



First results of the Colombia Lightning Mapping Array

Jesus López (1), Joan Montanyà (1), Oscar van der Velde (1), David Romero (1), Ferran Fabró (1), John Taborda (2), Daniel Aranguren (3), and Horacio Torres (4)

(1) Universitat Politècnica de Catalunya, Electrical Engineering, Spain (montanya@ee.upc.edu), (2) Universidad del Magdalena, Faculty of Engineering, Electronics Engineering, Colombia, (3) Kereaunos S.A.S., Colombia, (4) Universidad Nacional de Colombia, Electrical Engineering, Colombia

In April 2015 the 3D Lightning Mapping Array (COLMA) network was installed on Santa Marta area (north of Colombia). The COLMA maps VHF radio emissions of lightning leaders in three dimensions by the time-of-arrival technique (Rison et al., 1999). This array has six sensors with base lines between 5 km to 20 km. The COLMA is the first VHF 3D network operating in the tropics and it has been installed in the frame of ASIM (Atmosphere-Space Interactions Monitor) ESA's mission in order to investigate the electrical characteristics of tropical thunderstorms favorable for the production of Terrestrial Gamma ray Flashes (TGF).

In this paper we present COLMA data of several storms. We discuss lightning activity, lightning leader altitudes and thunderstorm charge structures compared to data from our ELMA (Ebro Lightning Mapping Array) at the north-east coast of Spain.

The data confirm what we expected, lightning leaders can propagate at higher altitudes compared to mid latitude thunderstorms because the higher vertical development of tropical thunderstorms. A simple inspection of a ten minute period of the 16th of November of 2015 storm shows a tripolar electric charge structure. In that case, the midlevel negative charge region was located between 7 to 9 km. The structure presented a lower positive charge below the midlevel negative and centred at 6.5 km and an upper positive charge region extending from 9 km to slightly more than 15 km. This vertical extension of the upper positive charge where negative leaders evolve is significantly larger compared to the storms at the ELMA area in Spain. COLMA has shown frequent activity of negative leaders reaching altitudes of more than 15 km.