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Author: Prof.Dr. Colin Price
Tel Aviv University, Israel, cprice@flash.tau.ac.il

LIGHTNING OBSERVATIONS FROM SPACE CAN PROVIDE EARLY WARNING OF SEVERE
WEATHER AROUND THE GLOBE

Abstract

Electrical activity in storms is related to the microphysical and dynamical processes within thunderstorm cells. The lightning activity can easily be tracked and monitored from space using both optical and radio sensors. In the coming years the new generation of GOES and METEOSAT geostationary satellites will have new lightning sensors to continuously monitor the lightning activity within thunderstorms from space at high temporal and spatial resolution.

Numerous studies have shown that lightning activity in storms is linked to the severity of these storms (Dotzek and Price, 2009). We have shown that lightning activity in tropical storms peaks approximately one day before the maximum sustained winds in the eye of hurricanes (Price et al., 2009). We have shown the link between lightning and flash floods in the Mediterranean (Price et al., 2011), and the possibility to use lightning data for nowcasting intense convection that may produce flash floods (Kohen et al., 2010). In addition, studies show that lightning activity appears to "jump" 15-20 minutes before the formation of tornadoes in severe thunderstorms (Dotzek and Price, 2009; Price, 2013). Besides severe weather, lightning also ignites wildfires, while producing NO_x and other gases that affect atmospheric chemistry, and lightning is a natural hazard to the public and industry. Hence, future lightning observations from space will provide a great advance in our ability to understand and monitor continuously lightning from space, and will provide essential data for supplying early warnings to the public, stake holders and emergency management services.

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