Supplemental Information

Table S1. Soil texture of LFM sites used in the study. Soil texture information is obtained from the Harmonized World Soil Database (version 1.2) [1]

Soil type	Dominant Topsoil	Soil texture		Dominant Subsoil	Soil texture		Site
Luvisols	Loam	Gravel	9%	Clay loam	Gravel	8%	Coastal (6 sites)
		Sand	47%		Sand	39%	
		Silt	29%		Silt	27%	
		Clay	24%		Clay	34%	
Regosols	Loam	Gravel	17%	Loam	Gravel	18%	Mountainous (6 sites)
		Sand	43%		Sand	38%	
		Silt	35%		Silt	36%	
		Clay	22%		Clay	26%	

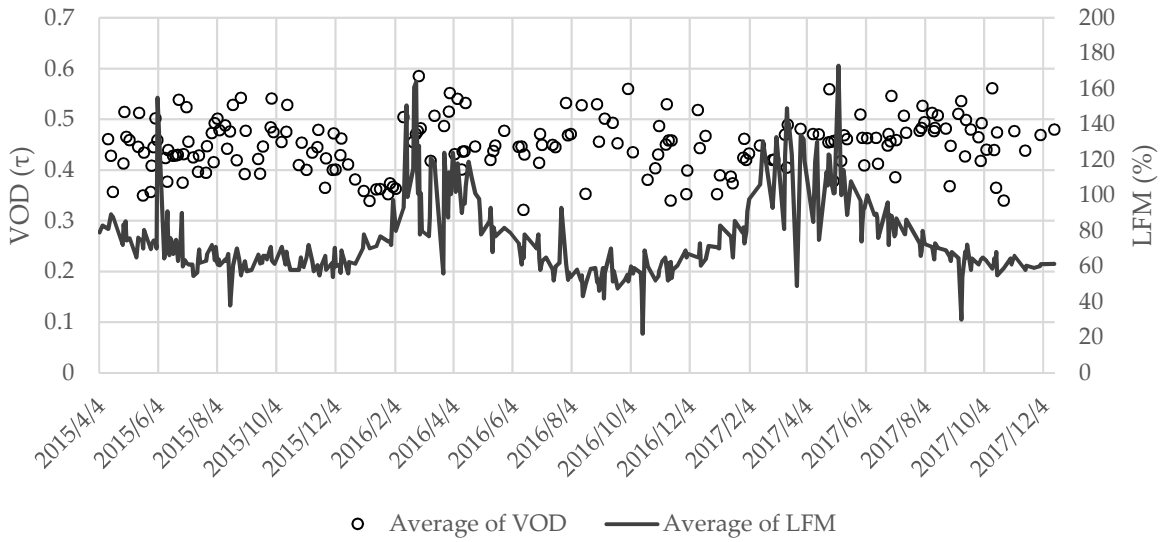

Figure S1. Averaged LFM in Southern California and VOD derived from SMAP L-band soil moisture using the multi-temporal dual-channel retrieval algorithm (MT-DCA) [2].

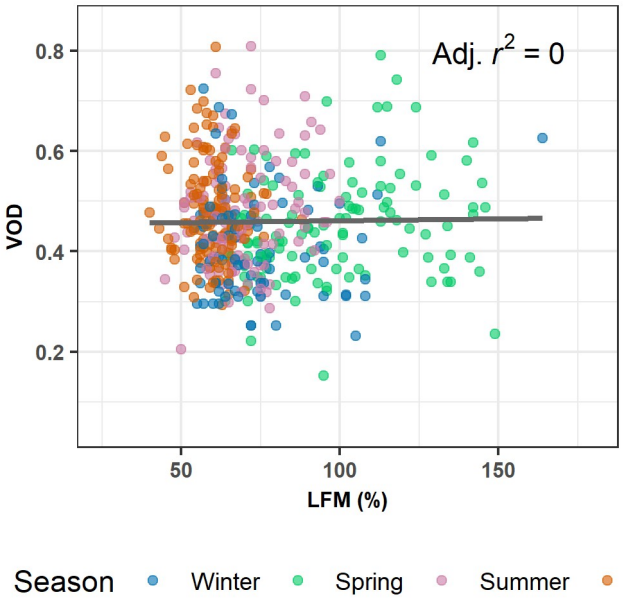

Figure S2. Scatterplot of LFM and VOD for LFM sites in Southern California. Colors indicate different seasons.

