"Space Weather" - Solar Flares

Post by “Kalosyni” of December 16, 2023 at 3:16 PM

Just in case anyone else is interested...I wanted to share what I've been finding regarding space weather, and since we are nearing the solar maximum of sun flares and sun spots.

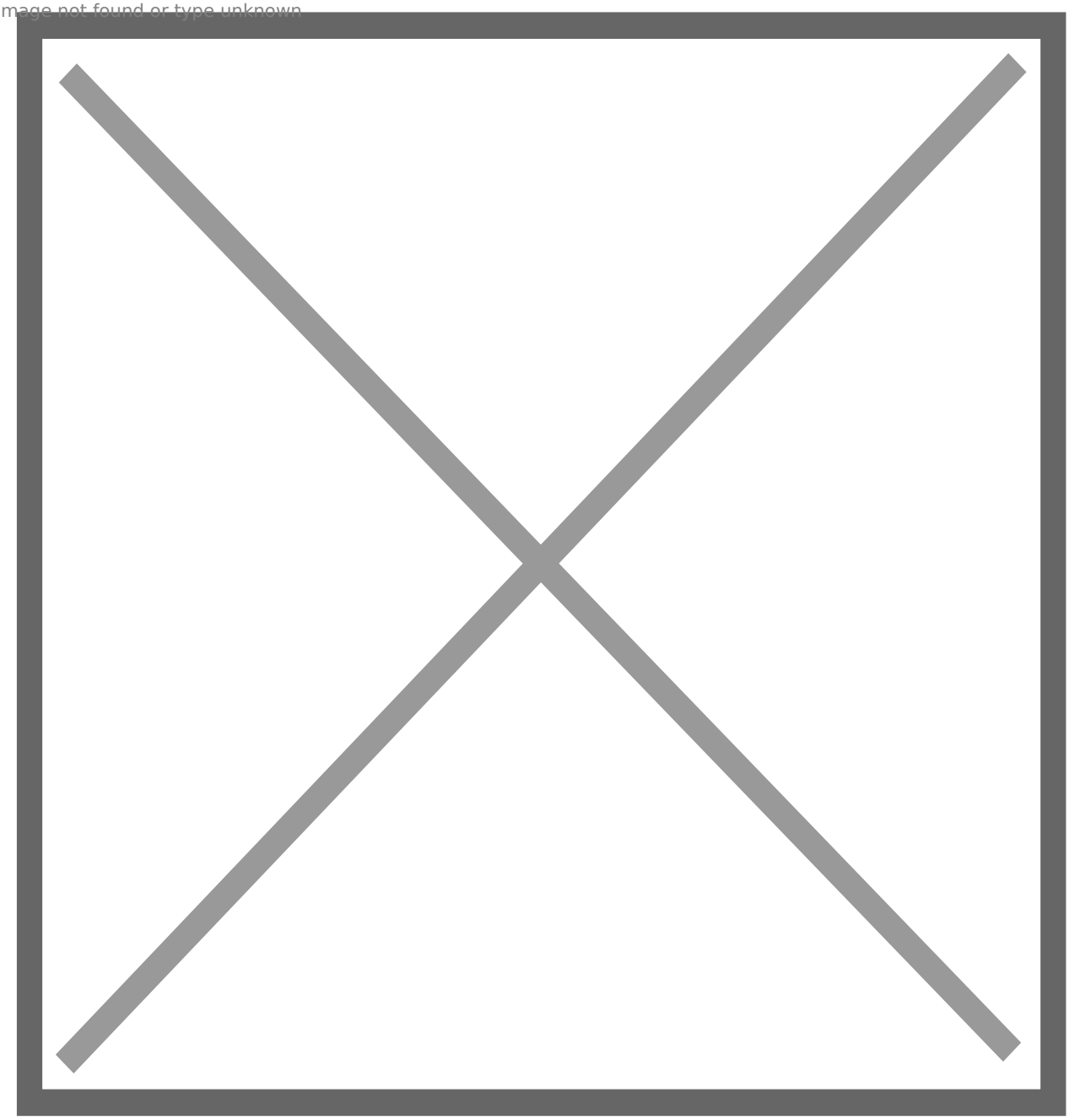
This is interesting to me both because of the science and also because I am attempting to assess the probability of whether or not a strong CME might hit Earth and affect technology, the electrical grid, and of course the internet.

At first glance it may seem like a "dooms-day" scenario, but as I've been reading that there is as high as a 25 percent probability of something really strong occuring (have to go back and find the source on that statistic).

For myself, it seems relevant to the Epicurean understanding of the nature of things...and also it lends itself to remembering to consider self-sufficiency (although I am no prepper, but possibly this may turn me into becoming one ).

