Progress Report

Utility of HICO imagery in Monitoring Coastal Waters with High Content of Sediments

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1. Data acquired

As shown in table 1, since November, 2011, 19 HICO images have been collected at the Yellow River Delta, and only 4 of them have not much of clouds and can be used for study in proposal: Nov. 20th, 2011, Jan. 11th, 2012, May 3rd, 2012, and May 9th, 2012. At another investigation site, Northern Jiangsu Shoal, there are only 2 images collected, and neither of them can be used in water remote sensing due to the cover of clouds.

On Oct. 18th, 2011 and Oct. 30th, 2011, two field investigations were conducted to measure water spectral reflectance, suspended sediments concentrations. There is no simultaneous match data between field investigation and images.

Table 1 HICO images collected since November, 2011

Site imagery	Description
	Yellow River Estuary **Long,Lat:** 119.28406 E**,** 37.72728 N 19 HICO images in total has been collected, and 4 of them with high quality were used for further study.
	Northern Jiangsu Shoal **Long,Lat:** 120.54199 E**,** 33.77915 N 2 HICO images in total has been collected, but there is no high quality image data.

2. Results

FLAASH (Fast Line of sight Atmospheric Analysis of Spectral Hypercubes) in ENVI was adopted in atmospheric correction for HICO images collected at the Yellow river delta (Fig. 1), and the generated reflectance were compared with in-situ collected water reflectance (Xing et al., 2012) and the China satellite hyperspectral sensor HJ-1A/HSI (Lou et al., 2012, in review). Results show that HICO reflectance can indicate the changing suspended sediments concentration

(SSC, 10 to 300 mg/L) in the turbid waters and the HICO spectral reflectance were generally consistent with the in-situ measured ones. The reflectance value at 817.4 nm (band 73) may be used as an index of SSC, and the SSC distribution results were in our expectation. With the increase of SSC, the reflectance peak in 450-750 nm shifted towards longer wavelength. Compared to HJ-1A/HSI, the HICO images have better performance both in image texture (Fig. 2) and spectra (Fig. 3).

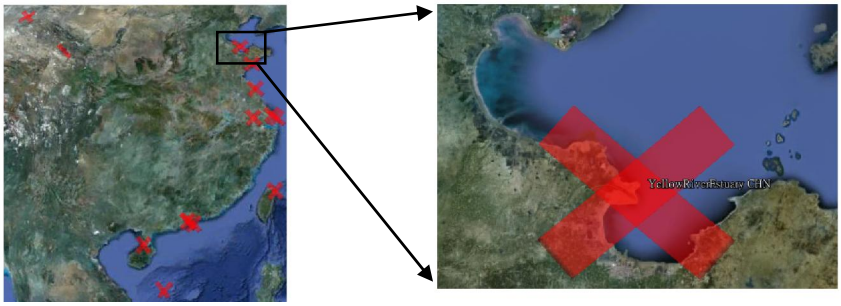

Fig.1 HICO's targets in China and its orbits at the Yellow River Delta (Lou et al., 2012, in review)

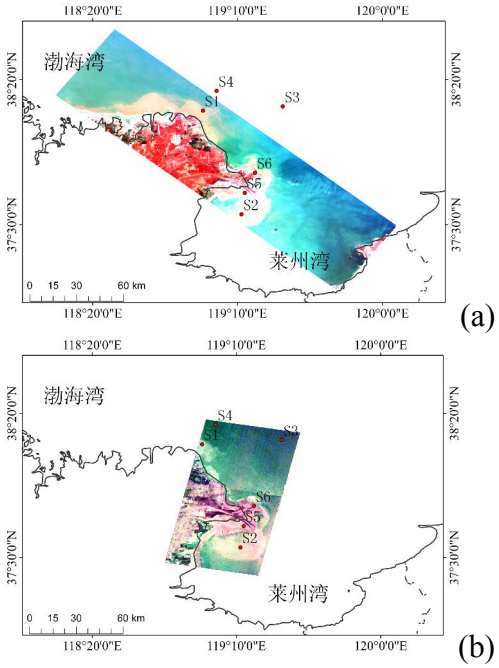

Fig.2 Images of HICO and HIS at the Yellow River Delta (Lou et al., 2012, in review):

