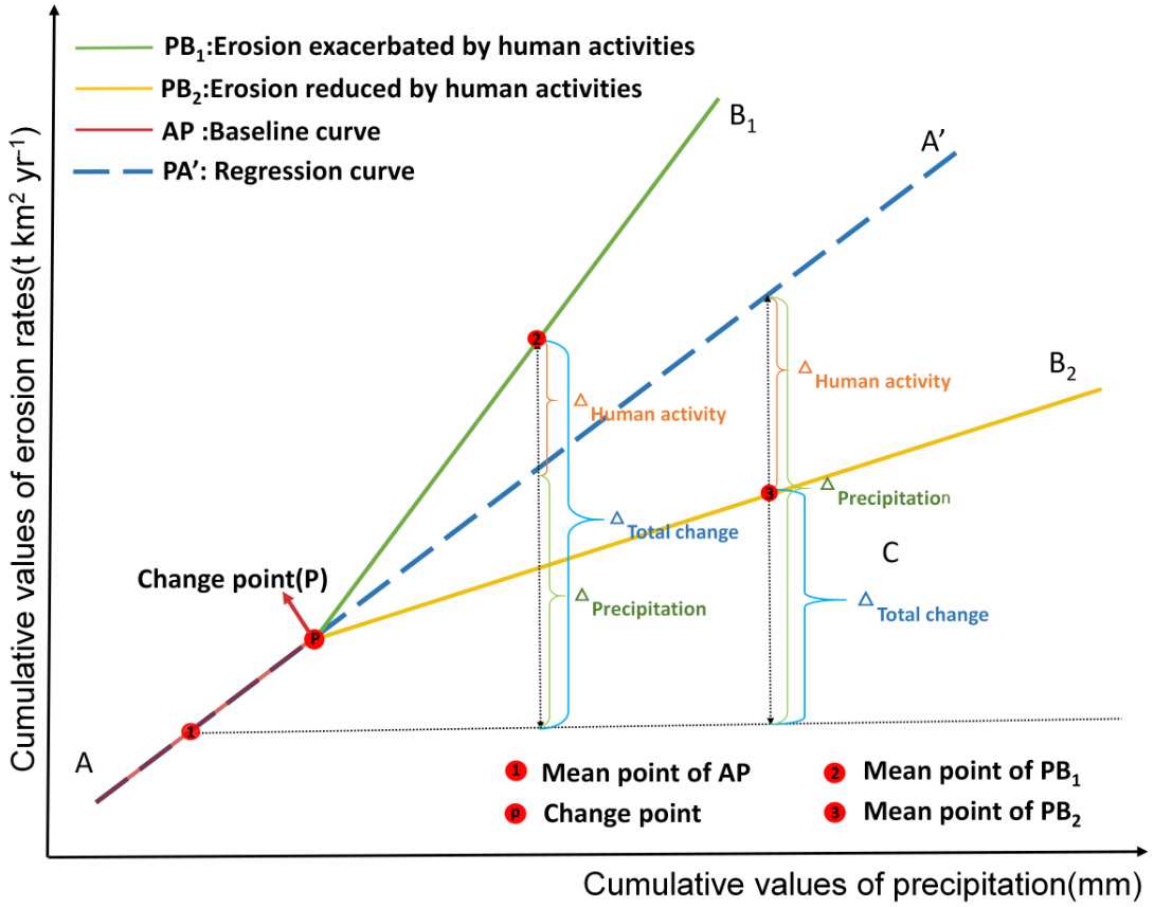
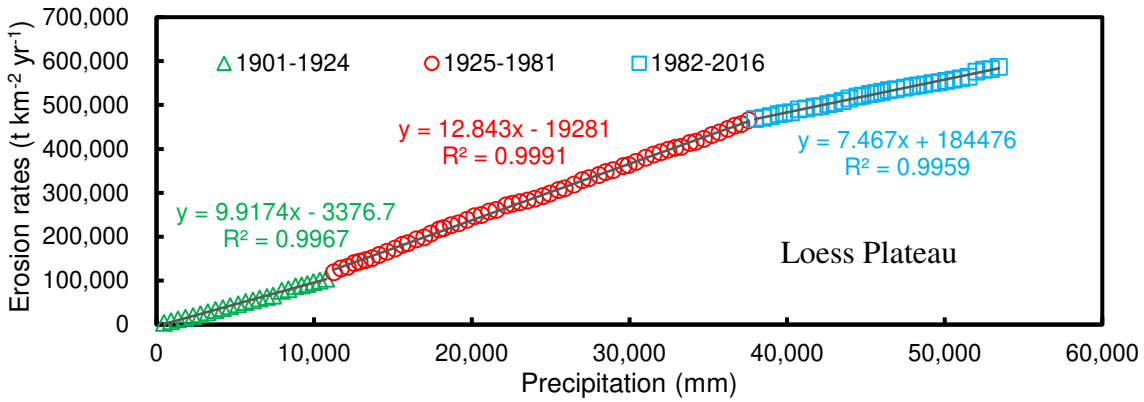
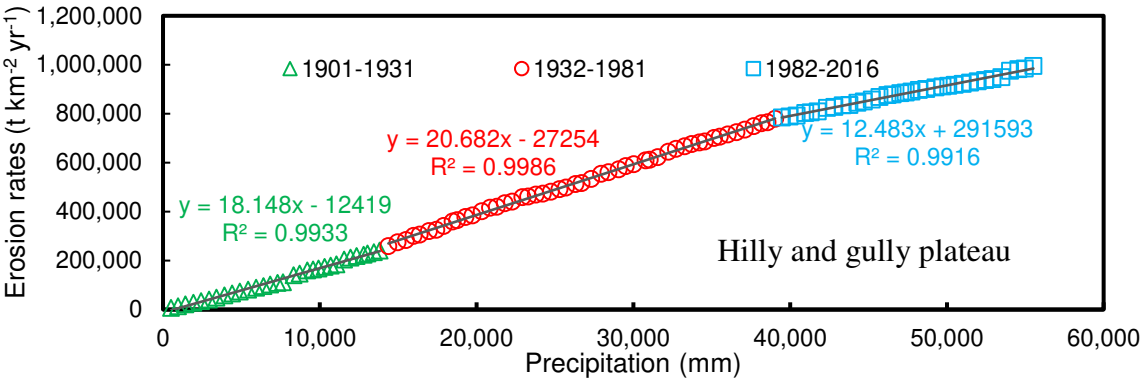