So from a purely scientific stand-point here are five webpages:

Image not found or type unknown

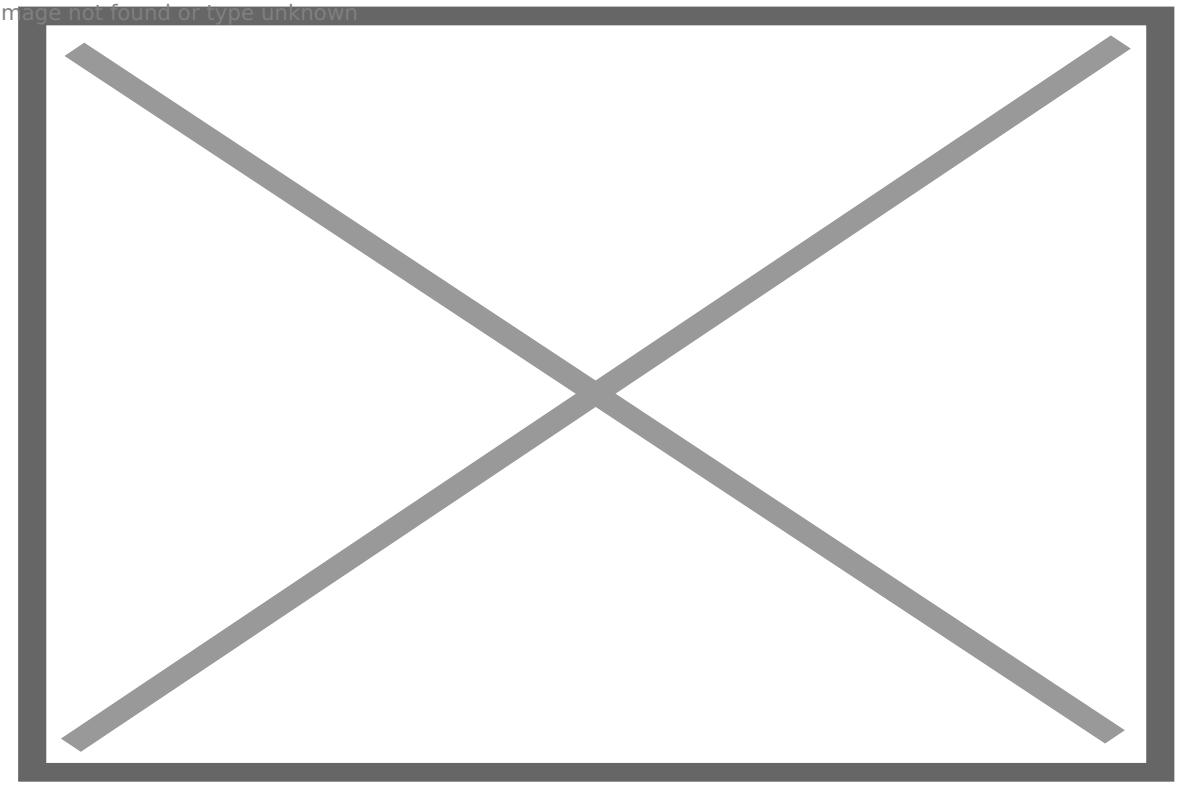


[Space weather: What is it and how is it predicted?]
Space weather can wreak havoc on our technological world.
www.space.com

> Quote
>
> There are two distinct types of solar storm: Geomagnetic storms and solar radiation storms.

> The first of these refers to strong disturbances to Earth's magnetic field caused by ejected solar material called a coronal mass ejection (CME). The second. refers to a stream of much faster moving particles ejected by the sun. According to NOAA's National Weather Service, solar radiation storms involve large quantities of protons and electrons which bathe the near-Earth satellite environment, these storms can last from a few hours to days, depending on the magnitude of the eruption.

Image not found or type unknown



A large solar storm could knock out the internet and power grid — an electrical engineer explains how

Every few centuries the Sun blasts Earth with a huge amount of high-energy particles. If it were to happen today, it would wreak havoc on technology.

www.astronomy.com

Space Weather Enthusiasts Dashboard | NOAA / NWS Space Weather Prediction Center

NOAA Space Weather Scales | NOAA / NWS Space Weather Prediction Center

Space weather effects on technology

Post by “Kalosyni” of March 8, 2024 at 9:44 AM

I found this very interesting website which gives updates on space weather and space phenomenon, with interesting nearly daily changing updates. Today's entry talks about sunspot AR3599 and SAR arcs.

