remote sensing

Supplementary Materials

Table S1. Characteristics of satellite data used.

Band	Wavelength (nm)	Resolution (m)	Band Applications
Landsat-5 TM			
1	450 – 520	30	Bathymetric mapping, distinguishing soil from vegetation, and deciduous from coniferous vegetation
2	520 – 0.600	30	Emphasizes peak vegetation, which is useful for assessing plant vigor
3	630 – 690	30	Discriminates vegetation slopes
4	760 – 900	30	Emphasizes biomass content and shorelines
5	1550 – 1750	30	Discriminates moisture content of soil and vegetation; penetrates thin clouds
6	10400– 12500	120	Thermal mapping and estimated soil moisture
7	2080 – 2350	30	Hydrothermally altered rocks associated with mineral deposits
Terra/Aqua MODIS			
1	620–670	250	Land/cloud/aerosols boundaries
2	841–876	250	
3	459–479	500	Land/cloud/aerosols properties
4	545–565	500	
5	1230–1250	500	
6	1628–1652	500	
7	2105–2155	500	
8	405–420	1000	Ocean color/phytoplankton/biogeochemistry
9	438–448	1000	
10	483–493	1000	
11	526–536	1000	
12	546–556	1000	
13	662–672	1000	
14	673–683	1000	
15	743–753	1000	
16	862–877	1000	
17	890–920	1000	Atmospheric water vapor
18	931–941	1000	
19	915–965	1000	
20	3.660–3.840	1000	Surface/cloud temperature
21	3.929–3.989	1000	
22	3.929–3.989	1000	
23	4.020–4.080	1000	
24	4.433–4.498	1000	Atmospheric temperature
25	4.482–4.549	1000	
26	1.360–1.390	1000	Cirrus clouds water vapor
27	6.535–6.895	1000	
28	7.175–7.475	1000	
29	8.400–8.700	1000	Cloud properties
30	9.580–9.880	1000	Ozone
31	10.780–11.280	1000	Surface/cloud temperature
32	11.770–12.270	1000	
33	13.185–13.485	1000	Cloud top altitude
34	13.485–13.785	1000	
35	13.785–14.085	1000	
36	14.085–14.385	1000	

S1. MODIS Fire Radiative Power description

FRP values (MW) stored in the Collection 5 MODIS fire product suite are calculated using the equation originally formulated by *Kaufman et al*. [**1**] and amended by *Giglio* [**2**] to account for variations in pixel size across the swath:

$$\text{FRP} = A_s \beta (T_f^8 - T_b^8) \quad \text{(S1)}$$

where T_f is the 4 μm brightness temperature of the fire pixel, T_b is the mean 4 μm brightness temperature of the background window, A_s is the nominal MODIS pixel area evaluated at the scan angle, or sample number, s, and the coefficient $\beta = 4.34 \times 10^{-19}$ $\text{Wm}^{-2}\text{K}^{-8}$ is specific to the MODIS 4 μm spectral response. Although T_b is representative of a window that expands until at least 25% of the surrounding pixels are identified as valid cloud-free land pixels that are also not fire pixels [2], it is still possible for T_b to be influenced by hot spots in the background window but not recognized by the MODIS active fire detection algorithm [3].

