

Urbanization Dynamics at Regional and Global Scales Using Multi-Temporal DMSP/OLS Nighttime Light Data

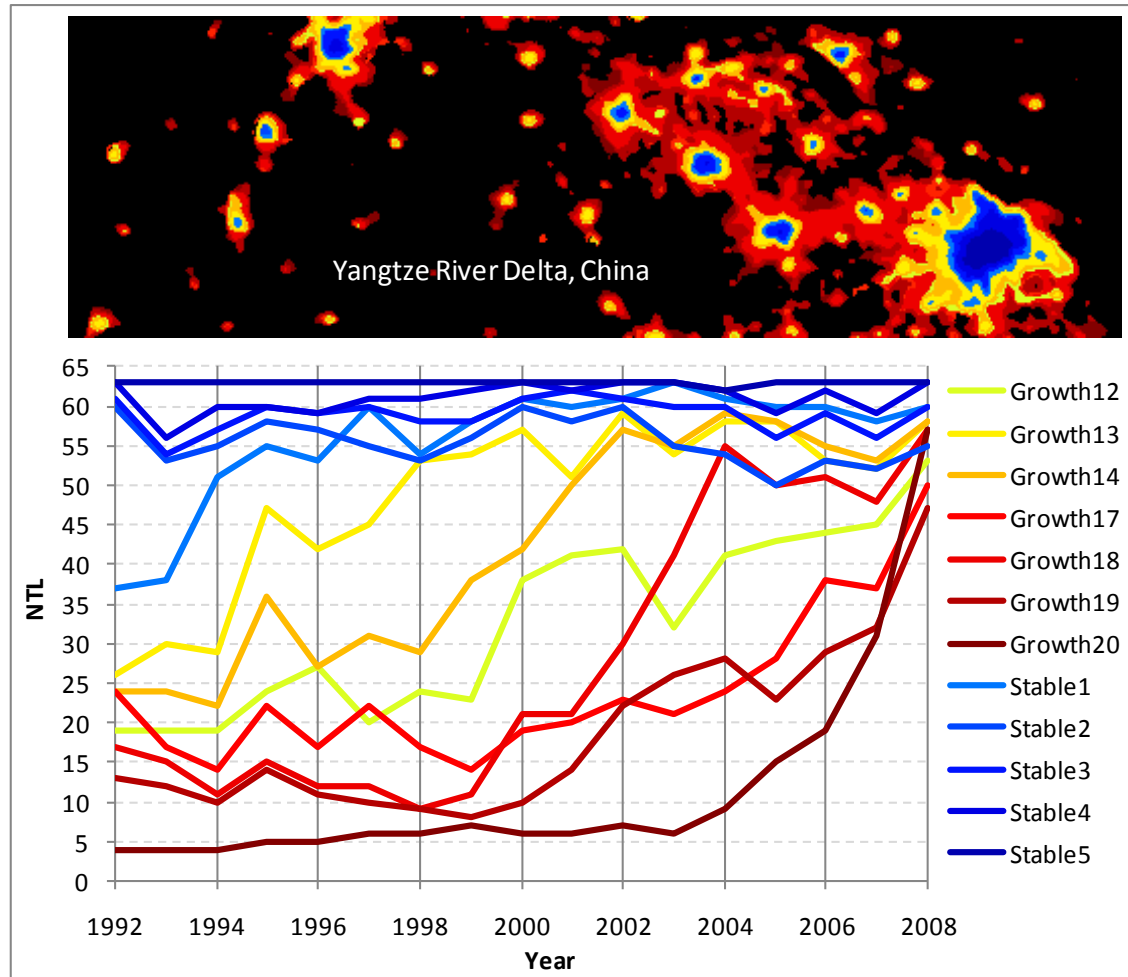
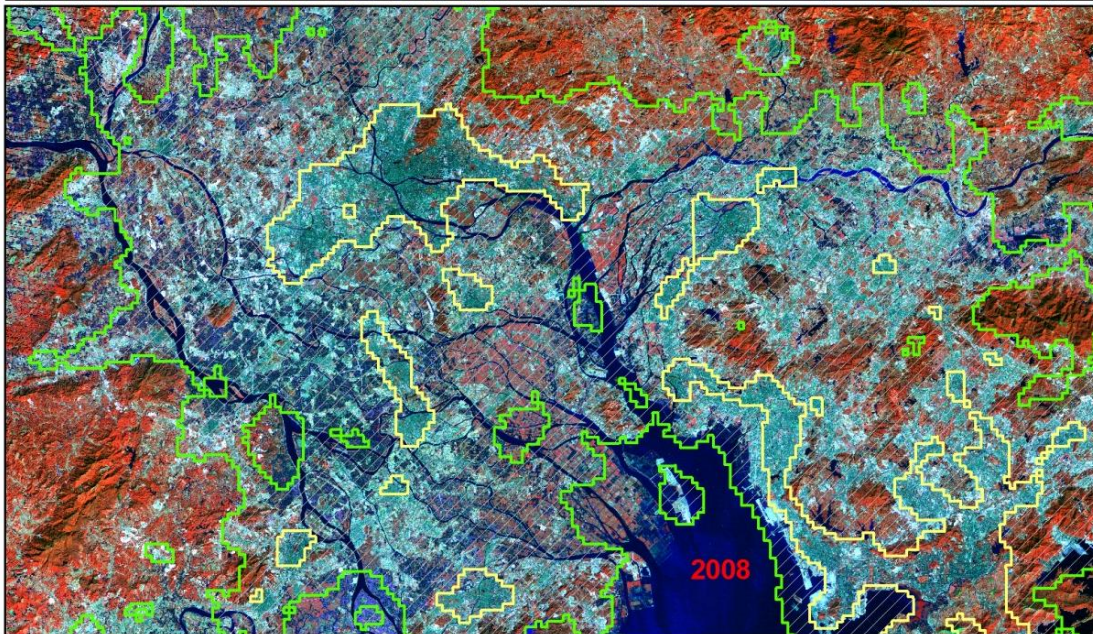
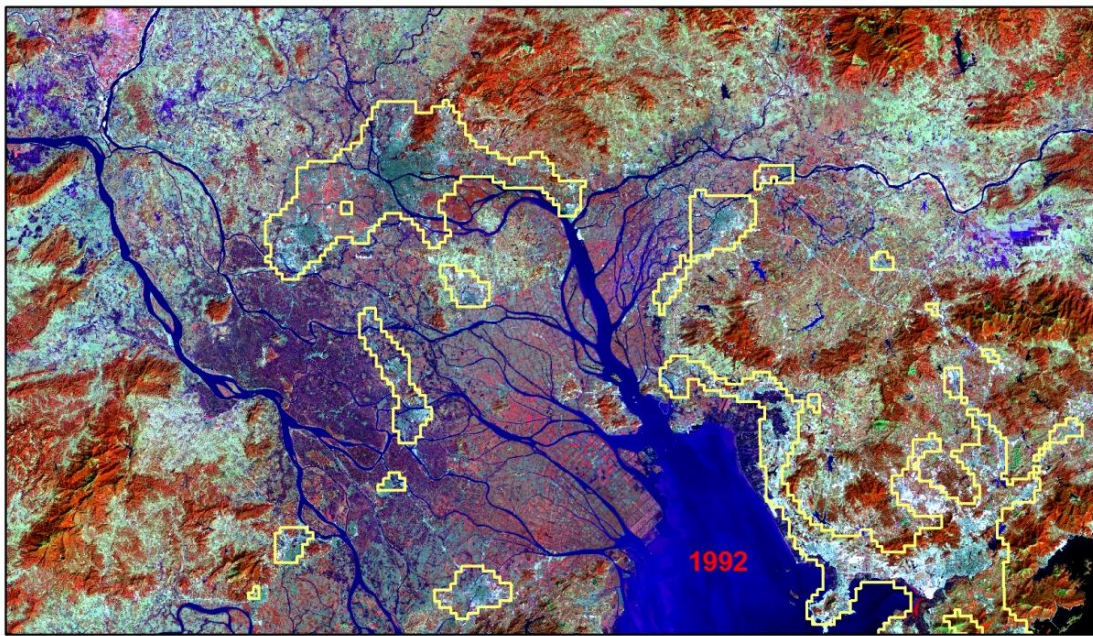


