

JAXA/EORC Joint PI Work Shop 2020JFY, Online, 21 January 2021 Wildfire detection and FRP retrieval from SWIR data of SGLI

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1. Introduction

Spatial resolution of 250 m of SGLI is expected to detect wildfires with high accuracy. We investigated wildfire detection and fire radiative power (FRP) retrieval using SW3 (1.6 um) and SW4 (2.2 um) data from SGLI.

2. Hot spot detection

1.We assumed that SW3 (1.6 um) and SW4 (2.2 um) are insensitive to the Earth surface temperatures.

2.Hot spots are detected by comparing the normalized standard





250x250 (=FOVsw3 = 1/16 FOVsw4)

deviation (n_{σ} , Eq. (1)) with a threshold.

3.We use two thresholds, one $(n_f=4)$ to detect hot spots and another one (n_{f0}=3) to find likely hotspots in the neighborhood of each detected hot spot (Figs. 1-3, Tables 1-3).



Table 1 Confidence level. A confidence level is decided for each detected hotspot based on the n σ and the detection frequency during 2018-2019 (Fig. 3).

Level	Description					
1	$L < 8 \sigma_{e}$ (L < 32 σ_{e} for water pixel), non vegetated (snow. ice. barren). or					
	5.6 m ²	250x250 (=FOVsw3 = 1/16				

in the brackets shows the total number of 2.5x2.5 grids.

5.6 m²

		SGLI				
_	2019	1	2	3	4	5
	April	0.61 % (185)	0.67 (123)	0.76 (62)	0.85 (27)	1.00 (15)
	May	0.66 (146)	0.70 (93)	0.74 (54)	0.79 (28)	0.92 (12)
	June	0.65 (196)	0.69 (124)	0.75 (72)	0.81 (41)	0.71 (21)
	July	0.67 (142)	0.76 (94)	0.85 (46)	0.88 (24)	1.00 (9)
FOVsw4)	pr Jul.	0.64 (669)	0.70 (434)	0.77 (234)	0.83 (120)	0.88 (57)



	FRP					
SW4	sensitive		insensitive	saturate		
SW3	insensitive	sensitive	saturate	sensitive		
April 2019	1,690	15,217	79	5,814	91	
May	984	10,046	59	4,059	42	
June	322	4,340	21	2,049	30	
July	453	5,040	29	2,351	38	
Apr Jul. 2019	3,449	34,643	188	14,273	201	
%	6.54	65.67	.36	27.06	.38	

FRP (Wm²) SGLI FRP (MW)

Fig. 4 SGLI vs. Himawari-8. FRPs retrieved from SGLI SWIR data were compared with those from Himawari-8 which were determined by performing a Bi-spectral method (Dozier 2918) with SWIR and MIR data.

4. Summary

1.More than 60 % of hotspots detected using SWIR data of SGLI agreed with those detected from Himawari-8 TIR and MIR data. 2.FRPs retrieved from SGLI SWIR data show good agreements with those retrieved from Himawari-8 data.

References

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