

# The Sun is less active magnetically than other stars

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An ice core from the West Antarctic Ice Sheet. Credit: Heidi Roop, NSF

Our sun is the source of life on Earth. Its calm glow across billions of

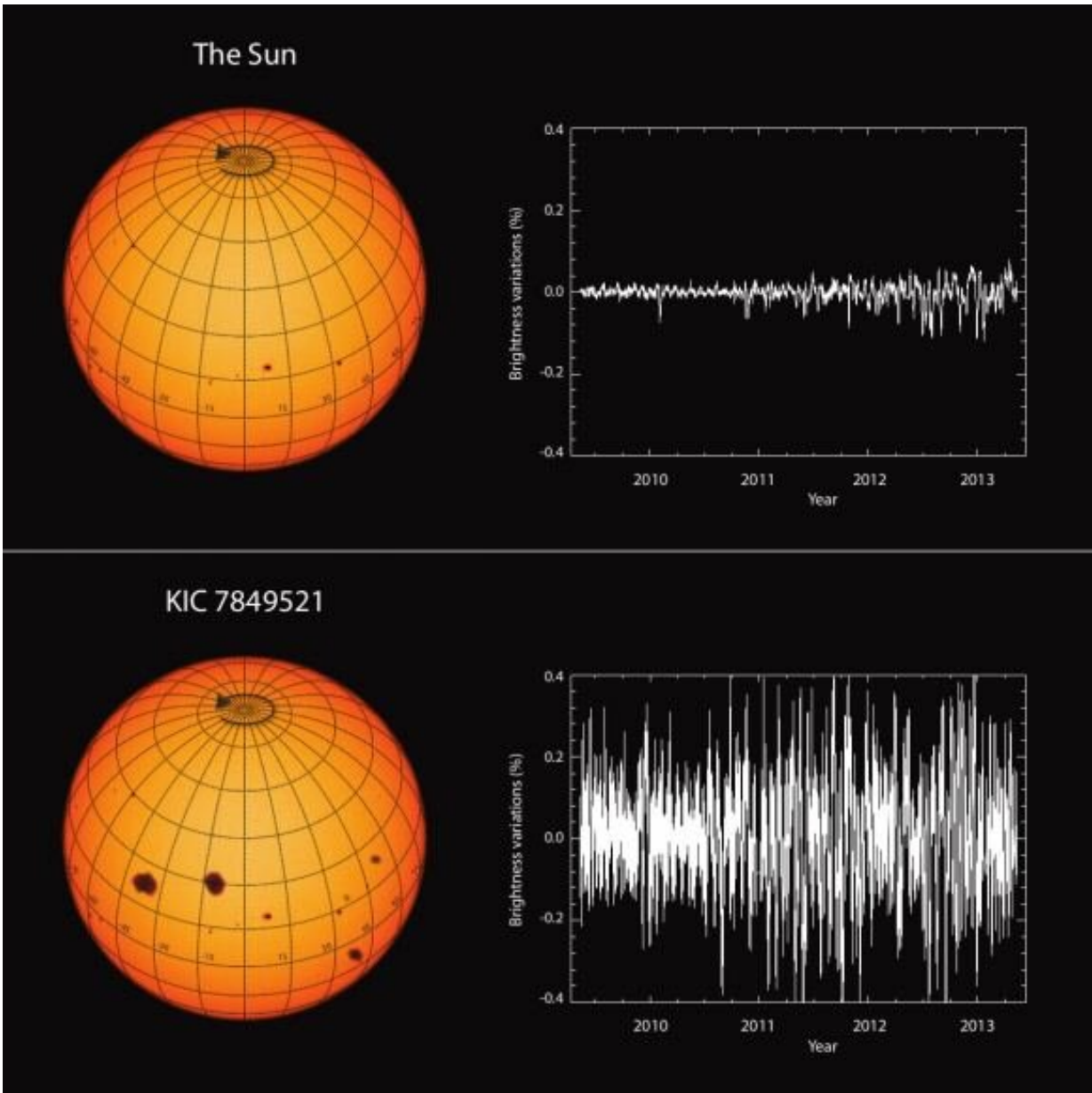
years has allowed life to evolve and flourish. This does not mean the sun doesn't have an active side. We have observed massive solar flares, such as the 1859 Carrington event, which produced northern lights as far south as the Caribbean, and drove electrical currents in telegraph lines. If such a flare occurred in Earth's direction today, it would devastate our electrical infrastructure. But fortunately for us, the sun is mostly calm—unusually calm when compared to other stars.

Astronomers have only recently studied the activity of the sun. The oldest study, undertaken since the 1600s, counts the number of spots on the sun's surface. It has shown that the sun goes through cycles of active and quiet periods. A four-century study is long in human terms, but is barely a moment of cosmic time.

Longer studies have looked at isotopes of carbon and other elements in ice cores and tree rings. When the sun is particularly active, high-energy protons can strike atoms in the [upper atmosphere](#), converting them into radioactive isotopes. They can then become trapped in ice and wood. This gives us an idea of solar activity across nearly 10 millennia.

That is still only a fraction of the sun's lifetime. Is the past few thousand years a good sample of solar activity? What if the sun just happens to be going through an unusually calm period, and is usually far more active? To answer this question, a team of astronomers compared our sun to similar [stars](#), and the results are surprising.

Using data from the Gaia spacecraft, the team looked for stars very similar to the sun. They found stars of similar mass, age and surface temperature. From these they chose stars that not only had a similar metallicity, but also a similar rotational speed. They were left with 369 stars that are nearly twins of our sun.



Brightness variations of the Sun compared to the star KIC 7849521. Credit: MPS

The team then compared the sun's variation in activity over four years to the activity of these other stars. They found that the sun's activity is much lower than the others. The variability of other stars is five times stronger than our sun. Solar flares such as the Carrington event are much

more common on other stars.

This could mean that our sun has been unusually calm during the span of human civilization. If that's the case, it could become more active in the future, which could have serious consequences for civilization. It is also possible that there is some unknown factor that keeps our sun so calm.

At the moment, there is no indication that the sun might enter a hyperactive period. For now and for the foreseeable future, we can continue to enjoy the calm of the sun.

**More information:** Timo Reinhold, et al. The sun is less active than other solar-like stars: arXiv:2005.01401v1 [astro-ph.SR] 4 May 2020. [arxiv.org/pdf/2005.01401.pdf](https://arxiv.org/pdf/2005.01401.pdf)

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