Figure 1. Representative spectral signals of the final classes.



Legend: Stable Urban (yellow outline), Urban Growth (green outline)

Landsat TM/ETM false color composite: Red=Band4, Green=Band7, Blue=Band3

Scale: 10 5 0 10 20 Km

Figure 2. Stable urban areas and urban growth areas detected from NTL in the Pearl River Delta, China.

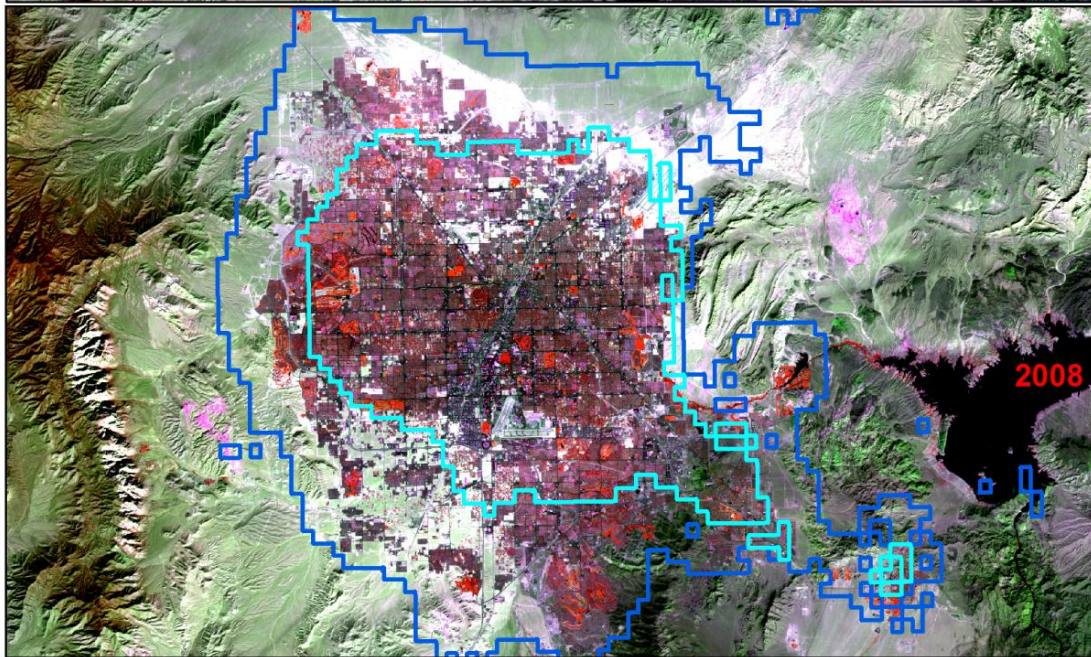
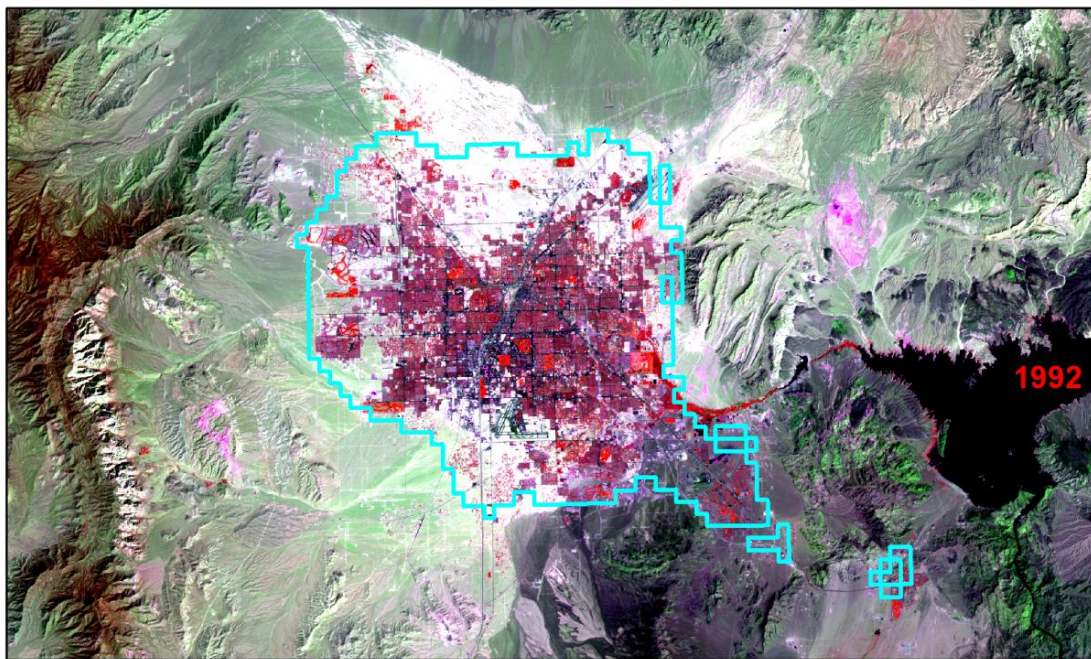


Stable Urban
 Urban Growth

Landsat TM/ETM false color composite:
 Red=Band3, Green=Band2, Blue=Band1

10 5 0 10 20
 Km

Figure 3. Stable urban areas and urban growth areas detected from NTL in the Yangtze River Delta, China.



Stable Urban Urban Growth Landsat TM color composite: Red=Band4, Green=Band7, Blue=Band3 0 3 6 12 18 Km

Figure 4. Stable urban areas and urban growth areas detected from NTL in the Las Vegas region, USA.

