

Supplement:

1、 R_{wj} estimation

R_{wj} is the surface reflectance of three deep water areas. The coordinates for the top-left and bottom-right corners of these areas are provided in Figure S1 as follows:

① [114.23825130261295, 13.636935490401187]

[114.61178645886295, 13.25226730278519]

② [134.96966023951578, 21.048223768929386]

[135.58489461451578, 20.51410391089155]

③ [164.4532277212974, 31.081378316597455]

[168.4522511587974, 27.635093971239797]

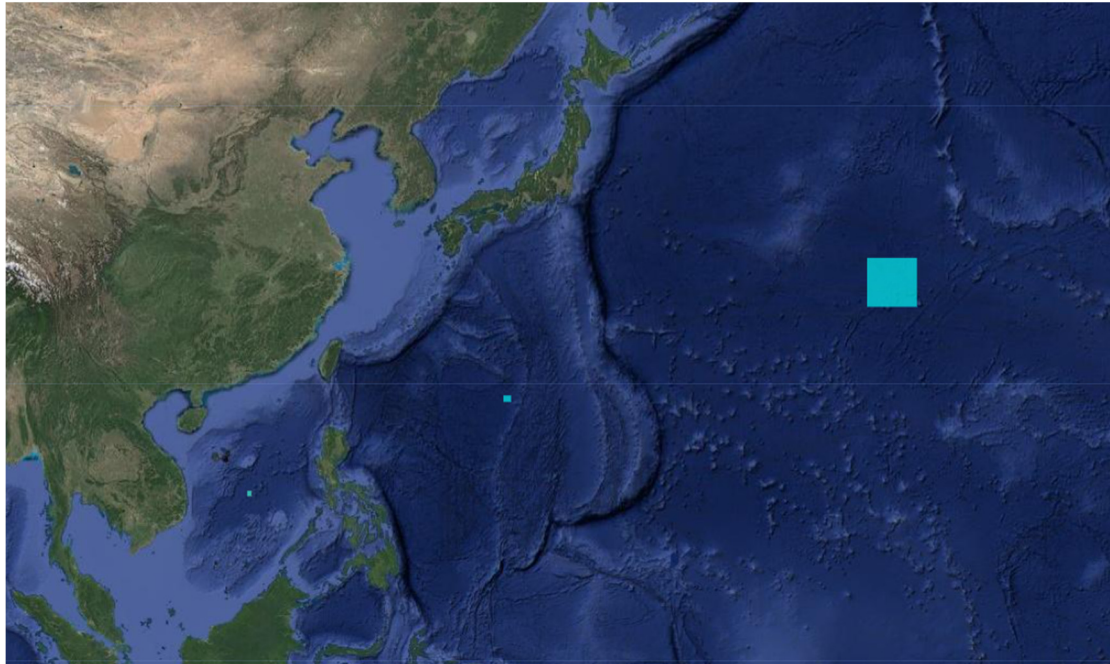


Figure S1. The regions for deep water areas.

2、The comparison of bathymetry retrieval models

In this study, we have revised the model comparisons by testing different band combinations (e.g., blue+green bands, red+green+blue bands) across various models, including the log-transformed band ratio model (BRM), linear band model (LBM), random forest (RF), and support vector regression (SVR). As shown in Table S1, our results indicate that the R^2 values for Zhanjiang Port range from 0.06 to 0.37, with SVR and LBM performing best overall.

Table S1. The bathymetry retrieval model tested in Zhangjiang Port

2019.09-2022.09 Sentinel-2 Zhanjiang		SampleAll
Model	Bands	R2
BRM	B + G	0.366
	B+R+ G	0.360
LBM	B + G	0.175
	B+R+ G	0.306
SVR	B + G	0.19
	B+R+ G	0.306
RFR	B + G	0.06
	B+R+ G	0.26

