

Supplementary Materials

Table S1 Abbreviation or symbols

Abbreviation or symbols		Abbreviation or symbols	
Abpm	Adsorption Based Productivity Model	MUMM	Management Unit of the North Sea Mathematical Models
ADEOS	Advanced Earth Observation Satellite	Mar Pollut Bull	Marine Pollution Bulletin
ABs	Algal blooms	MOS	Maritime Observation Satellite
AFAI	Alternative floating algae index	MCC	Maximum cross-correlation
a_w	Assumption of the pure water absorption	MERIS	Medium Resolution Imaging Spectrometer Instrument
AC	Atmospheric correction	MODIS	Moderate Resolution Imaging Spectroradiometer
$b_{bp}(\lambda)$	Backscattering coefficients	MLP	Multi-Layer Perceptron
BBHR	Bio-optical hyperspectral reconstruction	NASA	National Aeronautics and Space Administration
BPNN	BP neural network	NIR	Near-infrared
CNKI	China National Knowledge Infrastructure	NPP	Net primary production

COCTS	Chinese Ocean Color and Temperature Scanner	NDVI	Normalized difference vegetation index
Chla	Chlorophyll a	NMI	Normalized mutual information
CZCS	Coastal Zone Color Scanner	NRTI	Normalized red tide index
CDOM	Colored dissolved organic matter	OCTS	Ocean Color and Temperature Scanner
COMS	Communication Ocean and Meteorological Satellite	OSMI	Ocean Scanning Multispectral Imager
Cont Shelf Res	Continental Shelf Research	Ocean Sci J	Ocean Science Journal
CNN-TL	Convolutional neural network transfer learning model	OE	Optics EXPRESS
CBI	Cyanobacterial bloom intensity	POC	Particulate organic carbon
k_d	Diffuse attenuation coefficient	PC	Phycocyanin
DOC	Dissolved organic carbon	PMRIS	Playful Magnetic Resonance Imaging Simulator
DB-SFNet	Dual-branch sea fog detection network	POLDER	Polarization and Directionality of the Earth's Reflectances
Earth-Sci Rev	Earth-Science Reviews	RF	Random forest
ESTARFM	Enhanced spatial and temporal adaptive reflection fusion model	$L_{rc}(\lambda)$	Rayleigh-corrected radiance

Environ Res Commun	Environmental Research Communications	RI	Red tide index
Environ Sci Pollut Res	Environmental Science and Pollution Research	RS	Remote sensing
ESA	European Space Agency	RSE	Remote Sensing of Environment
FAC	Floating algae cover	$R_{rs}(\lambda)$	Remote sensing reflectance
FLH	Fluorescence line height	Sci Total Environ	Science of the Total Environment
GABI	Generalized algal bloom index algorithm	SFDD	Sea fog data set
GLI	Generation Global Imager	SIA	Sea ice area
GLIMR	Geostationary Littoral Imaging and Monitoring Radiometer	SIT	Sea ice thickness
GOCST	Geostationary oceancolor satellite	SSCs	Sea surface currents
GOCS	Geostationary oceancolor sensors	SSS	Sea surface salinity
HABs	Harmful algal blooms	SeaWiFS	Sea-viewing Wide Field-of-view Sensor
IEEE T-GRS	IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING	SeaDAS	SeaWiFS Data Analysis System
IGAG	Index of floating Green Algae for GOCI	SDD	Secchi disk depth

Indian J Geo-Mar Sci	Indian Journal of Geo-Marine Sciences	SGLI	Second Generation Global Imager
ICWs	Inland and coastal waters	SWIR	Shortwave infrared
JAG	International Journal of Applied Earth Observation and Geoinformation	SERT	Simple semi-empirical radiative transfer
Int J Remote Sens	International Journal of Remote Sensing	SMAP	Soil Moisture Active Passive
ISPRS	ISPRS Journal of Photogrammetry and Remote Sensing	SZA	Solar zenith angle
JAXA	Japan Aerospace Exploration Agency	Spat Inf Res	Spatial Information Research
J Appl Remote Sens	Journal of Applied Remote Sensing	ESOA	Spectral optimization algorithm
J Environ Manage	Journal of Environmental Management	SVR	Support vector regression
JGR	Journal of Geophysical Research-Oceans	SPM	Suspended particulate matter
J Mar Sci Eng	Journal of Marine Science and Engineering	SCI	Synthetic chlorophyll index
J Mar Sci Tech	Journal of Marine Science and Technology	GOCI	The Geostationary Oceanscolor Imager
J Quant Spectrosc Ra	Journal of Quantitative Spectroscopy & Radiative Transfer	UV	Ultraviolet
J Sea Res	Journal of Sea Research	VIIRS	Visible Infrared Imaging Radiometer