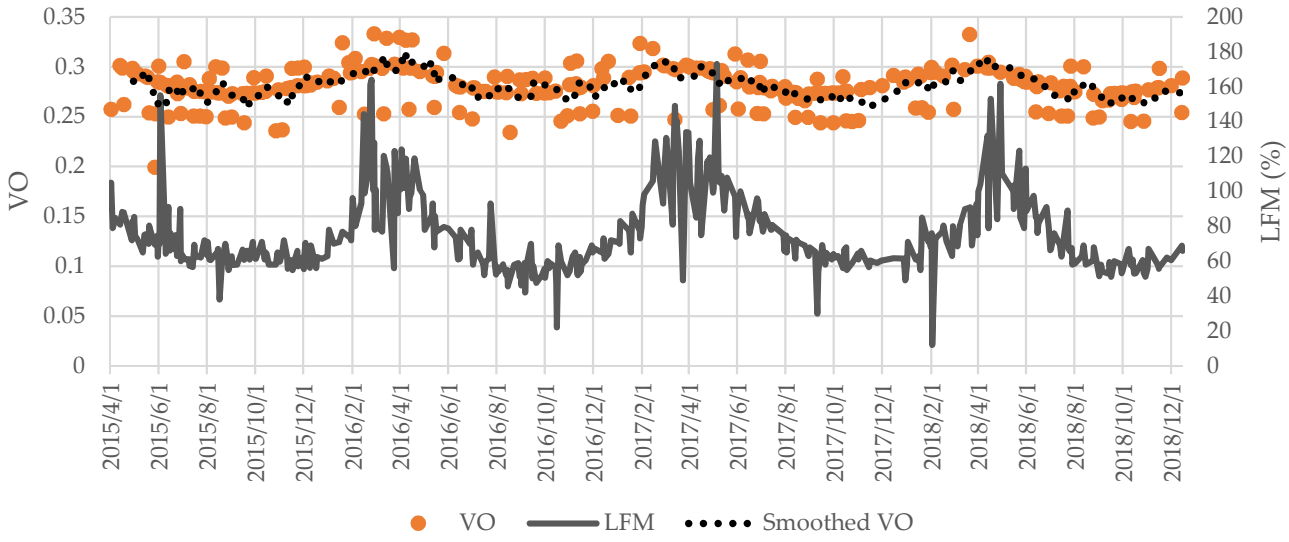

Figure S3. Averaged LFM, Vegetation Opacity (VO), and smoothed VO using 10-day moving average across LFM sites in Southern California.

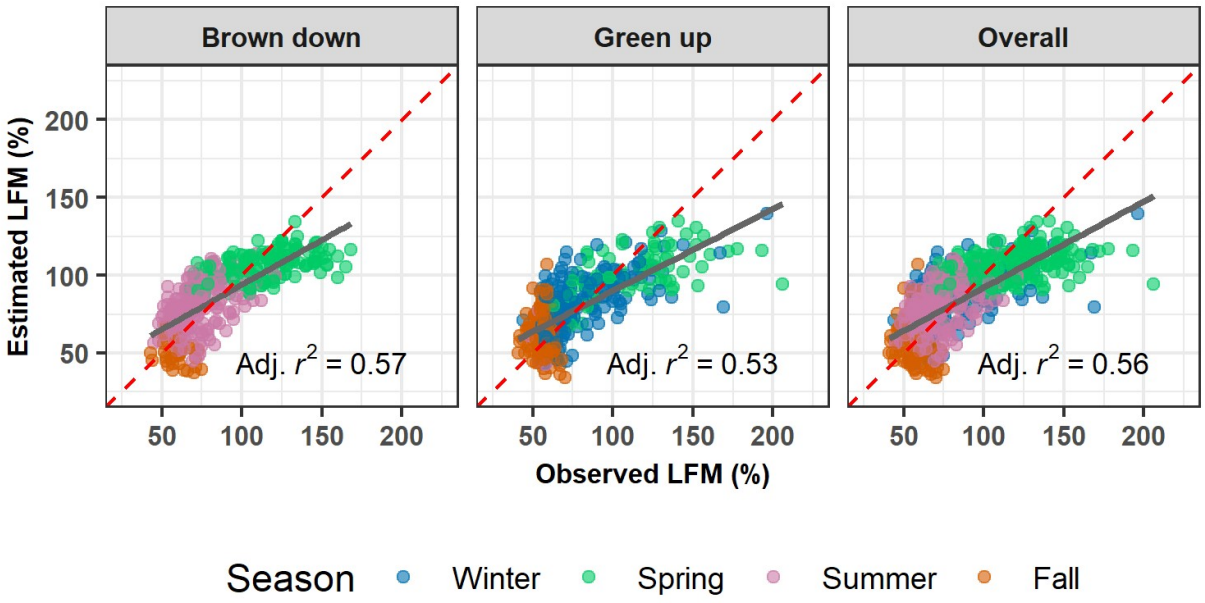

Figure S4. Estimated LFM using VARI + Cumulative GDD. Panels indicate models built for brown down and green up period, as well as the entire dataset.

References

1. FAO/IIASA/ISRIC/ISSCAS/JRC. Harmonized World Soil Database (version 1.2). 2012 ed.; FAO: Rome, Italy and IIASA, Laxenburg, Austria, 2012.
2. Konings, A.G.; Piles, M.; Rötzer, K.; McColl, K.A.; Chan, S.K.; Entekhabi, D. Vegetation optical depth and scattering albedo retrieval using time series of dual-polarized L-band radiometer observations. *Remote Sensing of Environment* **2016**, *172*, 178-189, doi:https://doi.org/10.1016/j.rse.2015.11.009.