Evaluating Satellite Precipitation Estimates Using Lightning Information

Meteorological Applications of Lightning Data

Scott Rudlosky (NOAA/NESDIS/STAR, 5825 University Research Court, Suite 4001, College Park, MD, 20770, USA; scott.rudlosky@noaa.gov), Mitch Ramsey (Ashland University, Ashland, OH), and Martina Ricko (UMD/ESSIC/CICS-MD, College Park, MD)

This study integrates ground-based lightning observations with satellite-derived precipitation estimates to examine the occurrence and distribution of dry thunderstorms. Data from the Tropical Rainfall Measuring Mission (TRMM) 3B42 and Global Lightning Dataset 360 (GLD360) are compared at 3 h intervals on a common 0.25° × 0.25° grid to identify four conditions: no rain and no lightning, rain with no lightning, rain with lightning, and lightning with no rain. As expected, the most common condition is no rain/no lightning, so this study focuses on the seasonal and regional distributions of the weather-related conditions (i.e., rain and/or lightning). Although the main objective is to characterize dry thunderstorm occurrence, this analysis also provides insights into the accuracy of both datasets as well as physical relationships between lightning and rain. The results of this study will help better characterize the dry thunderstorm threat and guide the use of lightning information to improve satellite precipitation estimates.