3. The scatter plot between SDB and in situ bathymetry based on L8 and S2

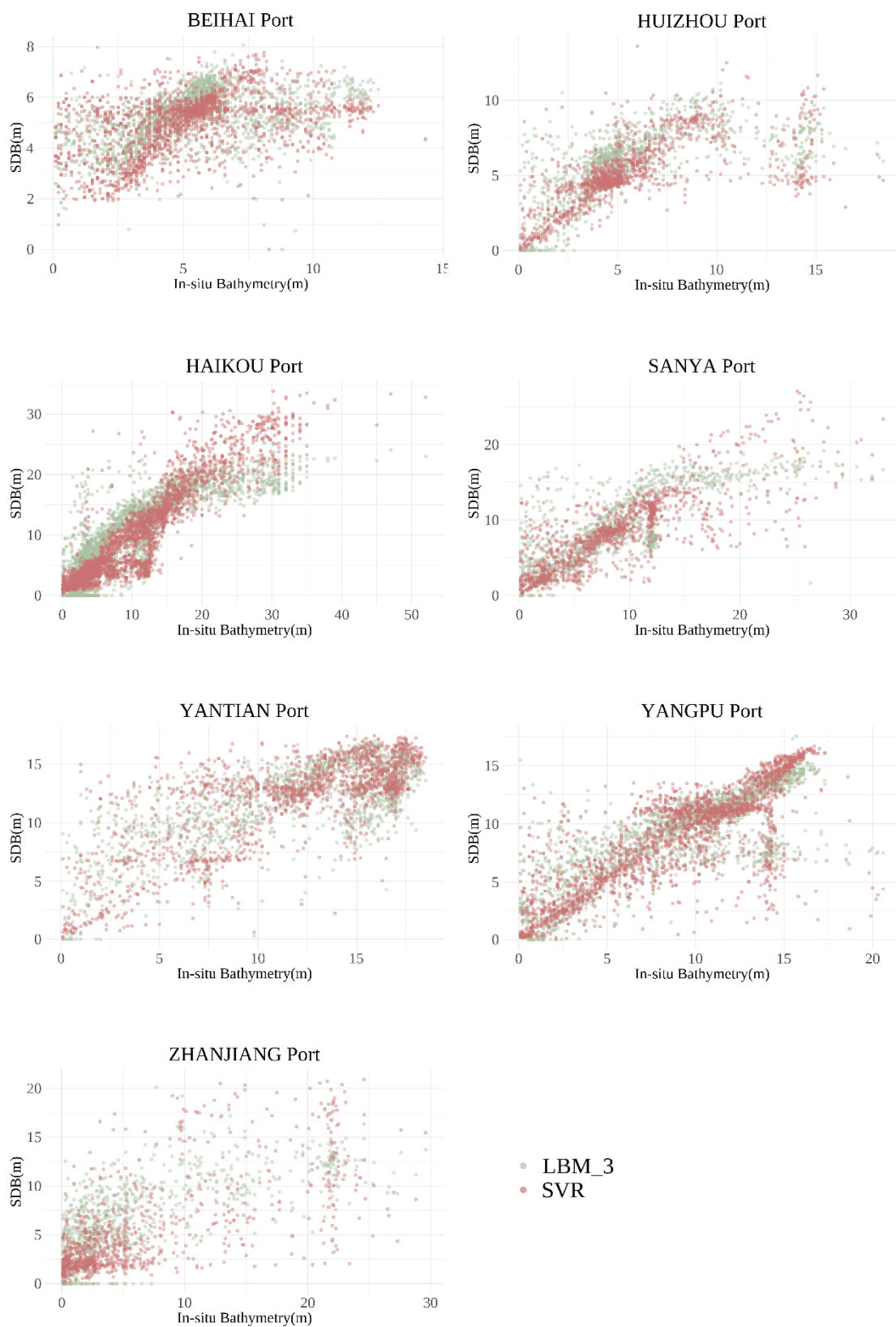


Figure S2. The correlation between SDB and in situ bathymetry based on Landsat8

