

## MONITORING DYNAMICS OF COASTAL WETLANDS AND SUSPENDED SEDIMENT WITH HIGH (TEMPORAL/SPATIAL/SPECTRAL) RESOLUTION SATELLITE IMAGES

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### List of Principal Investigators (PIs)

Topic Nr.	PIs	Title
32405_1	Prof. Shubha Sathyendranath, Prof. Tingwei Cui	<b>Synergistic ocean color observation based on polar-orbiting and geostationary satellite images</b>
32405_2	Prof. Shubha Sathyendranath, Dr. Yi Ma	<b>Wetlands monitoring using high resolution remote sensing images in Yellow River estuary</b>

### EXECUTIVE SUMMARY

High resolution, in the temporal, spatial or spectral dimensions is one of the major trends of satellite remote sensing, with which one may derive more subtle and detailed information from the earth observation data. The objective of this project is to explore and demonstrate the technical possibility and capability of the high resolution remote sensing in the discipline of monitoring of coastal wetlands and suspended sediment, whose variability is of vital importance to human being. Specifically, In the monitoring of suspended sediment, geostationary optical satellite data are characterized by high temporal resolution (0.5~1h) and coarse spatial resolution (500m~4km), compared to the polar-orbiting optical satellite images, which are characterized by the higher spatial resolution (30m~1km) and longer revisit period (1~16d). So, synergistic utilization of geostationary and polar-orbiting optical images would provide the possibility of producing ocean color products at both the high spatial and temporal resolutions. The specific outcome of this research is the new ocean color retrieval method by synergistic use of optical images from polar orbiting satellite (e.g. Sentinel-3, HJ-1 CCD, Landsat-8 OLI, etc.) and geostationary satellite (GOCI, FY-2). For the monitoring of coastal wetlands, three main topics will be addressed in this proposal. Firstly, new method to detect the estuarine wetland changes will be developed for high spatial resolution satellite data to aid the high frequency, large scale coastal wetland mapping. Secondly, new algorithm for wetland types classification in fine scale based on hyperspectral images will be developed. Finally, the biomass and carbon storage of the estuarine wetlands will be retrieved with hyperspectral remote sensing image. Available funding from China's side includes projects of NSFC and SOA.

<b>ABSTRACT 32405_1: “Synergistic ocean color observation based on polar-orbiting and geostationary satellite images”</b>	
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<p>Geostationary optical satellite data are characterized by high temporal resolution (0.5~1h) and coarse spatial resolution (500m~4km), compared to the polar-orbiting optical satellite images, which are characterized by the higher spatial resolution (30m~1km) and longer revisit period (1~16d). Synergistic utilization of geostationary and polar-orbiting optical images would provide the possibility of producing ocean color products at both the high spatial and temporal resolutions.</p> <p>The objective of this project is to develop the new ocean color retrieval method by synergistic use of optical images from polar orbiting satellite (e.g. Sentinel-3, HJ-1 CCD, Landsat-8 OLI, etc.) and geostationary satellite (GOCI, FY-2).</p> <p>The roadmap is as follows. Firstly, the ocean color products (e. g. suspended particulate sediment concentration, SPM) from polar orbiting and geostationary satellite images over the turbid waters along China coast will be validated. Secondly, the new retrieval methods based on synergistic utilization of polar orbiting and geostationary satellite images will be developed and assessed. Finally, the new ocean color products with both the high spatial and temporal resolutions will be produced, and the spatio-temporal pattern and variability will be characterized.</p> <p>The research will be undertaken by scientists from Plymouth Marine Laboratory (PML), UK and First Institute of Oceanography (FIO), State Oceanic Administration (SOA), China. Available funding from China's side includes projects of NSFC and SOA.</p>	

<b>ABSTRACT 32405_2: “Wetlands monitoring using high resolution remote sensing images in Yellow River estuary”</b>	
<b>European Principal Investigator</b> Prof. Shubha Sathyendranath (Plymouth Marine Laboratory, United Kingdom)	<b>Chinese Principal Investigator</b> Dr. Yi Ma (The First Institute of Oceanography, State Oceanic Administration, CHINA)
<p>Coastal wetlands, especially the large river estuary, play an important role in the global climate change, and thus the distribution and changes of the river estuary wetland has been a hot research topic. In recent years, a growing number of high-resolution satellites have been launched into orbit, for example the Resource Satellite Series and the GF satellite Series of China, and the Sentinel Satellite Series of ESA. All these satellite data are playing an increasingly important role in coastal wetland monitoring. On the other hand, the operational wetland monitoring by the local and state governments need the assistance of high-resolution remote sensing technology.</p> <p>In this project, we choose the Yellow River Estuary, one of the three largest river estuaries, as the study area to explore the high-resolution remote sensing technology for river estuary management. Three main research contents are involved. Firstly, for high frequency and large scale coastal wetland thematic mapping, we plan to develop estuarine wetland change detection method based on high spatial resolution satellite data; secondly, in order to obtain the wetland types classification results in the fine scale, we intend to develop the precise monitoring algorithm based on the hyper-spectral remote sensing image; finally, in order to meet the requirements of wetland ecosystem monitoring, we hope to develop the retrieval model for estuarine wetlands biomass/carbon storage based on the hyper-spectral remote sensing image.</p> <p>Available funding from China's side includes projects of NSFC and SOA.</p>	