

# **Regional effects of strong geomagnetic storms during solar cycles 23 and 24.**

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## **Abstract:**

The geomagnetic field (GF) plays an important role protecting the atmosphere from the negative effects of solar wind (SW). However, GF can be disturbed at interaction with the interplanetary magnetic field (IMF) under certain conditions like high solar activity which can be translated as the occurrence of coronal mass ejections (CME) and the configuration of the IMF components. The result is a spontaneous weakening of the GF's strength and its temporal geometry readjustment. Such events are known as Geomagnetic storms (GMS). Some effects can follow a GMS, for example ionosphere disturbances and geomagnetic induced currents (GIC).

Extreme GMS effects can potentially generate serious damages to telecommunication networks, power grids, navigation systems and can even represent a risk for national security for any government. The purpose of this project aims to determine the regional effects associated with a strong GSM in Mexico from 1996 to 2018 spanning two complete solar cycles. Considering its latitudinal position, there are not so many ways to study the effects of a GMS. There are not either protocols to follow in an extreme case such as the Carrington event. Nevertheless, research of GIC's in low latitude and equatorial regions as Brazil (da Silva -barbosa et al. 2015), Spain (Torta et al. 2012), South Africa (Bernhardi et al. 2018), which were previously considered to be at low risk (Rachel L. Bailey et al. 2017) from regular GMS effects shows the importance of studying the possible effects for the case of Mexico

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**References:** Rachel L. Bailey et al. 2017, Pedro Corona-Romero et al. 2018,

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