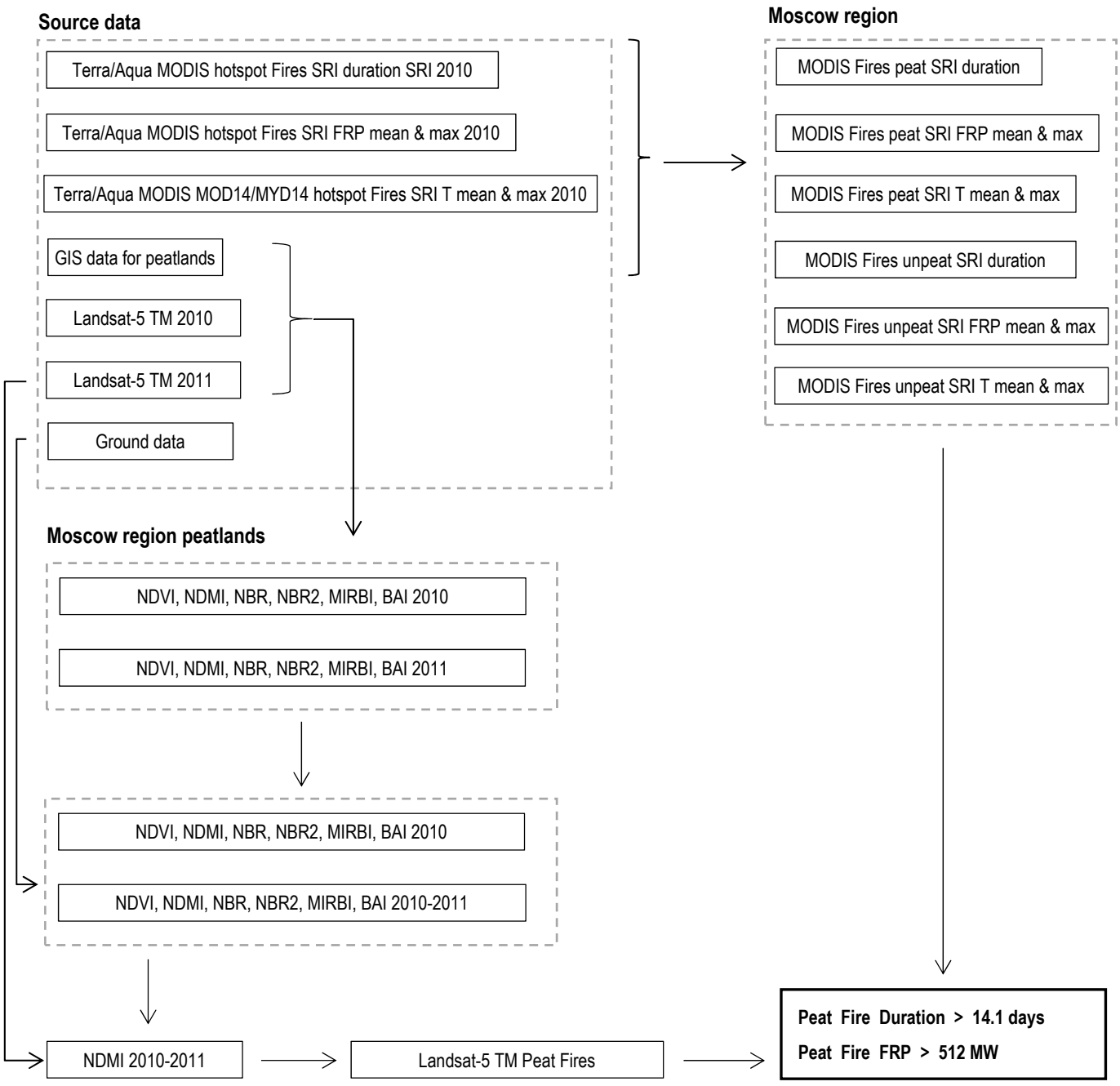

Figure S1. Processing chain.

References

1. Kaufman, Y.J.; Justice, C.O.; Flynn, L.P.; Kendall, J.D.; Prins, E.M.; Giglio, L.; Ward, D.E.; Menzel, W.P.; Setzer, A.W. Potential global fire monitoring from EOS-MODIS. *J. Geophys. Res.* **1998**, *103*, 32215–32238.
2. Giglio, L.; Descloitres, J.; Justice, C.O.; Kaufman, Y.J. An enhanced contextual fire detection algorithm for MODIS. *Remote Sens. Environ.* **2003**, *87*, 273–282.
3. Freeborn, P.H.; Wooster, M.J.; Roy, D.P.; Cochrane, M.A. Quantification of MODIS fire radiative power (FRP) measurement uncertainty for use in satellite-based active fire characterization and biomass burning estimation. *Geophys. Res. Lett.* **2014**, *41*. https://doi.org/10.1002/2013GL059086.