A Normalized Delta NBR index for fire severity mapping with spectral data

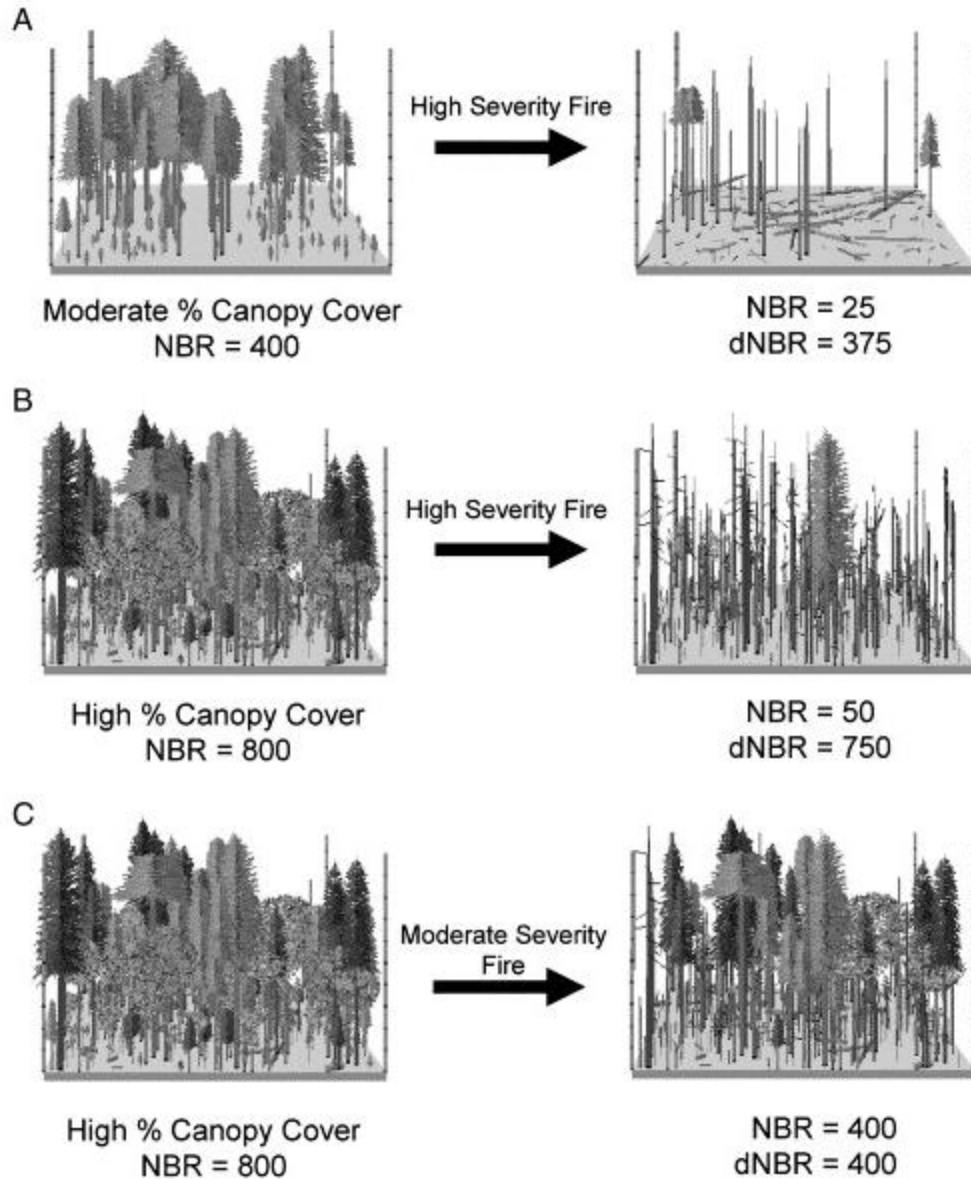


Figure 1. Typical NBR and dNBR values in two plots with moderate (A) and high (B and C) percent canopy cover before and after experiencing high (A and B) or moderate-severity fire (C). An NBR value of 25 indicates little to no live vegetation exists, whereas a value of 800 indicates dense vegetation (Miller and Thode 2007). The numbers here were all magnified by 1000 times.

1. $NBR = (NIR - MIR) / (NIR + MIR)$

2. $RdNBR = \frac{NBR_{PreFire} - NBR_{PostFire}}{\sqrt{ABS(NBR_{PreFire})/1000}}$

3. The Proposed Index:

$$NdNBR = (NBR_{PreFire} - NBR_{PostFire}) / (NBR_{PreFire} + NBR_{PostFire} + 2)$$

$$NBR_{PreFire} [-1, 1], NBR_{PostFire} [-1, 1]$$

Table 1. dNBR, RdNBR, and NdNBR for the three fires demonstrated in Figure 1 and two more simulated cases.

