

## Mapping Tornado Damage Tracks with NASA Satellite Data

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### Abstract

During the period of April 25-28, 2011, the southeastern United States was raked with several episodes of severe weather. Numerous tornadoes caused extensive damage, and tragically, the deaths of over 300 people. The event peaked in intensity on April 27 across Mississippi, Tennessee, Alabama, and Georgia in advance of a surface cold front and upper-level trough where the combination of atmospheric instability and wind shear contributed to three distinct periods of severe weather. Meteorologists from the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) performed extensive surveys to assess the intensity, duration, and ground track of tornadoes reported during the event. Survey activities included site visits to the affected locations, analysis of radar data, satellite data analysis, aerial surveys, and interviews with eyewitnesses. Although tornadoes strengthen and weaken along their paths and the EF categorization varies, individual tornadoes are categorized based upon their maximum observed intensity. To date, 59 tornadoes have been confirmed in Alabama alone, nearly half of which were categorized as EF-2 or stronger.

Satellite remote sensing from MODIS and ASTER played a helpful role in the location of tornado damage paths and assessment. For example, MODIS 250m single and 500m multichannel (RGB) imagery was used by numerous forecasters at several WFOs to corroborate their damage assessments with other offices. The ASTER instrument, which provides visible band imagery at 15 m resolution, but over a smaller coverage area was used to identify features as small as homes within subdivisions and complex road networks associated with urbanization. Although visible bands on ASTER are fewer in number and differ slightly from MODIS, combinations of ASTER channels produce vibrant false color composites useful for identifying storm damage tracks. The seminar will focus on the tornado events, satellite data analysis, and integration of satellite and radar data.