SpaceWeather.com -- News and information about meteor showers, solar flares, auroras, and near-Earth asteroids

---

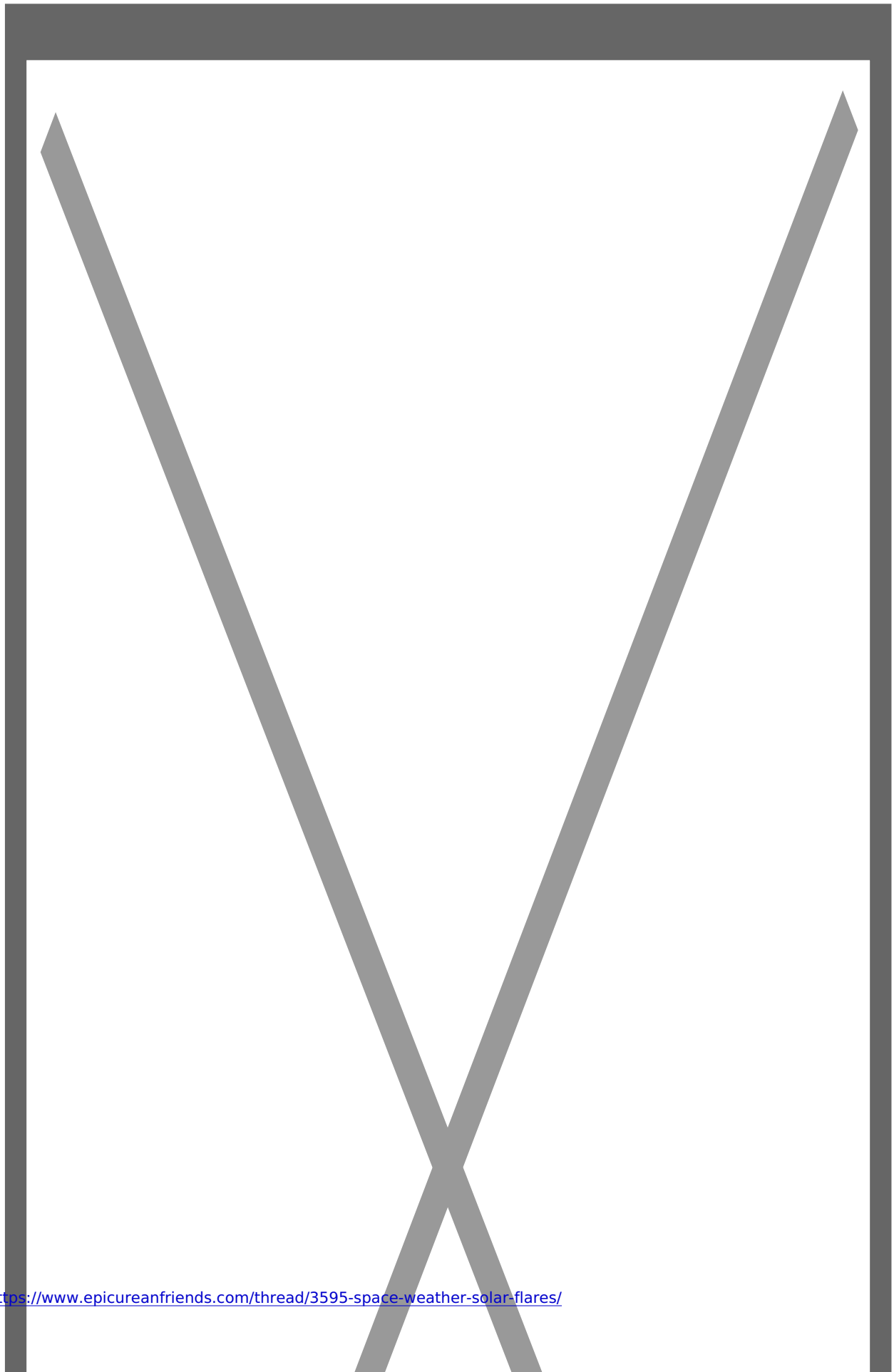
Post by “DavidN” of March 20, 2024 at 9:00 PM

The current solar maximum is also one of the strongest yet recorded.

Post by “Kalosyni” of May 10, 2024 at 10:26 AM

Joshua Tonight, the aurora borealis may be viewable for you:

Image not found or type unknown



Take a look up at the sky this weekend, Iowa. You may see the northern lights
A severe geomagnetic storm is predicted for Friday evening. That means an aurora borealis may be visible. Here's how you can see it in Iowa.
www.desmoinesregister.com

A G4 storm this weekend!

Post by “Kalosyni” of May 10, 2024 at 6:21 PM

Forecast just for Don and kochiekoch ...but they say you need to get out from the city lights.

Also, this website has Aurora forecast (for US):

Homepage | NOAA / NWS Space Weather Prediction Center

Post by “kochiekoch” of May 10, 2024 at 9:46 PM

LOL!!! Peak lights is a 2AM!!! I think I'll skip it. 😄

(Lots of clouds too).

