FEASIBILITY OF FENGYUN-3B VIRR AND METOP-B AVHRR TO DETECT LARGE FIRES BASED ON TERRA & AQUA MODIS AND SNPP VIIRS MEASUREMENTS

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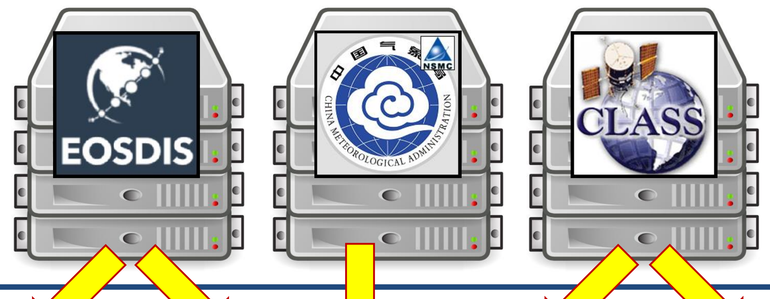
Region of study:

North-East China:
- Latitudes: [39, 54]º
- Longitudes: [115, 135]º

Periods of time:
- 2014/02/15 to 2014/04/15
- 2014/07/01 to 2014/08/31

Workflow:

Data acquisition



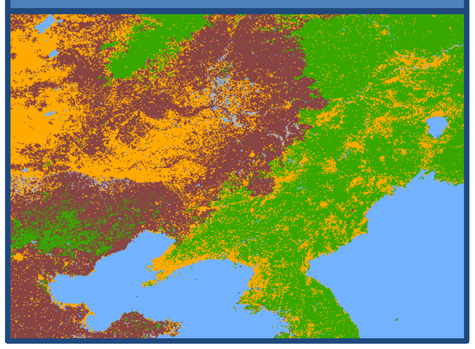
AQUA	TERRA	FY3B	SNPP	METOP-B
MODIS	MODIS	VIRR	VIIRS	AVHRR
MYD14	MOD14	GFR	VAF	Custom*

*Conditions to consider a L1B pixel as a fire hotspot:
- 20% clear sky (DN3.9 < 900) in 51x51 sq. around pixel
- (clear sq. DN3.9 – pixel DN3.9) / std(clear DN3.9) > 5.0
- (clear sq. DN12 – pixel DN12) / std(clear DN12) < 1.2

Normalization

Relevant GlobCover classes for fire hotspot detection: [40, 130]

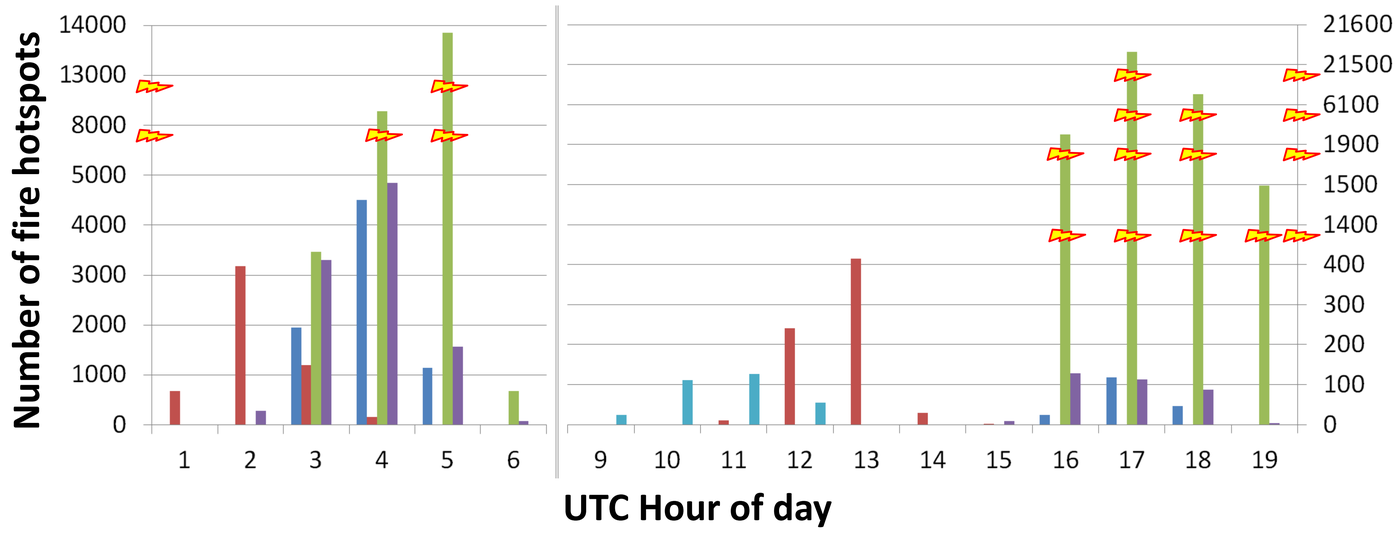
GlobCover filter



Fire hotspot cross validation: intercomparison

Equality for two hotspots:
- |Time lapse| < 6 h
- |Latitude difference| < 0.02º
- |Longitude difference| < 0.02º

Preliminary results:



Day		TARGET				
		A	T	F	N	M
SOURCE	A	7612	2815	3244	5070	9
	T	2661	5211	2012	3120	1
	F	6505	4230	26274	7278	22
	N	5867	3919	4264	10065	12
	M	0	0	0	0	0

Night		TARGET				
		A	T	F	N	M
SOURCE	A	189	69	19	128	4
	T	90	696	6	108	52
	F	67	21	31082	49	0
	N	172	95	24	339	9
	M	16	85	19	27	315

Day = from 21:00 UTC to 08:59 UTC + 1 day, Night = from 09:00 UTC to 20:59 UTC
Satellite codes: A = AQUA, T = TERRA, F = FY3B, N = SNPP, M = METOP-B

First conclusions and acknowledgements:

- Fengyun-3B detects ≈40% of fire hotspots from reference satellites during daytime. This percentage is much lower during the night. Fengyun-3B VIRR GFR also contains a huge amount of false fire hotspots due to noise lines (it should be filtered in further analysis).
- METOP-B is restricted to nighttime because of limitation in the number of channels. The best matching occurs with Terra due to temporal proximity. An acceptable number of hotspots is detected but METOP-B geolocation is not so accurate and this issue makes difficult the matching with fire products from other satellites with better geolocation.
- All the fire datasets come from official repositories of NASA EOSDIS, CLASS NOAA and NSMC Fengyun Satellite Data Center. We thank Liu Cheng (NSMC/CMA) for helping with the documentation of VIRR GFR. V. M. and M. G. thank FUNGE for economical support.