Fires	Pre-fire NBR	Post-fire NBR	dNBR	RdNBR	NdNBR	Fire Severity
A	400	25	375	592.93	0.88	High
B	800	50	750	838.52	0.88	High
C	800	400	400	447.21	0.33	Moderate
D	0	-20	20	6324.55	0.0101	Very low
E	0	40	-40	-12649.1	-0.0196	Regrowth

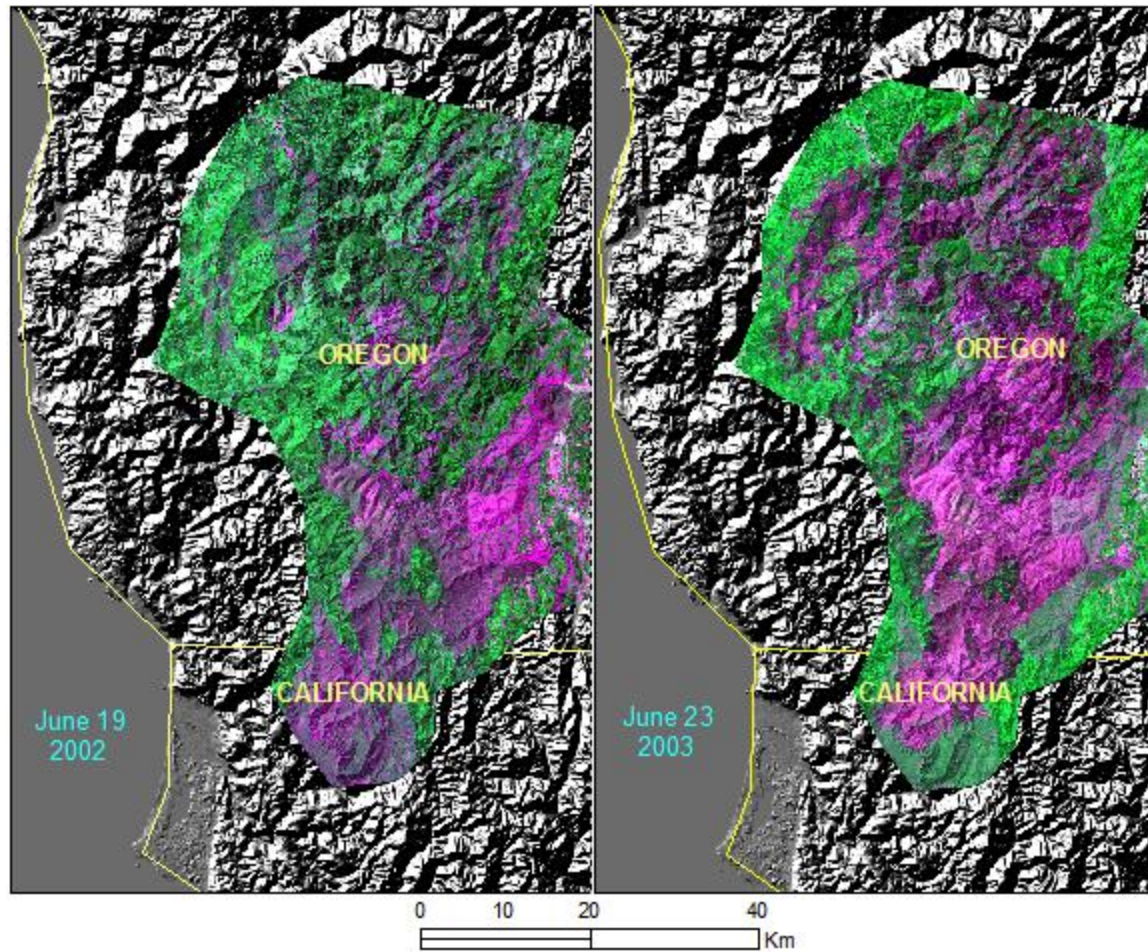


Figure 1. The Biscuit fire affected area in the Siskiyou National Forest, located in Oregon and California. The false color composites of Landsat 5 TM bands (Red: TM3, Green: TM4, Blue: TM2) show the contrast between pre-fire and post-fire. The purple color indicates areas affected by fires. Note the southern part was burnt by a previous fire occurred before June 19, 2002. The green color indicates forests, and the background is a shaded relief.

