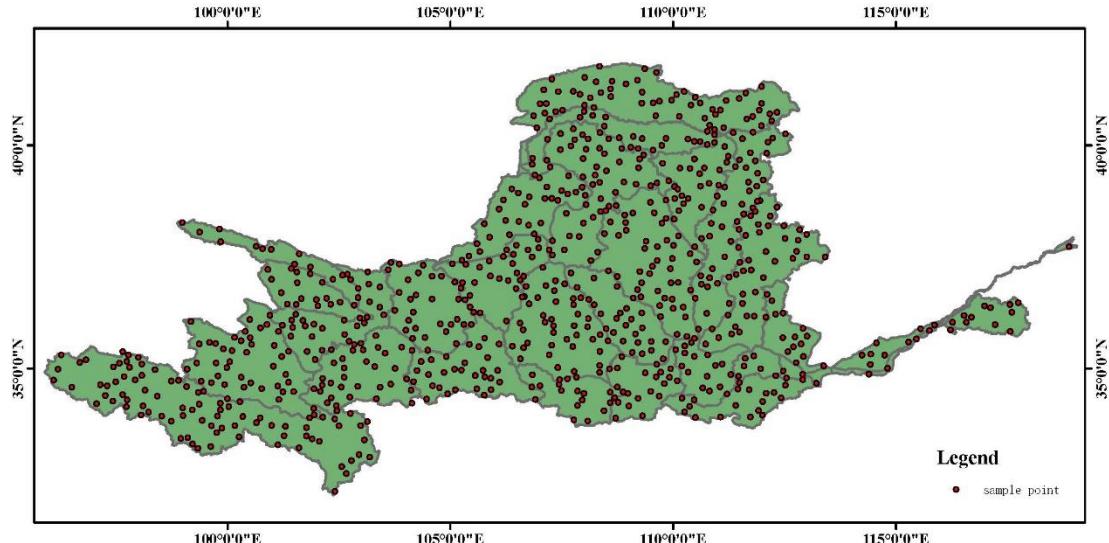
1   **Supplementary materials**

2

3   **Figure S1: Distribution of sample points required by the geographic detector model**

4   **Table S1. Reclassification schemes of the CCI LC land cover dataset**

	CCI LC
1 Forest	50/60/61/62/70/71/72/80/81/82/90/100/160/170
2 Grassland	110/130/140
3 Shrub	120/121/122
4 Cropland	10/11/12/20/30/40
5 Wetland	180
6 Water	210
7 Construction	190
8 Bare land	150/152/153/200/201/202
9 Permanent ice and snow	220

5

6   **Table S2. Parameter values of the R factor formula**

Climatic zone	β	α	ε
BS	1.73	$log\,\alpha = 1.85 - 1.348 \times \beta$	0.3296
BW	1.514	$log\,\alpha = 1.781 - 1.341 \times \beta$	$2.123 - 0.04 \times lat$
Cf	1.5	$log\,\alpha = 3.016 - 2.079 \times \beta$	$-0.012 \times lon - 0.037 \times lat + 3.792$
Cw	1.558	$log\,\alpha = 2.935 - 1.94 \times \beta$	0.817
Dw	1.466	$log\,\alpha = 2.637 - 1.735 \times \beta$	1.24
Df	$2.243 - 0.008 \times lat$	$log\,\alpha = 9.458 - 5.236 \times \beta$	$0.028 \times lon - 0.588$

7   lon refers to the longitude, and lat refers to the latitude.