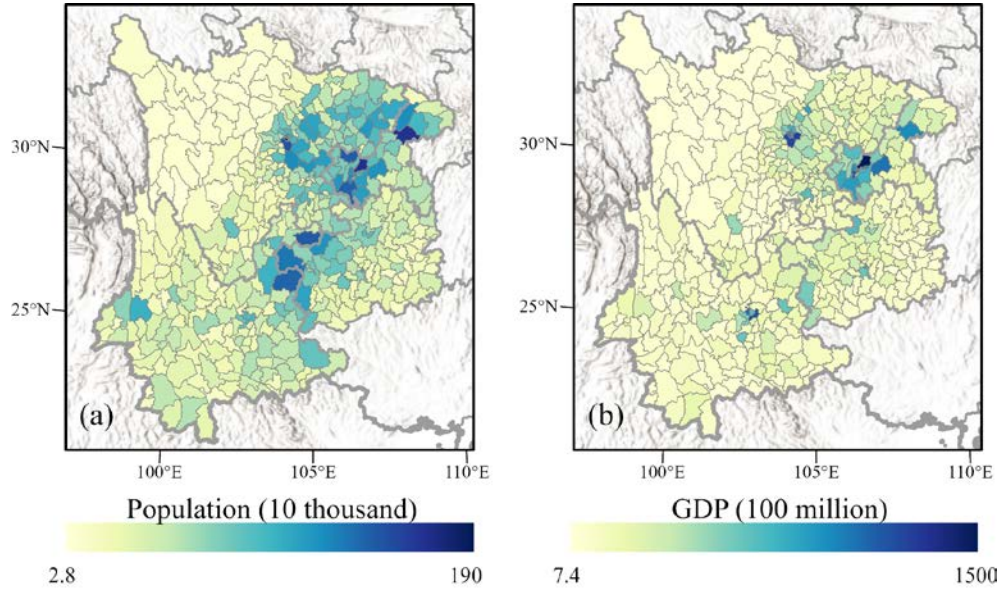
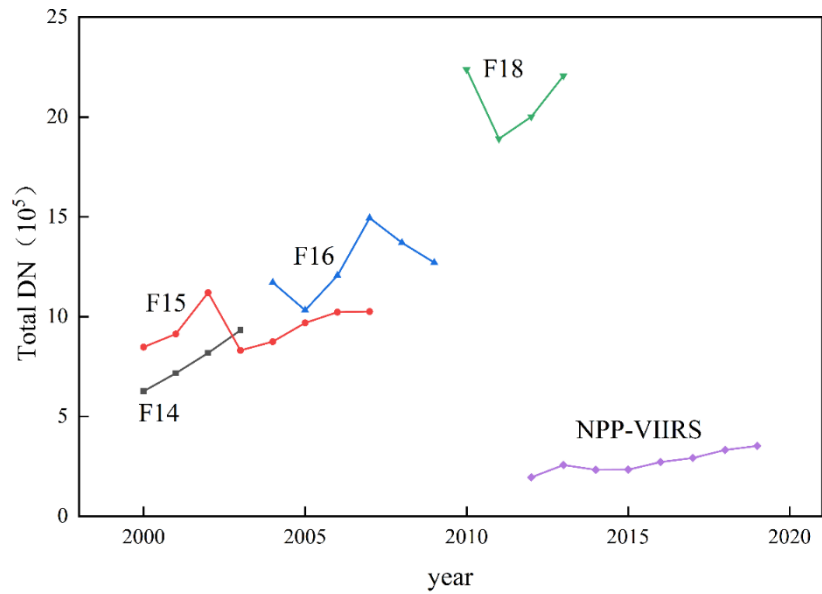


## Supplementary Materials



**Figure S1.** The population (a) and GDP (b) of the southwestern China in 2019.



**Figure S2.** The original NTL data from 2000 to 2013 are composed by images from multiple sensors.

**Table S1.** List of PSO-BP algorithm parameter settings.

Parameter Name	Parameter Value
Learning factor C1	2.0
Learning factor C2	2.0
maximum iteration number	50
population size	20
Inertia factor	0.8
number of neural network layers	3
number of input layer node	4

number of hidden layer node	5
number of output layer node	1

**Table S2.** Abbreviation in this paper and its description.

Abbreviation	Description
NTL	nighttime light
PSO	particle swarm optimization
BP	back propagation
DMSP-OLS	the Defense Meteorological Satellite Program's Operational Line Scan System
NPP-VIIRS	the Suomi National Polar-orbiting Partnership Visible Infrared Imaging Radiometer Suite
ACPI	the actual comprehensive poverty index
ECPI	the estimated comprehensive poverty index
GDP	gross domestic product
DN	digital number
TDN	the cumulated total DN values
CV	coefficient of variation
ANN	artificial neural network
r	correlation coefficient
R2	the coefficient of determination
RE	the relative error
MRE	the mean relative error