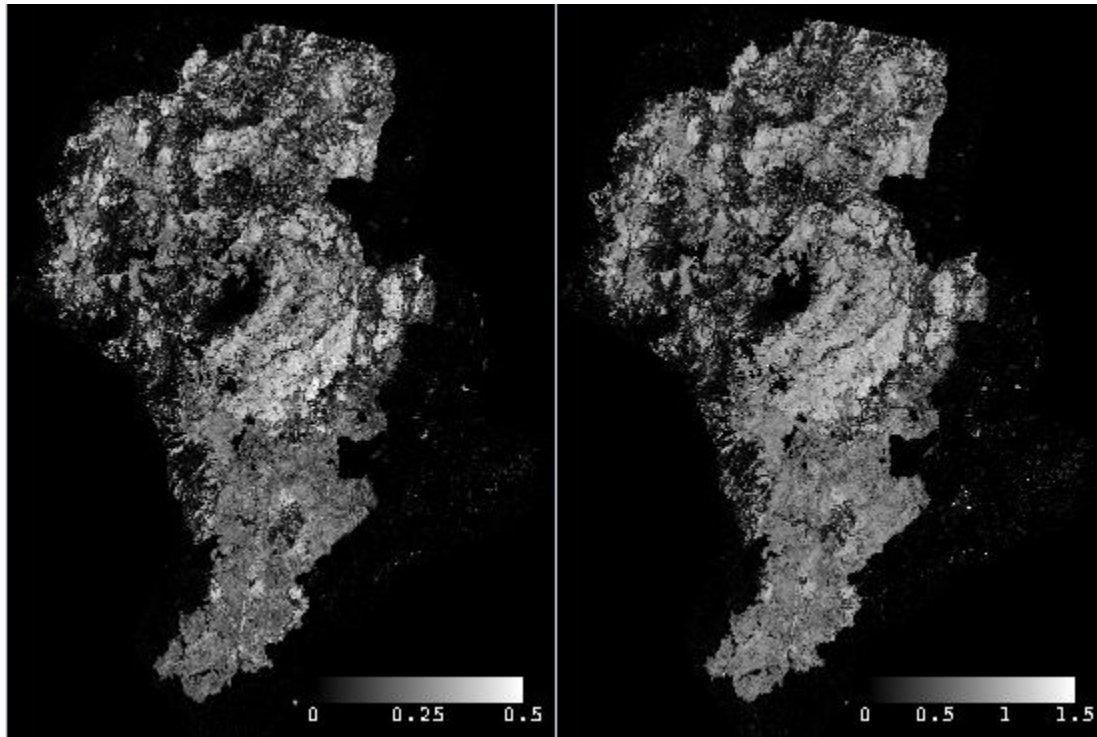


Figure 2. NdNBR (left) and RdNBR (right) of the Biscuit Fire. Note: negative NdNBR values were stretched to 0, and NdNBR values larger than 0.5 were stretched to 0.5; negative RdNBR values were stretched to 0, and RdNBR values larger than 1.5 were stretched to 1.5.

