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## The Importance of Fairies Research in South America with Leona and their Ionospheric Implications

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South America is one of the most active thunderstorm regions of the world. In 2014 we started to establish in South America the "Transient Luminous Event and Thunderstorm High Energy Emission Collaborative Network in Latin America - LEONA", with 4 ground stations in Brazil. The objective of LEONA is to perform collaborative research in South America and make consistent long term ground based measurements of the Electrical Activity Related to Convective System - FARIES, which are mainly observed as Transient Luminous Events - TLEs and High Energy Emissions from Thunderstorms - HEET. We are planning to expand LEONA to have 12 TLE ground stations, 2 fixed and 1 mobile HEET stations. The expanded version of LEONA will cover the Central Region of South America, including Southeastern and Southern Brazil, Northern Argentina, Paraguay and Uruguay, which compose the most electrically active Region of South America. In this paper we will present in detail the current status of LEONA network and we will present the first results of our analysis of the effects of FARIES detected over Brazil in the Ionosphere. We have analyzed one TLE producing thunderstorm combined with ionospheric data. The thunderstorm lifetime was 32 h, it was a positive storm, with its highest +CG production of 6480/30 min versus 2700/30 min for the -CG. Both polarity CGs peaked at the same time interval. The geomagnetic conditions were moderate to calm on the first day/night of the storm lifetime and calm on the second day/night, and the ionosphere presented several sporadic E layers ( 90 km) at different moments of the thunderstorm lifetime, plus other unusual characteristics. We will present in details these preliminary results and the results of the ongoing analysis to determine how much they are related to the convective and electrical activity of the TLE producing storm and how much they are related to the geomagnetic conditions.

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