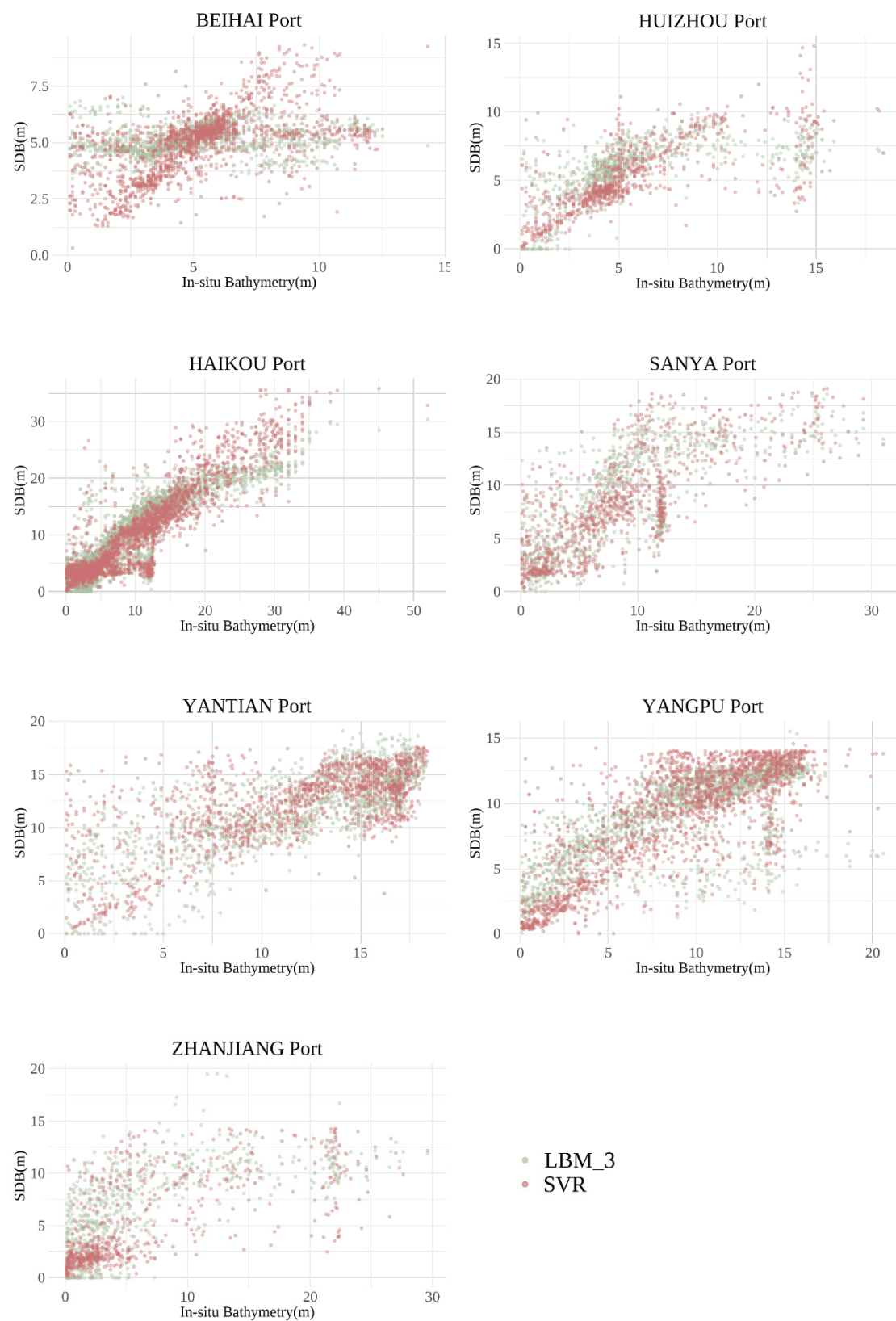


Figure S3. The correlation between SDB and in situ bathymetry based on Sentinel-2

4、 The difference of retrieval bathymetry based on L8 and S2

SDB Difference (LBM-SVR)