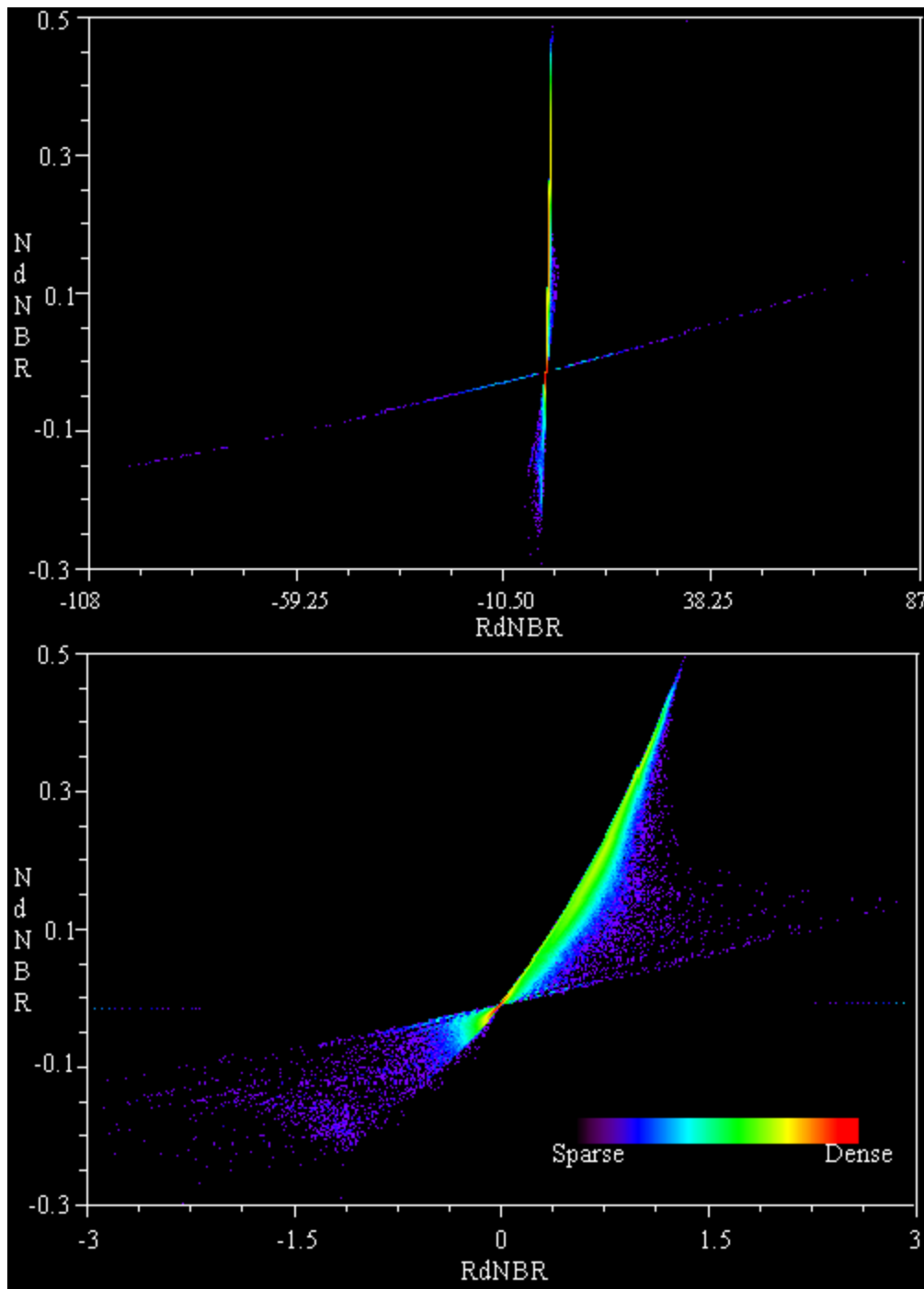


Figure 3. NdNBR vs. RdNBR based on data from part of the Biscuit Fire area (Top) and a more detailed view into the part within the range $[-3, 3]$ of RdNBR (Bottom). The colors show the frequency of occurrence of specific NdNBR and RdNBR combinations.

A Global Snow-free Reflectance Anisotropy Database Derived from MODIS Land Products using Gap-filling Techniques

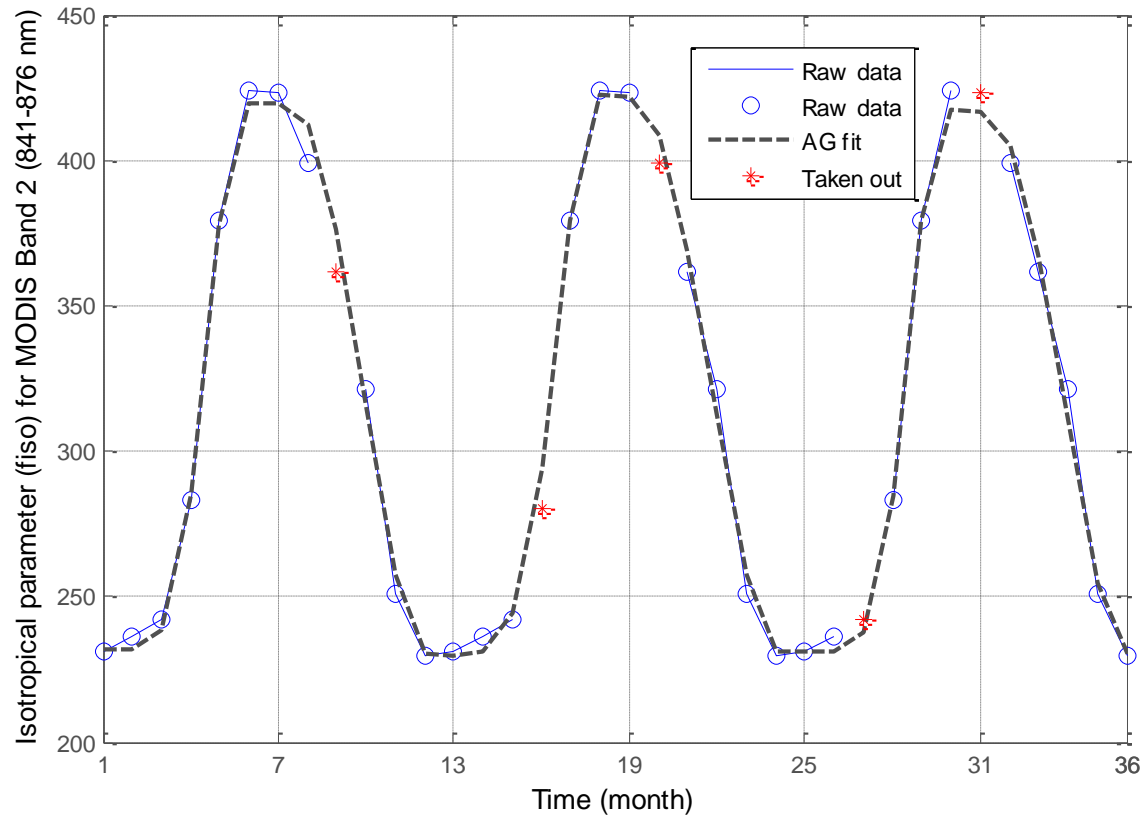


Figure 1. A mean complete MODIS CMG BRDF (Weight of the Isotropic kernel of the Infrared band (841-876 nm)) time series of the Deciduous Broadleaf Forest class in Asia and the curve fitted with the asymmetric Gaussian functions after taking out one data point from the time series. (The time series comprises of 12 monthly periods per year and was duplicated 3 times to make this graph, assuming that the pattern remains constant year after year.)