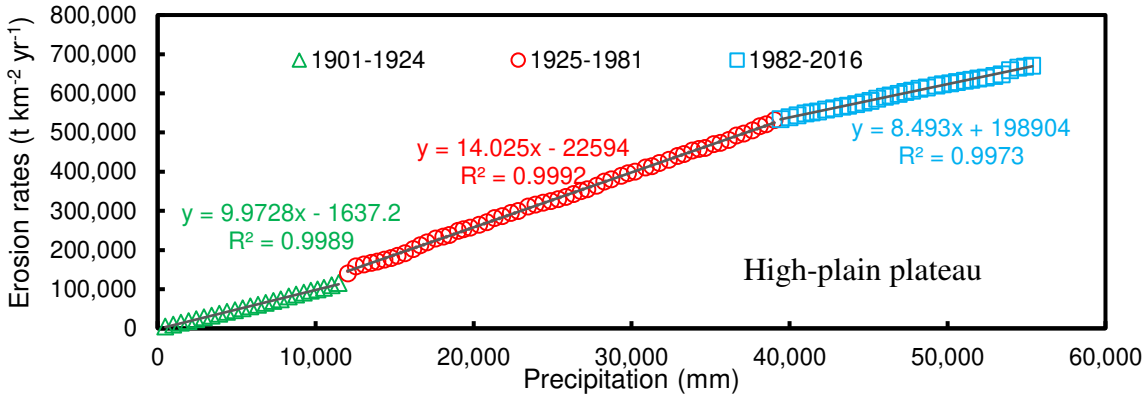
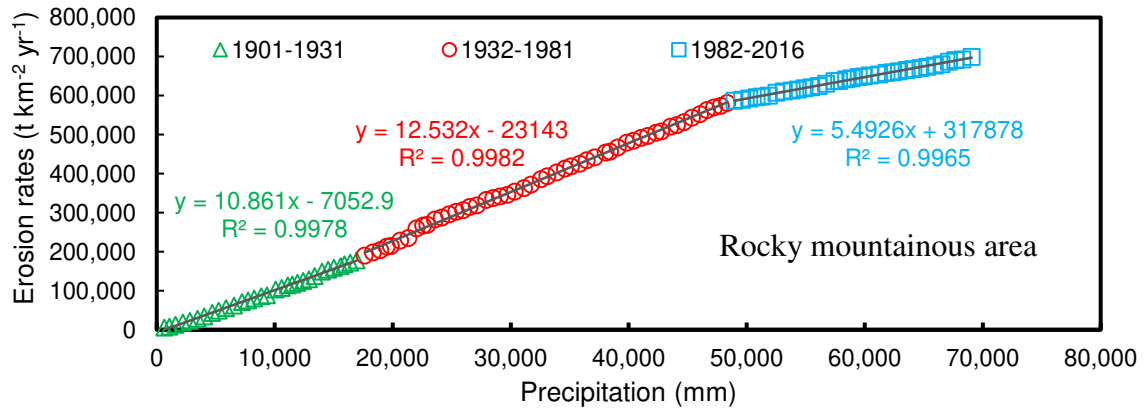


