

Burned Villages and Human Rights Violations in Darfur

Salem State University graduate student Tommy O’Connell uses imagery to investigate human rights violations in Darfur, Sudan.

Villages around Gereida, South Darfur, Sudan were attacked by armed militias between November 2005 and February 2006, killing over 300 people. Sixty villages were burned by the Janjaweed horsemen. The American Association for the Advancement of Science (AAAS) reported that 1,660 huts were burned and destroyed during the violent attacks. The number of internally displaced persons (IDPs) in the region grew to nearly 90,000, swelling Gereida with makeshift tents and shelters. The BBC reported that as of May 2013 approximately 300,000 people have died since the most recent wave of violence started in 2003, and over 1.4 million people are homeless, either as foreign refugees or IDPs.

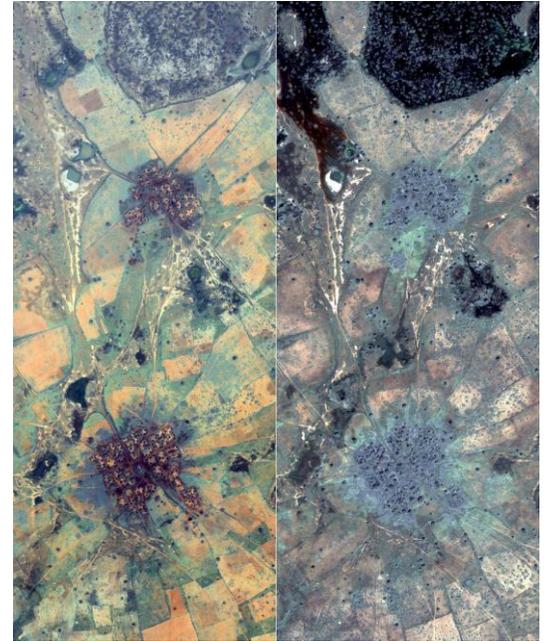
Information about human rights violations can be hit or miss. Because of violence in the area or lack of access to outside organizations, reports about what is happening can be lacking in accuracy. Satellite imagery and remote sensing technology have shown much potential in identifying or corroborating attacks. Studies tend to use manual analysis of the imagery because of accuracy issues and efficiency, but automated methods are being explored. Tommy O’Connell, a graduate student at Salem State University, used high resolution satellite imagery of Gereida provided by the DigitalGlobe Foundation to examine three remote sensing methods that have potential in human rights violation analysis – Supervised Classification, Change Detection, and Feature Extraction.

The results were positive. O’Connell found that feature extraction had the most potential to be used for future studies. Almost 80% of villages were accurately identified using the satellite imagery when compared to hand counts, which can be used to look at before and after studies to see which villages remained and which villages were destroyed after an attack. O’Connell also found that satellite imagery can reveal longer term effects of violence, like agricultural patterns surrounding a village, which can also be used to study violence in the region.

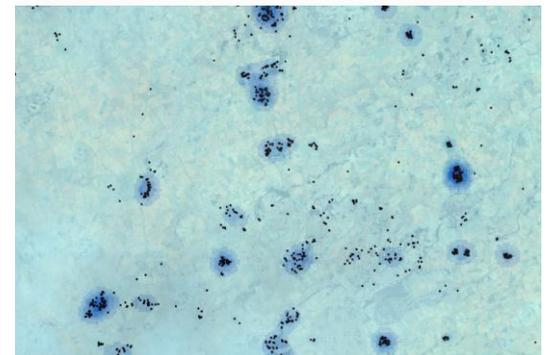
“Combined with human rights organizations reports, satellite imagery from DigitalGlobe Foundation provides the world with a window into the previously unseen areas where atrocities occur.”

—TOMMY O’CONNELL

While diplomacy and international politics play an important role in holding governments responsible for human rights violations, remote sensing and satellite imagery also play an important role in verifying the violence.



ABOVE: DigitalGlobe satellite imagery showing before attacks, September 16, 2004 (left), and after the attacks September 8, 2006 (right).



ABOVE: This Kernel Density map shows huts identified through feature extraction. The dark blue areas represent assumed villages, with 80% correctly identified.