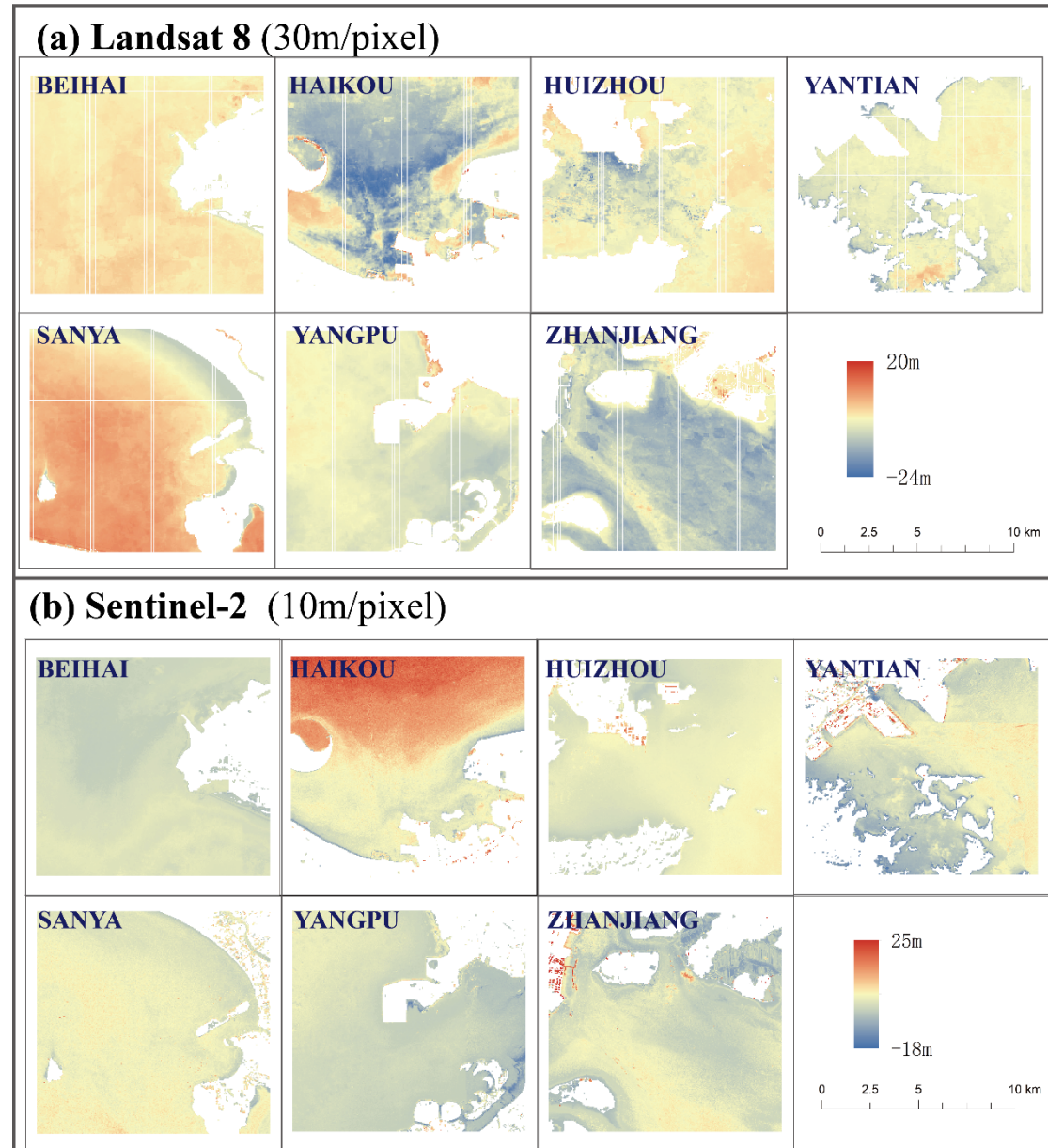


Figure S4. Bathymetry differences between LBM and SVR models across seven ports.

SDB Difference (S2-L8)