Figure S3. A sketch of the double mass curve of precipitation versus erosion rates that demonstrates the separation of the contribution of human activities ($\Delta_{\text{Human activity}}$) and precipitation change ($\Delta_{\text{Precipitation}}$) to the erosion rates changes between the reference period (AP) and comparison period (PB_1 and PB_2).


Erosion rates (t km-2 yr-1)
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1901-1924
1925-1981
1982-2016
y = 12.843x - 19281
R² = 0.9991
y = 7.467x + 184476
R² = 0.9959
y = 9.9174x - 3376.7
R² = 0.9967
Loess Plateau
0
10,000
20,000
30,000
40,000
50,000
60,000
Precipitation (mm)


Erosion rates (t km-2 yr-1)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1901-1931
1932-1981
1982-2016
y = 20.682x - 27254
R² = 0.9986
y = 12.483x + 291593
R² = 0.9916
y = 18.148x - 12419
R² = 0.9933
Hilly and gully plateau
0
10,000
20,000
30,000
40,000
50,000
60,000
Precipitation (mm)


Erosion rates (t km-2 yr-1)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1901-1924
1925-1981
1982-2016
y = 14.025x - 22594
R² = 0.9992
y = 8.493x + 198904
R² = 0.9973
y = 9.9728x - 1637.2
R² = 0.9989
High-plain plateau
0
10,000
20,000
30,000
40,000
50,000
60,000
Precipitation (mm)


Erosion rates (t km-2 yr-1)
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1901-1931
1932-1981
1982-2016
y = 12.532x - 23143
R² = 0.9982
y = 5.4926x + 317878
R² = 0.9965
y = 10.861x - 7052.9
R² = 0.9978
Rocky mountainous area
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
Precipitation (mm)

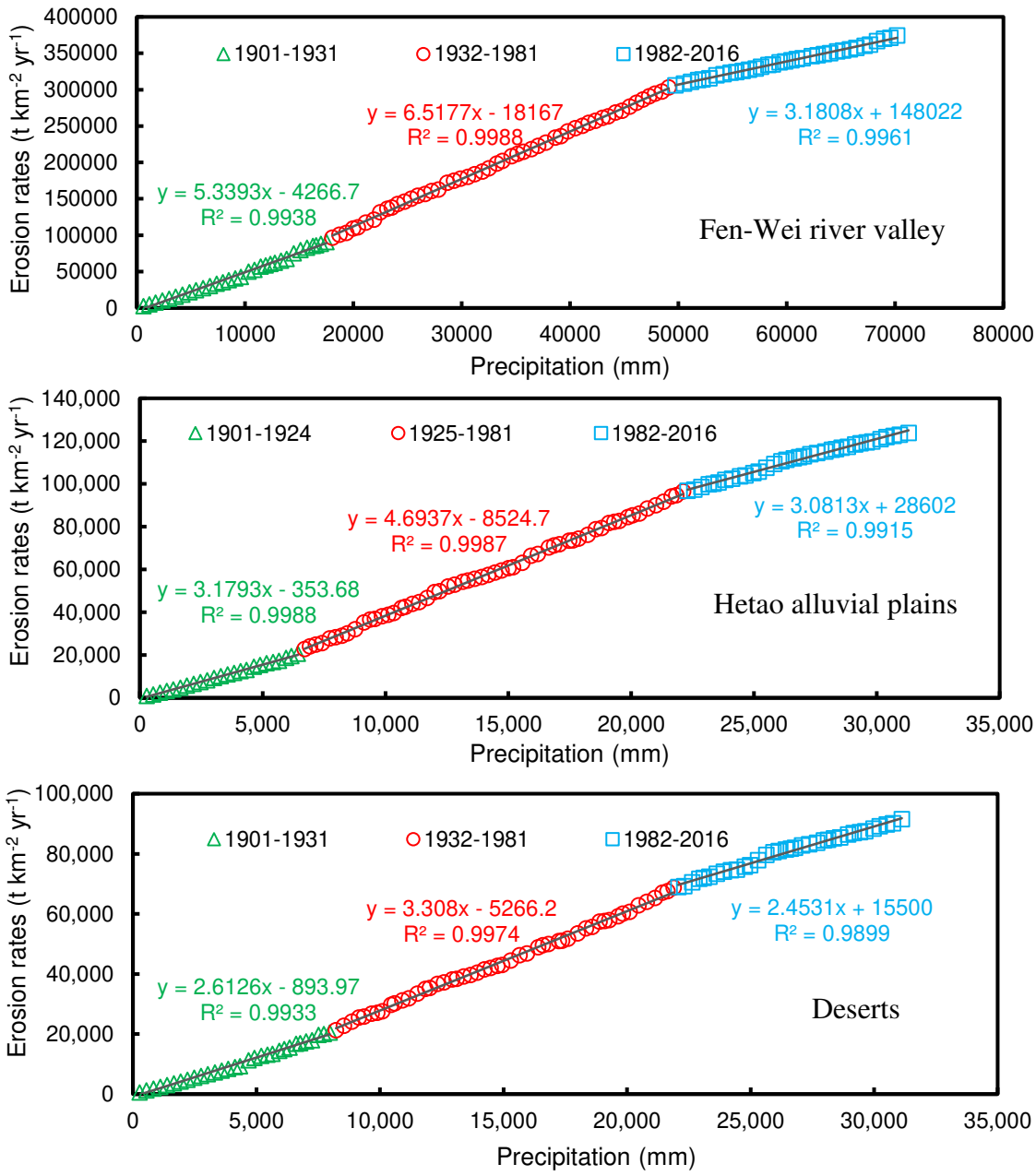


Figure S4. Double mass curves of cumulative precipitation versus erosion rates during 1901-2016.