Monitoring suspended sediment transport in the lower Yellow River using Landsat observations

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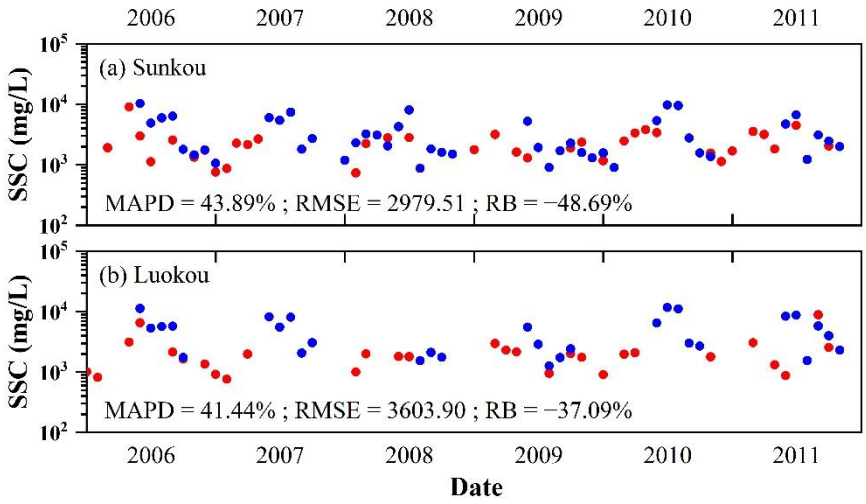

Figure S1. Comparison of time series data of in situ (in blue) and satellite-derived (in red) SSC at the (a) Sunkou and (b) Luokou Hydrological Stations. Please refer to Figure 1 for the geographical locations of the stations.

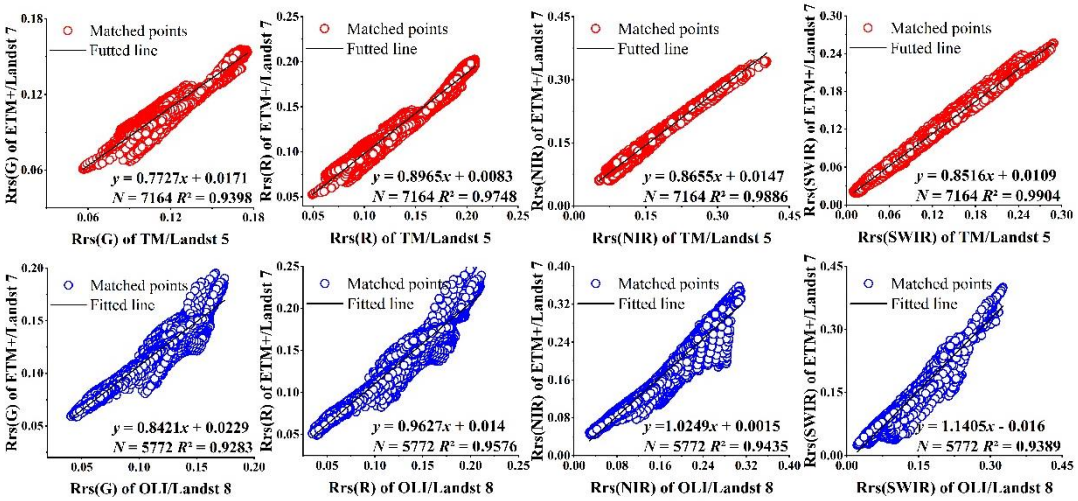

Figure S2. The inter-calibration of Landsat for the individual channels. Rrs(NIR), Rrs(R), Rrs(G), and Rrs(SWIR) correspond to the Rrs in the near-infrared, red, green, and short-wave infrared bands, respectively.

Table S1. Index table of main acronyms

Acronyms	Full name
SSC	Suspended sediment concentration
Rrs	Remote sensing reflectance
MODIS	Moderate-Resolution Imaging Spectrometry
SeaWiFS	Sea-Viewing Wide-Field-of-View Sensor
OLCI	Ocean and Land Color Instrument
TM	Thematic Mapper
ETM+	Enhanced Thematic Mapper Plus
OLI	Operational Land Imager
GloFAS	Global Flood Awareness System
GEE	Google Earth Engine
MAPD	Mean absolute percent difference
RMSE	Root-mean-square error
RB	Relative bias

Table S2. The monthly in situ SSC for the four hydrological stations during two periods. The table shows the arithmetic mean values of the measured SSC (Section 2.2).

Station	SSC range (mg/L)		Mean ± std (mg/L)	
	pre-WSR (1984-1989)	post-WSR (2006-2012)	pre-WSR (1984-1989)	post-WSR (2006-2012)
Sanmenxia	172.86-99,793.55	327.67-215,813.60	24,719.04±24,341.31	28,559.36±50,874.09
Xiaolangdi	98.83-95,414.84	193.00-40,400.00	16,094.19±22,713.97	13,171.10±12,100.94
Huayuankou	2471.67-61,322.58	379.68-10,121.81	11,301.60±12,180.83	1552.63±1945.08
Lijin	402.26-63,203.23	115.35-12,670.65	9583.38±12,148.50	2737.53±2989.98

Table S3. Mean Landsat-derived SSC for five stations during 1984-2022.

Station	SSC (mg/L) Mean ± std
Upstream Sanmenxia	2998.33±1221.41
Sanmenxia	1008.42±602.83
Xiaolangdi	1177.89±627.95
Huayuankou	1580.63±758.18
Lijin	2424.38±1561.25

Table S4. Decadal mean Landsat-derived SSC at two stations on the Yellow River.

Station	SSC (mg/L) Mean ± std	
	1980s	2020s
Upstream Sanmenxia	3580.53±2,051.45	1563.75±271.36
Lijin	3952.90±911.03	1529.14±199.60

Table S5. Seasonal mean SSC in the entire downstream Yellow River

	SSC (mg/L) Mean ± std			
	Spring	Summer	Autumn	Winter
1990s	4795.40±2282.57	9556.65 ± 3512.06	8791.17 ± 3,422.69	2794.15 ± 917.43
2010s	2438.83±4212.89	5536.43 ± 2,188.77	1851.59 ± 2,495.81	814.11 ± 158.27

Table S6. Semiannual mean SSC retrieved from Landsat in two reservoirs.

Reservoirs	Winter and spring	Summer and autumn
Sanmenxia	1,113.94 ± 184.90	1579.66 ± 213.77
Xiaolangdi	919.182 ± 297.92	1391.83 ± 222.53