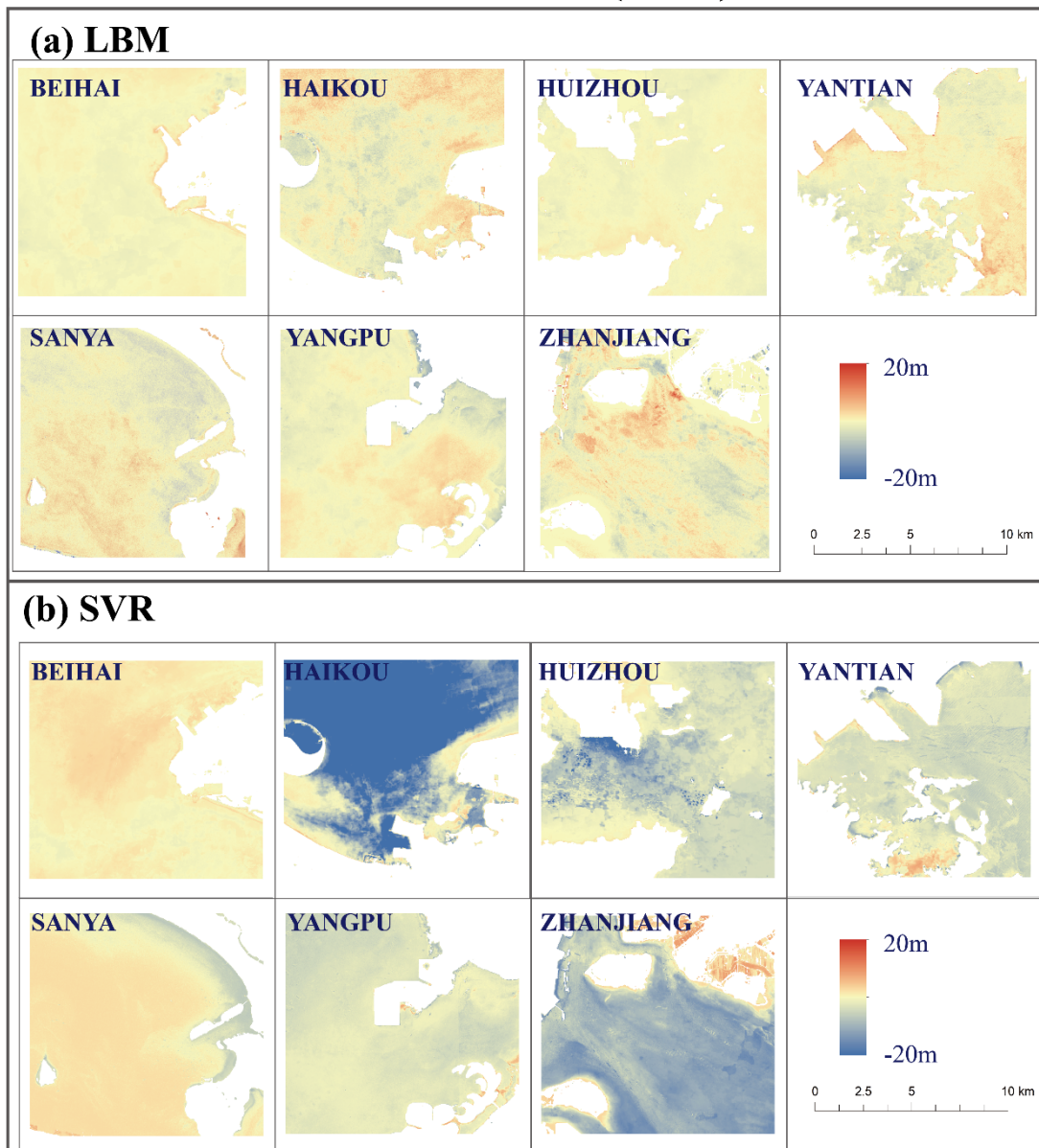


Figure S5. Bathymetry differences between S2 and L8 satellites at a 10-meter resolution across seven ports.

5. The differences in retrieval turbidity based on L8 and S2

Turbidity Difference (NTU) (S2-L8)

