Inter-sensor Comparison of Satellite Ocean Color Products from GOCI and MODIS



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Outline

- A brief overview of GOCI — Example of GOCI hourly imagery
- Ocean optics theory
- The Red Band Difference (RBD) and Fluorescence Line Height (FLH) techniques
 - Comparison between RBD, FLH and blue-green band ration algorithms
- MODIS vs. GOCI ocean color products
- MODIS vs. NCOM predicted SST
- GOCI hourly turbidity variation vs. NCOM predicted current
- Conclusion

A brief overview of GOCI

- World's first geostationary ocean color sensor providing images every hour for same geographic area (9am to 4pm local time)
- Eight visible to near-infrared bands, 500m spatial resolution, and coverage region of 2,500×2,500 km centered at Korea (East Asia: South & North Korea, China, Japan, Russia, Taiwan)
- GOCI Applications: harmful algal blooms (HAB), health of marine ecosystem, suspended sediment and current movement, improved marine fisheries information, ocean forecasting (with modeling), etc.
- Wide dynamics range of S/N (>1000): necessary for detection of very weak variation of ocean signal.

GOCI Hourly Imagery

13 May 2011 (8 hourly images, 0915-1615 local)



5 April 2011 (8 hourly images, 0915-1615 local)



Ocean Optics Theory



RBD & FLH

The Red Band Difference (RBD)

RBD and **FLH** are less sensitive to atmospheric corrections and **CDOM** absorption

RBD eliminate errors inherent in retrieval algorithms



Fluorescence Line Height (FLH)

 $FLH = nLw(\lambda_2) - nLw(\lambda_1) - (\lambda_2 - \lambda_1) * [(nLw(\lambda_3) - nLw(\lambda_1))/(\lambda_3 - \lambda_1)]$





MODIS SST vs. NCOM predicted SST



Hourly turbidity variations



GOCI data NCOM predicted data

Conclusion

- This study successfully separate algal and non-algal particles from GOCI and use MODIS as ground truth to validate the results.
- GOCI can be used effectively to monitor the temporal dynamics of the turbidity due to algal and non-algal particles in the coastal and open waters.
- Good agreement between GOCI and MODIS suggest that GOCI sensor is capable of producing quality ocean color products.
- Sediment movement shown by hourly GOCI FLH images agrees well with the dynamics predicted by the NCOM model. However, further study with in-situ data is necessary to refine the results.

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