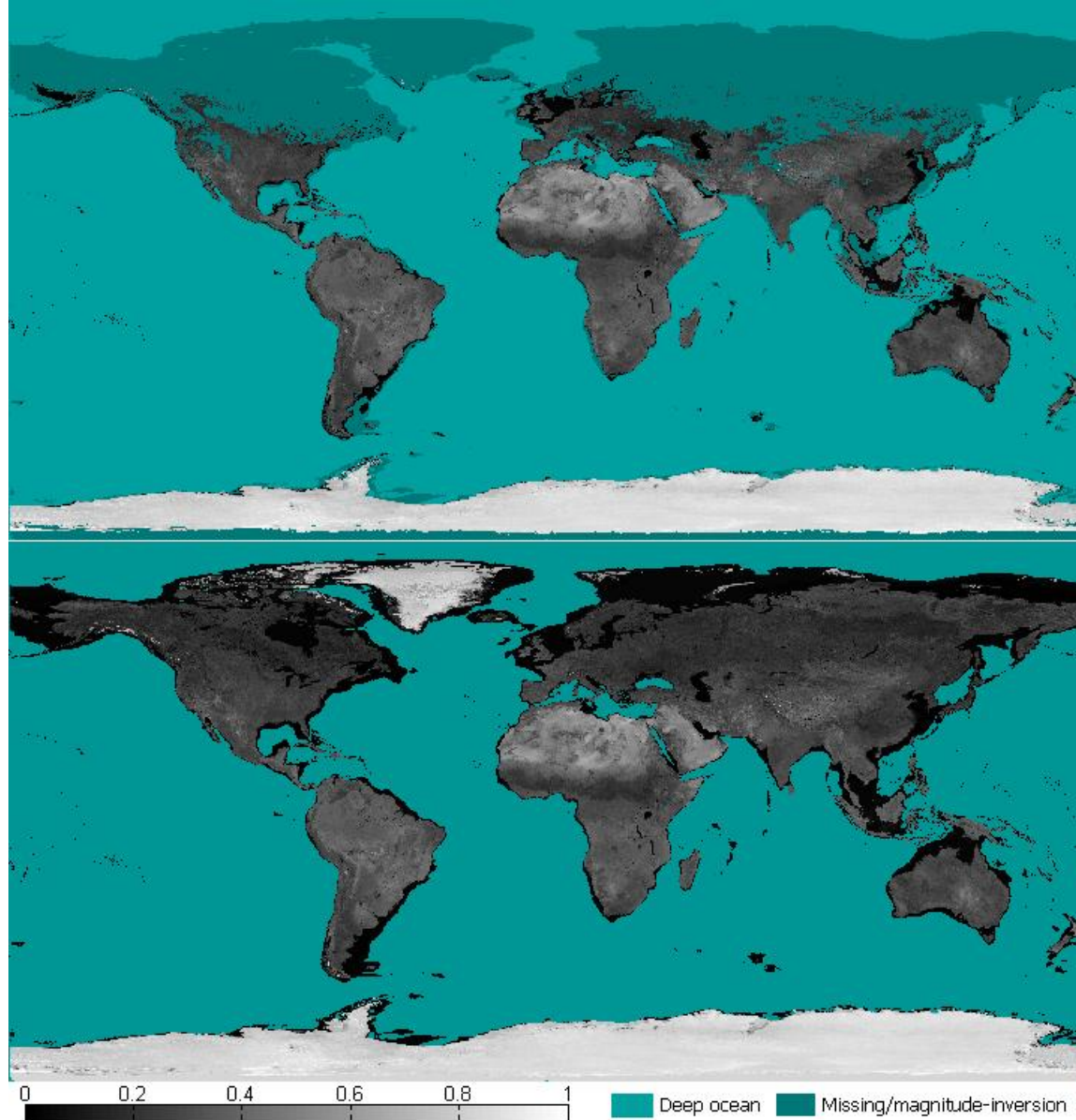


Figure 2. 5-year composite maps of the MODIS BRDF weight of the isotropic kernel (f_{iso}) for Band 2 (841~876 nm) before being gap-filled, thus full inversion only (top) and after being gap-filled (bottom) in January.