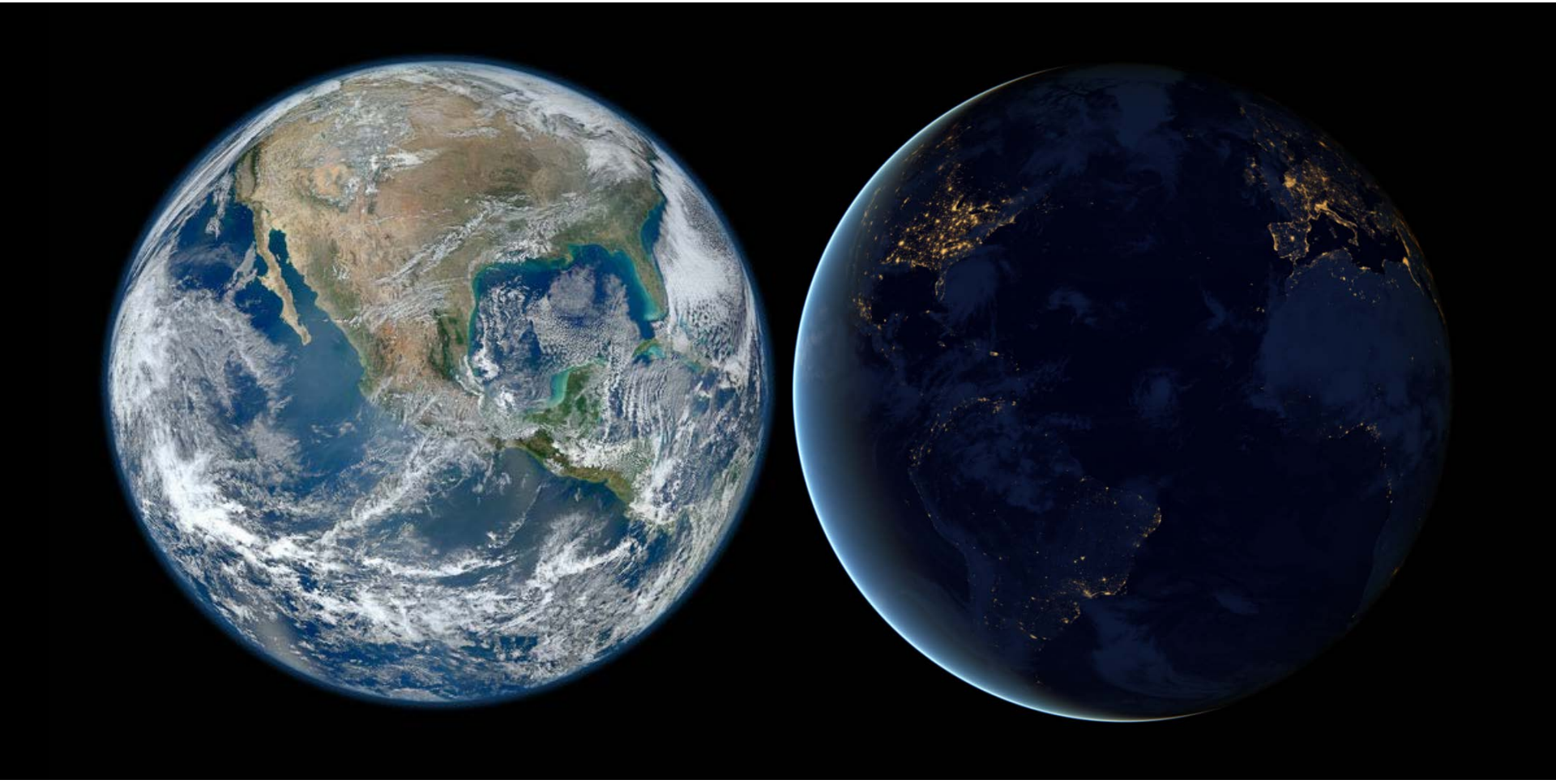
Use of Suomi-NPP Data for Global Land Change Science and Applications



Miguel O. Román, Zhuosen Wang, Eleanor Stokes, Donglian Sun, Wei Zheng, Virginia Kalb, Peter Ma, George Riggs, Dorothy Hall, Ivan Csiszar, and Karen Seto

