



Illustration of how deforms the magnetic field of the Earth solar storm NASA / GSFC / SVS

SOLAR STORMS (/NEXT/)

Obama is right, we must prepare for the big solar storm

On 13 October this year the President of the United States, Barack Obama issued an executive order with the idea of preparing the country against the havoc it can cause a subsequent solar flare and subsequent geomagnetic storm. Exaggerated? It does not seem according to the latest published data.

SCIENTIFIC CULTURE

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The magnetic field of the Earth is believed to be generated by a dynamo effect. Magnetic fields surround electric currents, so that it is assumed that circulating electrical currents in the molten core of the earth, would be the source of the magnetic field surrounding the Earth. The region above the ionosphere which tens of thousands of kilometers in space extends and protects us from the charged particles that could reach the surface of the Earth is called the **magnetosphere**. The interaction of the magnetosphere with the solar wind particles creates the conditions for the phenomena of auroras near the poles.

In the early hours of June 21, 2015 the Sun ejected a huge cloud of magnetized plasma in a solar flare. 40 hours later, those particles reached the Earth's magnetosphere, triggering a **major geomagnetic storm** that seriously affected radio signals in North and South America.

The analysis of the data collected by the telescope cosmic rays GRAPES-3, located in India, shows that **an abnormally high cosmic ray flux managed to pierce the magnetosphere during this storm**, with the result that for two hours cosmic rays (particles subatómicas from the extremely energetic) outer space could reach the surface.

Simulations indicate that cosmic rays could penetrate the magnetosphere because the geomagnetic storm would weaken the magnetic field in the polar regions. This weakening is due to **the magnetized plasma from the Sun deforms the Earth's magnetic field**, stretching its shape at the poles and decreasing their ability to deflect, especially the most energetic charged particles.

No, it does not seem that the idea of Obama to protect his country from extreme weather events are exaggerated space, especially when they affect not only radio signals, but to the power grid catastrophically.

Reference: P. K. Mohanty et al (2016) Transient Weakening of Earth's Magnetic Shield Probed by Cosmic Ray Burst *Phys. Rev. Lett.* Doi: 10.1103 / PhysRevLett.117.171101

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