(a) HICO, (b) HSI with correction of strip

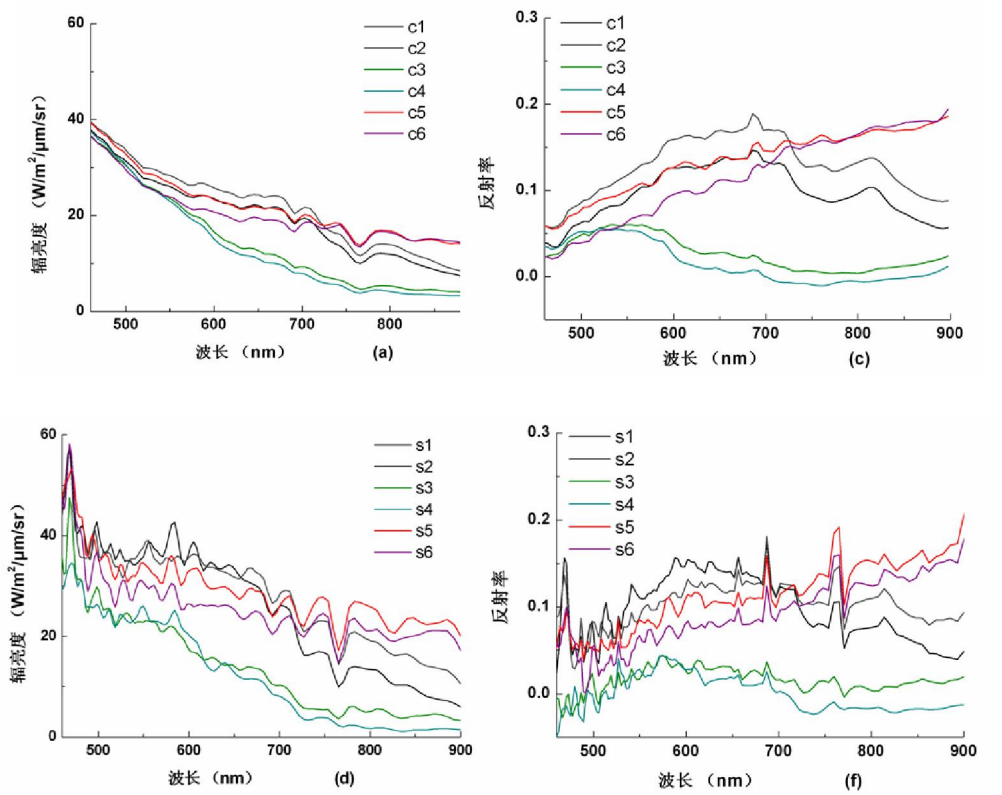

Fig. 3 The spectra of selected ground targets in the Yellow River Delta. (a): HICO radiance, (c): HICO reflectance, (d): HSI radiance and (f): HSI reflectance. (Lou et al., 2012, in review)

3. Future work

We hope hat atmospheric corrected standard products of HICO can be downloaded from website. Otherwise, we will look for other atmospheric correction modes.

More optical data and water samples will be collected to investigate the potential of HICO in monitoring very turbid coastal waters, i.e., the Yellow River Estuary and SSC retrieval model will be established against HICO data.

4. Publications

Q. Xing, M. Lou, D. Yu, R. Meng, P. Shi, F. Braga, L. Zaggia, L. Tosi, 2012. Features of turbid waters from Hyperspectral Imager for the Coastal Ocean (HICO): preliminary results at the Yellow River Delta and the Bohai Sea. IEEE WHISPERS: The 4th workshop on hyperspectral image and signal processing: evolution in remote sensing, Shanghai, P. R. China, June, 2012.

M. Lou, Q. Xing, P. Shi. 2012. Coastal Zone Remote Sensing and HICO. Remote Sensing Science and Technology. (in Chinese, in review)