NASA Goddard Space Flight Center

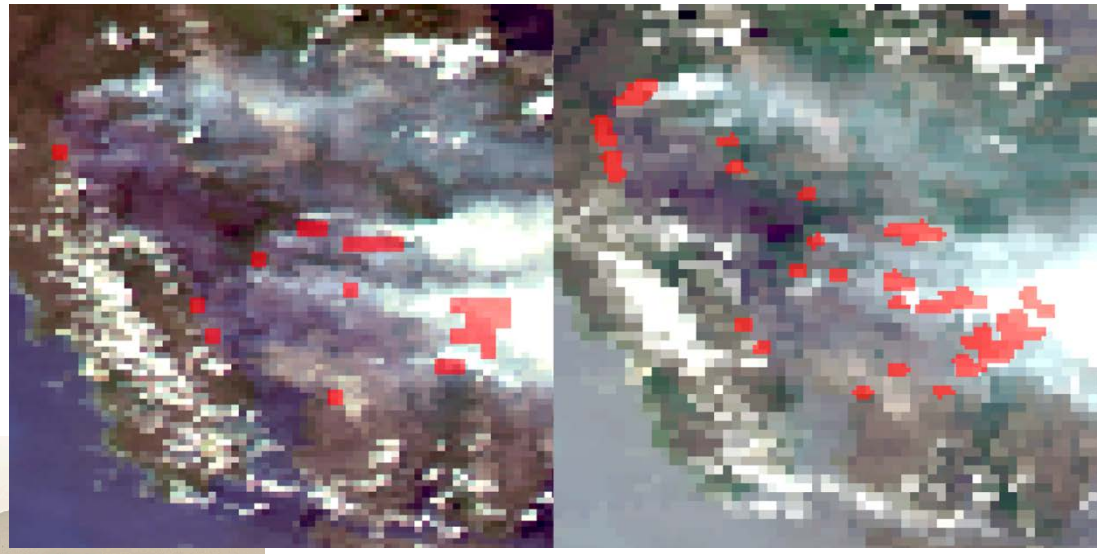
Yale University School of Forestry & Environmental Studies

George Mason University

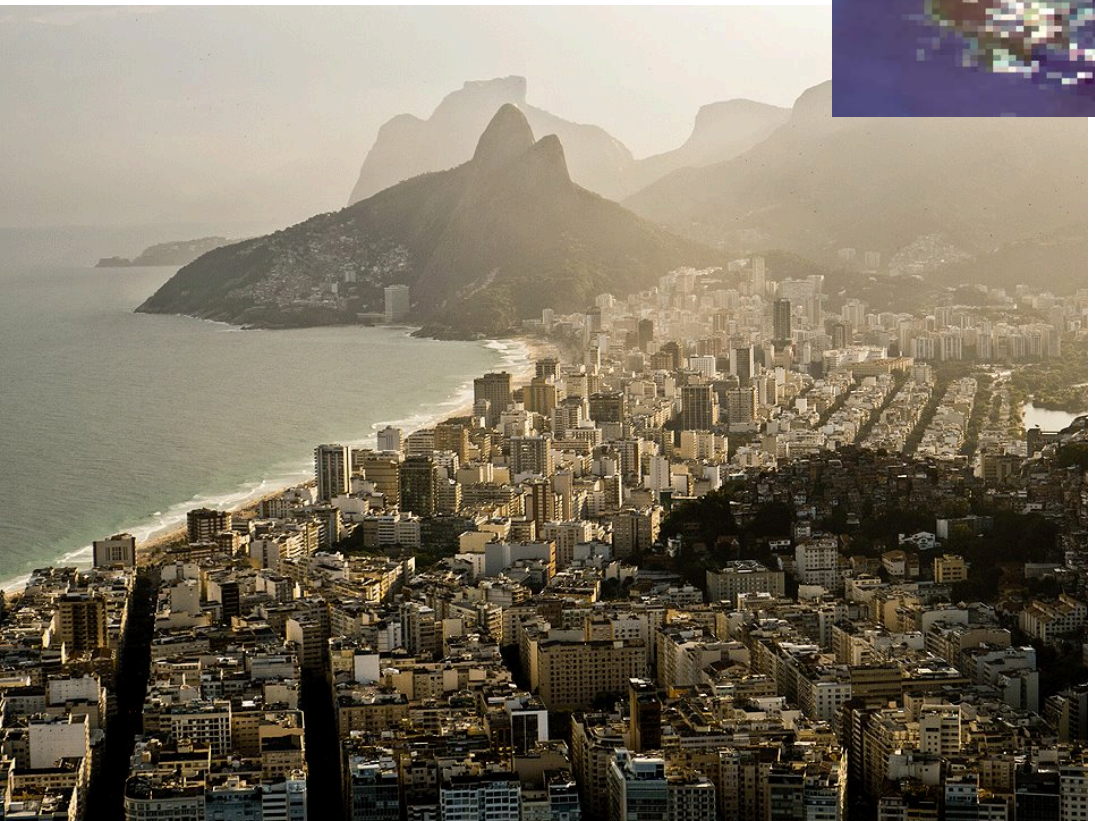
Research support provided by NASA's Disasters & LCLUC Program and the Office of the Chief Scientist