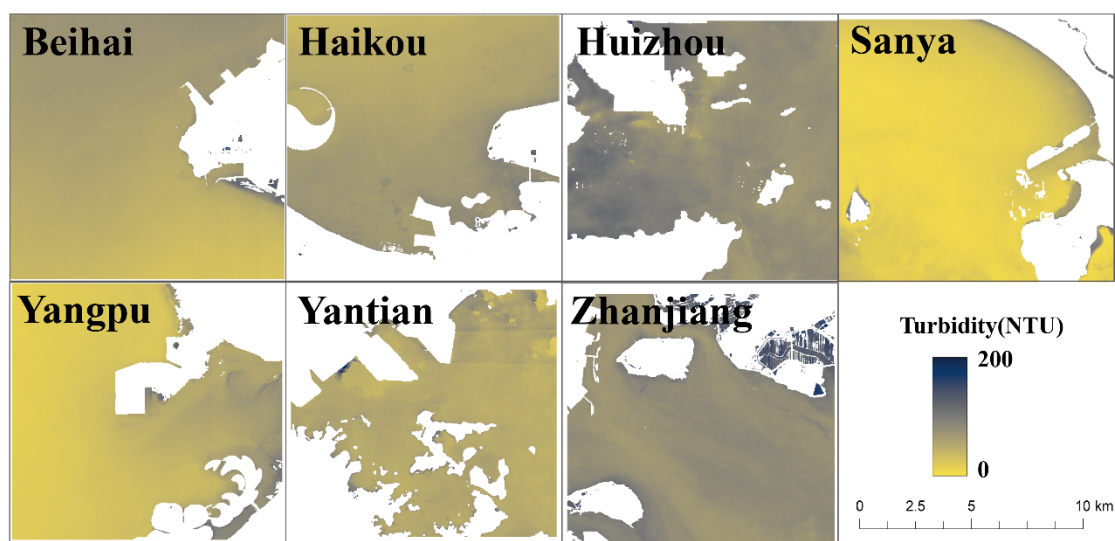


Figure S6. Turbidity differences between S2 and L8 satellites at a 10-meter resolution across seven ports.

6、The clustering results based on turbidity

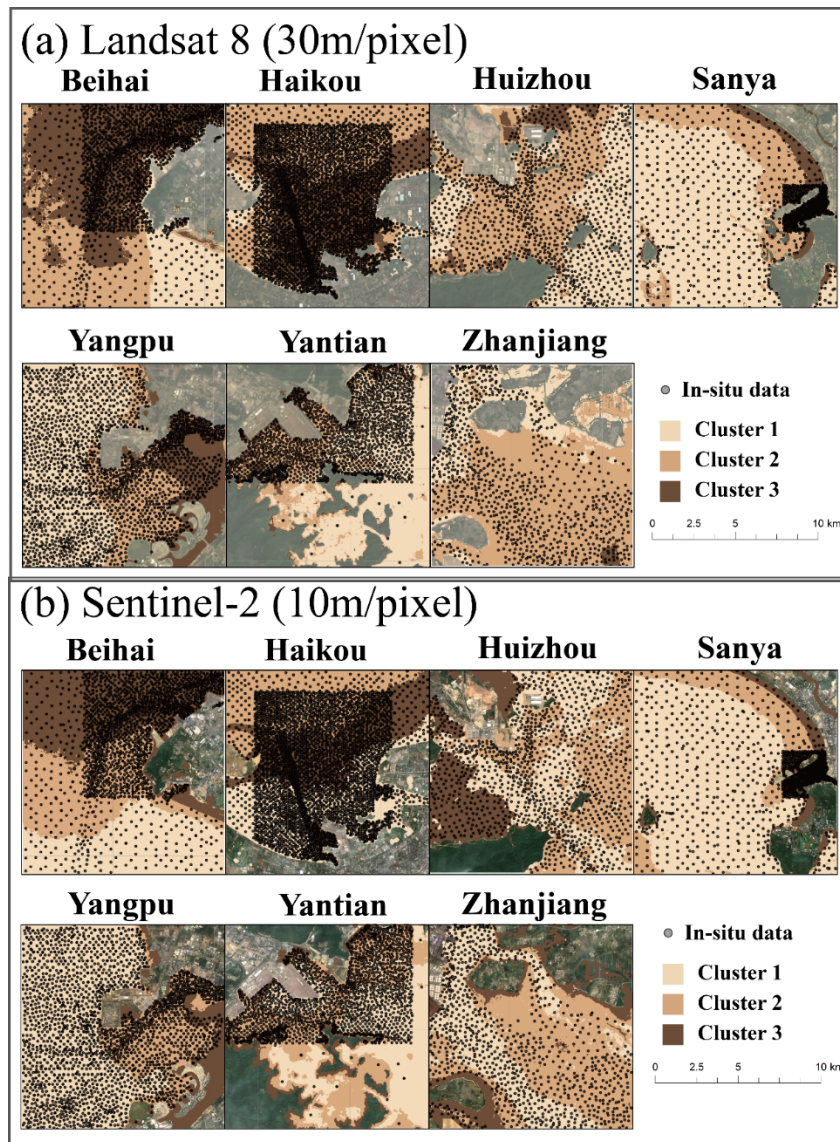


Figure S7. The cluster results based on water turbidity across seven ports