Korean J Remote Sens	Korean Journal of Remote Sensing	WR	Water Research
KOMPSAT-1	Korea Multi-Purpose Satellite-1	YRE	Yalu River estuary
Limnol Oceanogr	Limnology and Oceanography	YOC	Yellow and East China Sea Oceanscolor
LCI	Linear Combination Index		

Table S2 The number of articles published based on GOCI in the past ten years, the country, the study area, and research direction

Number of				
Years	published	Country	Study Area	Research Directions
	papers			
2023	1	USA	/	DOC
	2	South Korea	/	Algal blooms
			/	Red tide
	8	China	Lake Chagan	Lake ice

			Hangzhou Bay	Chla
			Hangzhou Bay	SPM
			Bohai Sea	SPM
			The Yangtze	Chla
			Yellow Sea	Chla
			/	Red tide
			Lake Taihu	Algal blooms
2022	1	USA	/	Decadal Measurements
	3	South Korea	Land Surface	Atmospheric reflectivity
			/	Machine learning
			Bohai Sea	Red tide
	9	China	Chaohu Lake	Chla
			/	Machine learning

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			Hangzhou Bay	SPM
			The East China Sea	Algal blooms
			Turbid Coastal Waters	SPM
			/	NPP
			/	Sea surface salinity
			/	Sea surface currents
			/	Sea fog
2021	1	India	Yellow Sea	Algal blooms
	3	South Korea	/	FLH algorithm
			/	Chla
			Yellow Sea	SPM
	7	China	The Yangtze	SPM
			Lake Taihu	POC
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			Taiwan coastal waters	SPM
			Yellow Sea	Algal blooms
			/	Sea ice
			Eutrophic Lake	POC
			The East China Sea	K _d
2020	3	South Korea	Turbid water	Water reflectance
			Turbid water	Atmospheric correction
			/	Sea fog
	9	China	/	Chla
			Shallow and eutrophic lakes	Water clarity
			Turbid Coastal Waters	Water clarity
			Lake Taihu	Atmospheric correction
			Turbid Coastal Waters	Atmospheric correction

			Turbid Coastal Waters	Chla
			Lake Taihu	Chla
			Lake Taihu	Chla/ Algal blooms
			The East China Sea	Chla
2019	1	India	/	Chla
	1	South Korea	/	SPM
	10	China	Lake Taihu	SPM
			Lake Taihu	SPM
			Yellow Sea	Atmospheric correction
			Turbid water	Atmospheric correction
			The East China Sea	Algal blooms
			Bohai Sea	Sea ice
			Coastal and inland waters	HABs

			The Yangtze	POC
			Yellow Sea	Sea surface salinity
			Jiaozhou Bay	Review
2018	1	South Korea	/	HABs
			East Sea	Algal blooms
	8	China	The Yangtze	SPM
			Yongjiang Estuary	SPM
			/	SPM
			Lake Taihu	Algal blooms
			Lake Taihu	SPM
			The Yangtze	SPM
			Yellow Sea	Algal blooms
			Bohai Sea/Yellow Sea	Water clarity

2017	2	South Korea	/	Green tide
			/	SPM
	9	China	Yellow River	Turbidity
			/	Literature Review
			Dongping Lake	Chla
			The Yangtze	Atmospheric correction
			The Yangtze	CDOM
			Lake Taihu	DOC
			Yellow Sea	Green tide
			Yellow Sea/Bohai Sea	PC
			Highly turbid waters	Sea surface currents
2016	2	South Korea	Yellow Sea	Sea ice
			North-East Asian	Chla

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	7	China	/	Turbidity
			Lake Taihu	Chla
			Lake Taihu	TP
			Bohai Sea	SPM
			Bohai Sea	Sea ice
			Yellow Sea	Turbidity
			/	K _d
2015	1	South Korea	The East China Sea	Algal blooms
	1	Netherlands	The Yangtze	Attenuation coefficient
	5	China	Lake Taihu	Chla
			Lake Taihu	Algal blooms
			Inland Waters	Chla
			Lake Taihu/Dongting Lake	Chla
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			Bohai Sea	Sea ice
2014	1	USA	/	Turbidity
	4	China	/	Literature Review
			The East China Sea	Algal blooms
			Bohai Sea	Sea ice
			/	Sea surface currents
2013	1	South Korea	Coastal waters	SPM
	4	China	/	Sediment
			Coastal waters	SPM
			Coastal waters	Sea surface currents
			Yellow River Estuary	SPM
2012	1	China	Complex waters	Atmospheric correction
	4	South Korea	/	Floating Green Algae

			/	Atmospheric correction
			East Sea	CDOM
			Bohai Sea	SPM
2011	1	South Korea	/	Literature review
2010	1	France	The East China Sea	SPM
	1	South Korea	/	Literature review
	2	China	Turbid inland waters	Chla
			/	Atmospheric correction