Some Unique Capabilities of Suomi-NPP

Improved fire detections (25% higher VIIRS fire counts than MODIS).



MODIS (left) and VIIRS (right) Fires in Tasmania
Credit: Peter Ma (NASA) & Wilfrid Schroeder (NOAA)

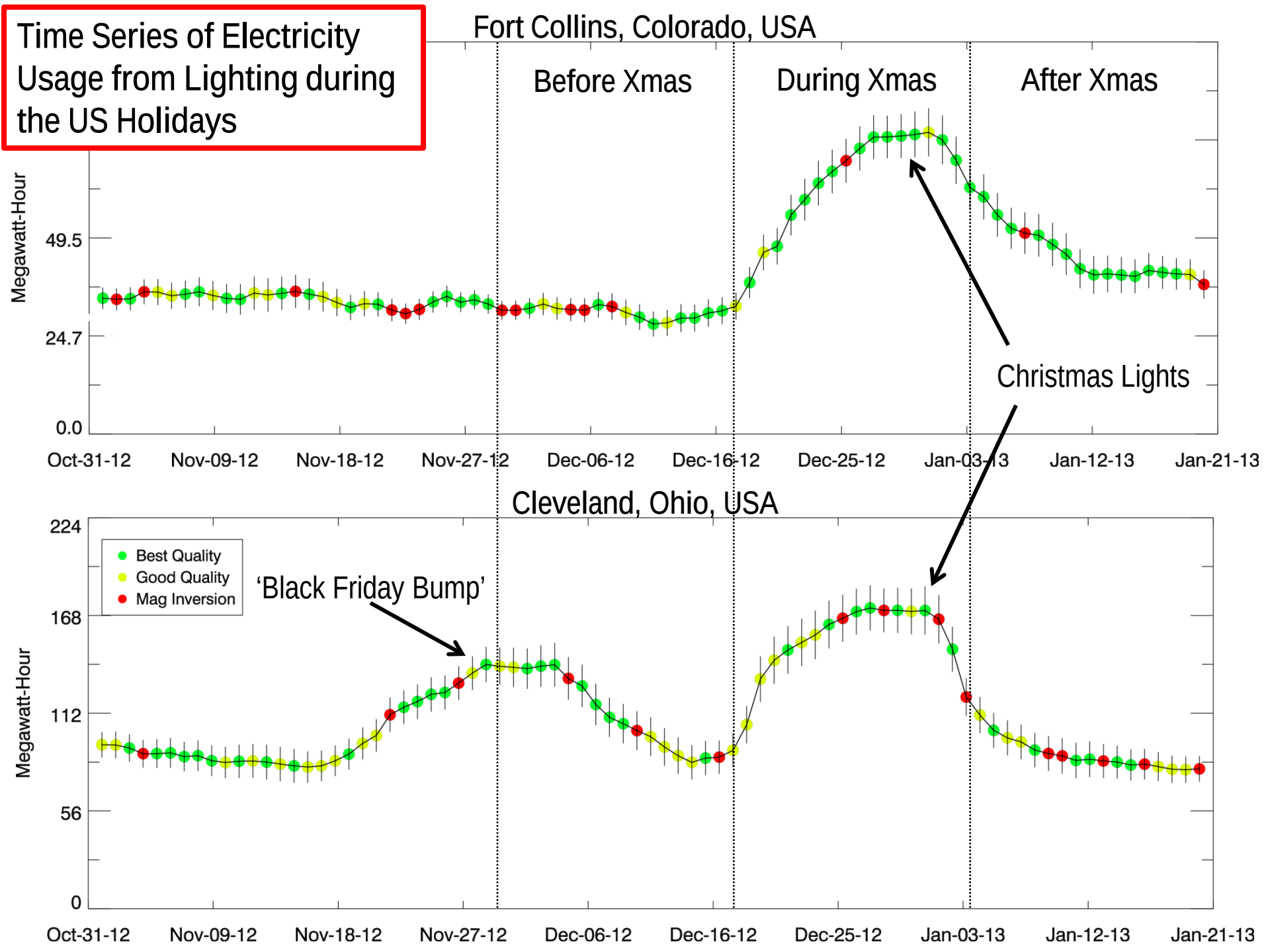


Measure a variety of phenomenon associated with human settlements.

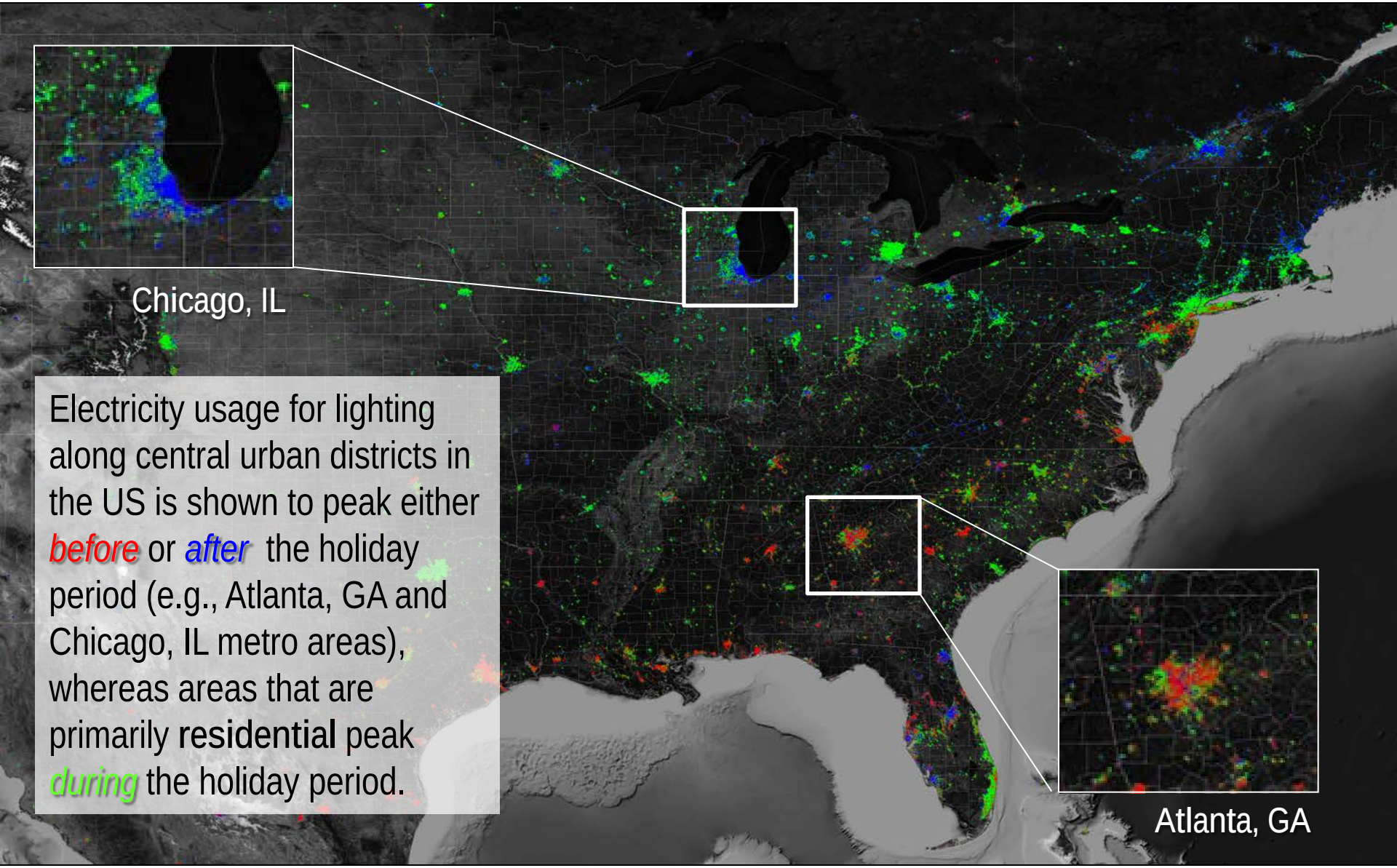
One apparent manifestation of energy use in human settlements is in the celebration of holidays.

During holidays, human activity patterns change. This in turn affects short-term patterns in energy consumption.

Román & Stokes (2014) submitted


Time Series of Electricity Usage from Lighting during the US Holidays
Fort Collins, Colorado, USA
Before Xmas
During Xmas
After Xmas
Megawatt-Hour
49.5
24.7
0.0
Christmas Lights
Oct-31-12
Nov-09-12
Nov-18-12
Nov-27-12
Dec-06-12
Dec-16-12
Dec-25-12
Jan-03-13
Jan-12-13
Jan-21-13
Cleveland, Ohio, USA
224
168
112
56
0
Best Quality
Good Quality
Mag Inversion
'Black Friday Bump'
Megawatt-Hour
Oct-31-12
Nov-09-12
Nov-18-12
Nov-27-12
Dec-06-12
Dec-16-12
Dec-25-12
Jan-03-13
Jan-12-13
Jan-21-13

Christmas Lights from Space!



Electricity usage for lighting along central urban districts in the US is shown to peak either *before* or *after* the holiday period (e.g., Atlanta, GA and Chicago, IL metro areas), whereas areas that are primarily **residential** peak *during* the holiday period.

Before Festivity

During Festivity

After Festivity

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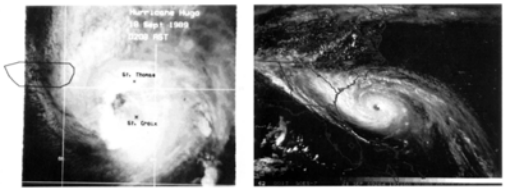
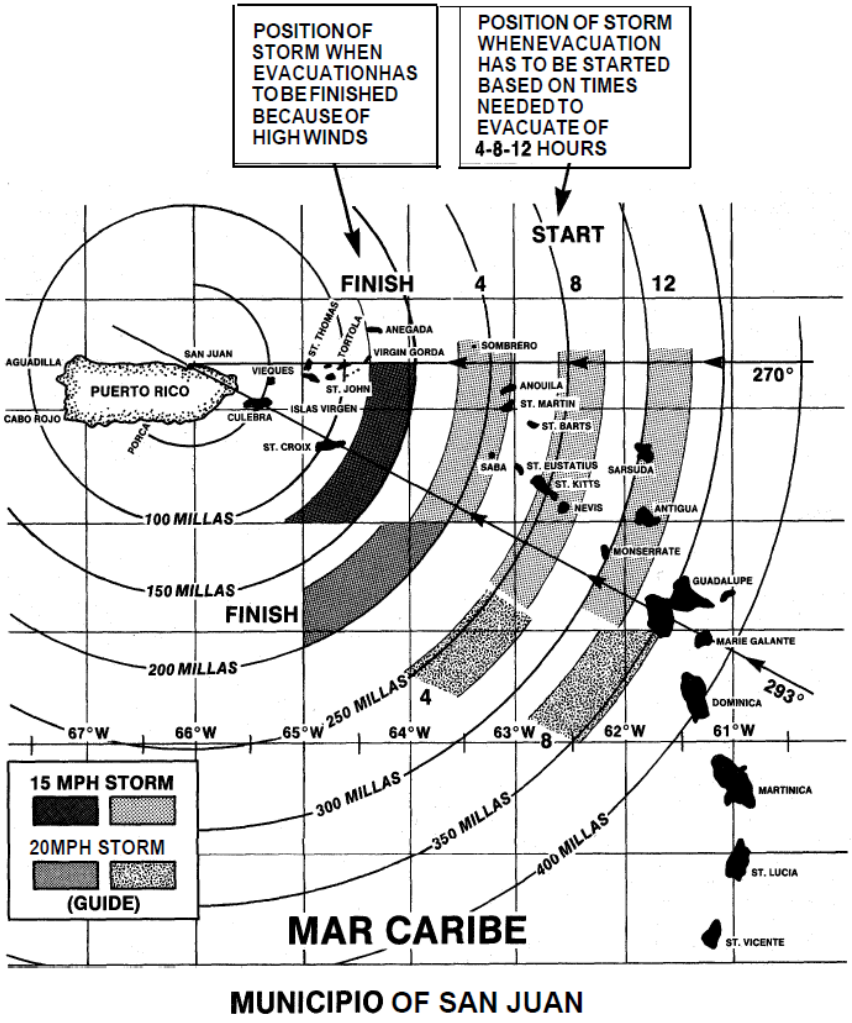
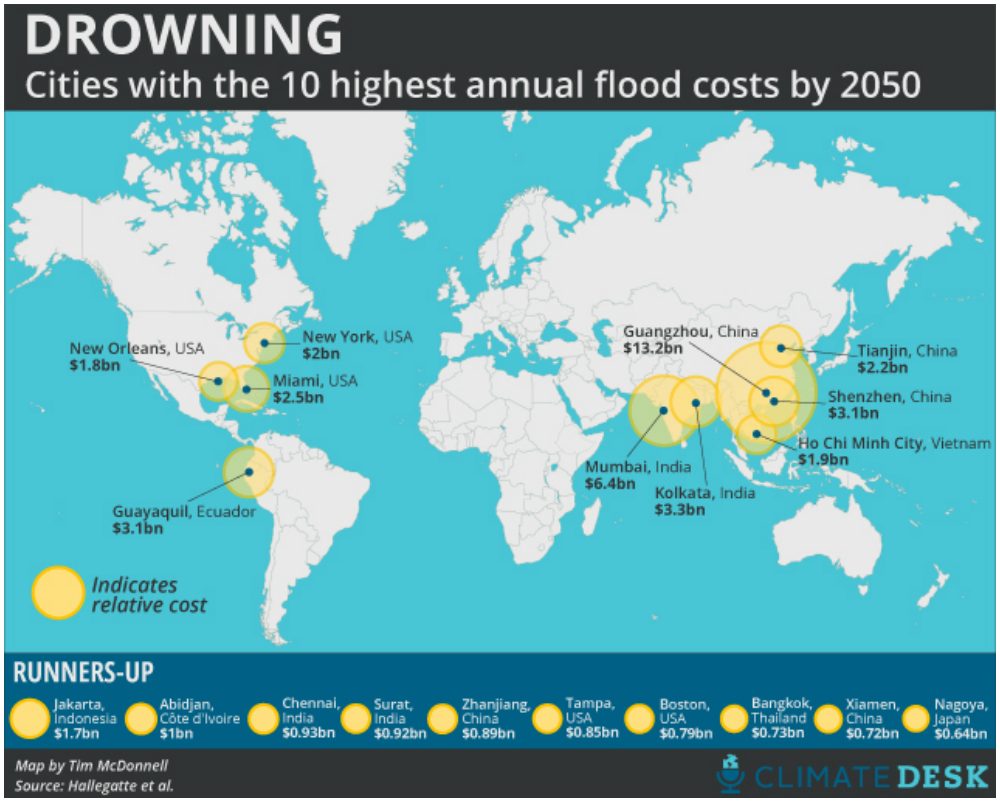
WHY HUMAN SETTLEMENTS?

Hurricane Hugo
September 10-22, 1989



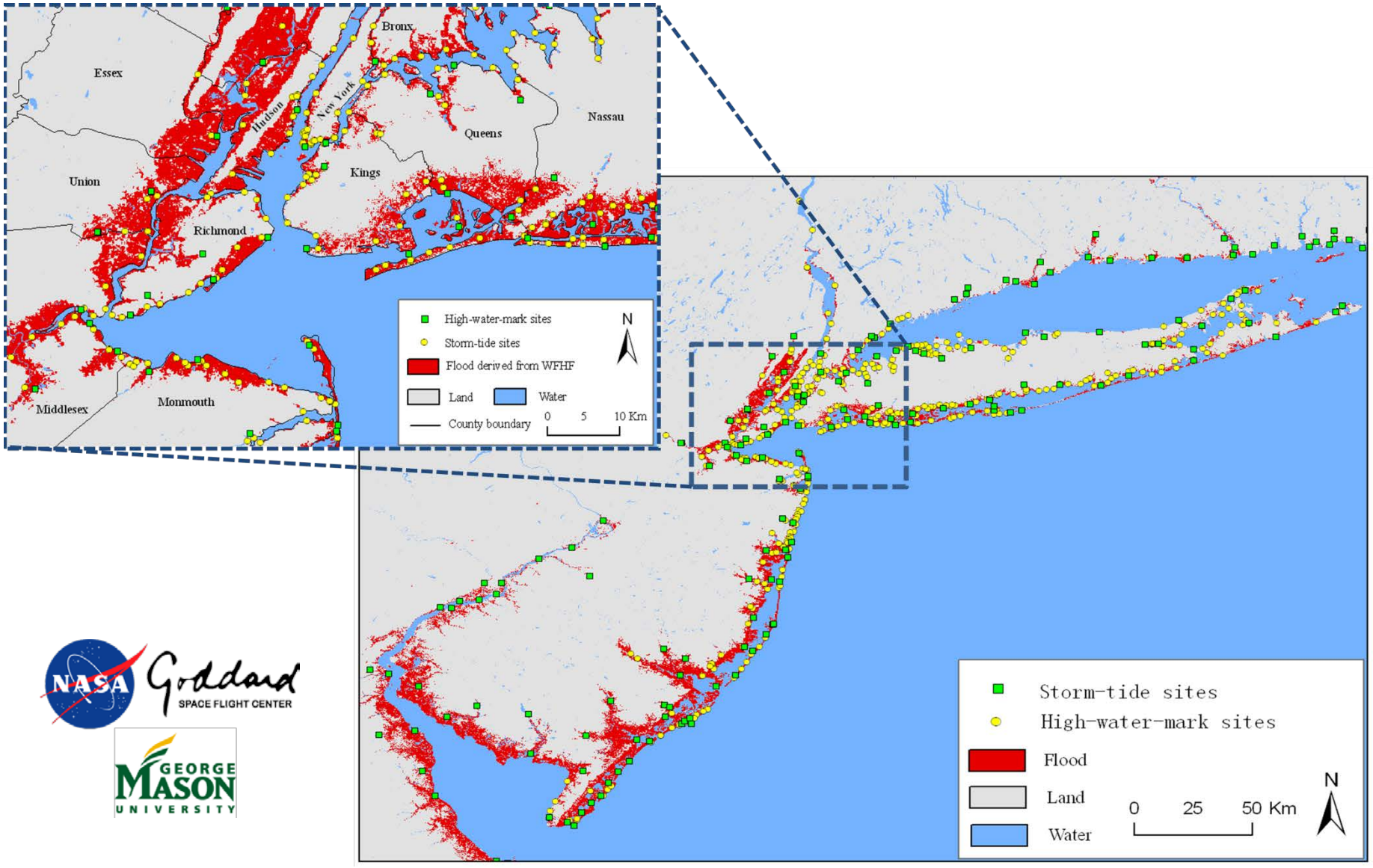


MUNICIPIO OF SAN JUAN



CITIES ARE AS VULNERABLE AS THEY ARE POWERFUL. Almost 50% of cities are already dealing with the effects of climate change, and nearly all are at risk. Over 90% of all urban areas are coastal, putting most cities on Earth at risk of flooding from rising sea levels and powerful storms.

Enhanced ATMS Flood Map of New York Metro Area After Hurricane Sandy



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Refined product shows consistent inundated locations (PCT = 88%; R^2 = 0.94)

Zheng et al., 2014 (in preparation)