Post by “Don” of May 10, 2024 at 10:16 PM

Definitely nothing at 10pm 😕

Post by “Joshua” of May 10, 2024 at 11:53 PM

We saw a bit when we went north of town, these are from a three or four second exposure.

Post by “Godfrey” of May 11, 2024 at 12:58 AM

From our trip to Alaska a couple of weeks ago:

Post by “Joshua” of May 11, 2024 at 1:01 AM

That's gorgeous!

Post by “Godfrey” of May 11, 2024 at 2:38 AM

Thank you; as are yours! The variety of colors in the various auroras is quite impressive!

Post by “Julia” of May 11, 2024 at 4:49 AM

Admin Edit: This post below covers both the existence of solar flares and the issue of dealing with electric grid disruptions. I have copied this post to a new section where we can deal with the electric grid disruptions in the context of self-sufficiency of varying kinds. So let's discuss the self-sufficiency issues of the electric grid there, and focus on the "prediction and existence of the problem" issues here in this thread.

> Quote from DavidN
>
> The current solar maximum is also one of the strongest yet recorded.

(I'm not an astrophysicist, neither by formal training nor by actual expertise, so this question is genuine – I'm actually wondering:) Aren't we, however, in a grand solar minimum (a negative interference of the two solar cycles, both the slow and fast one) from circa 2020-2053 (33 years for three 11-year-cycles), which would make the late-middle of that period the coldest (late-middle because the Earth doesn't react immediately)?

The Dalton minimum is an example of what I mean by “grand solar minimum”:

Sunspot_Numbers.png
Image not found or type unknown

> Quote from Kalosyni
>
> I am attempting to assess the probability of whether or not a strong CME might hit Earth and affect technology, the electrical grid, and of course the internet.
>
> At first glance it may seem like a "dooms-day" scenario, but as I've been reading that there is as high as a 25 percent probability of something really strong occuring (have to go back and find the source on that statistic).
>
> For myself, it seems relevant to the Epicurean understanding of the nature of things...and also it lends itself to remembering to consider self-sufficiency (although I am no prepper, but possibly this may turn me into becoming one).

I've been down this trail of thoughts – let me give you my travel notes, as they might simplify your journey through this rabbit hole

Why blackouts can happen anytime, anywhere:

- There is no advance warning: Back in 2006, when the European grid was still in quite good condition, one operator negligence in northern Germany split the entire grid into three segments (an automatic fail-safe procedure), in the course patches of brownouts were caused, scattered across the continent – within seconds. This is how fast cascading effects happen in a grid. They're practically immediate. Luckily, only 2,5% of the population lost power.
- Man-made trouble #1: In Europe, maps of the grid lines are public, including which lines feed which area. This allows people to attack the grid, which they actually do. These attacks cause longer-than-usual brownouts (= local blackouts), lasting around 7-21 days, depending on the damage.
- Man-made trouble #2: In Europe, maps of which grid junction is key to the overall, wide-spread stability, and at which time-of-day they are most needed are also public. If one of those towers was burnt down at the right time, it could cause an actual blackout (= a grid shutdown in a large, continuous area).
- Man-made trouble #3: In case of major armed conflict, it is reasonable to assume both sides would try to knock out the grid of their opponent. This can be done by detonating zero-fallout nuclear-powered electro-magnetic pulse (EMP) bombs in the atmosphere. Europe has no effective defense against the Russian hypersonic missiles, which are now proven to exist, because they are being used (albeit armed conventionally) in Ukraine.
- At the same time, major European grid operators have been forced by government regulation to dismantle their capacity for black-starting the grid. That means: If the power goes out, it stays out. Not indefinitely, of course, but for up to three weeks in the areas with the weakest grid (which is basically synonymous to Germany). As far as I know, this problem does not exist in North America.

OK, so we've established that it can happen, that it can happen at any time, and that there's no advance warning. Why does it matter? We've all sat in the dark at some point, it's not the end of the world, surely? Let's think about what happens when the power goes out for longer:

- No water. The pumps are electric, and very few have backup generators. Some regions are supplied from karstic springs, but regulatory substations should have their fail-safe default be set to “shutdown” in case of power loss (to avoid bursting the supply pipes). Normally, operators are able to adjust that manually, but they'll probably stay with their families, when things get bad.
- No petrol. Gas stations use electric pumps. No gas means no cars / trucks, which means no supply. Jams everywhere from broken-down cars. Infrastructure staff stuck and stranded.
- In Europe, only a handful of hospitals have backup power for more than a week. Most have 24-48h, some none at all. Most have no backup water or backup heating. Pharmacies, aged-care homes usually have no backups at all.
- No civilian communication. No way to call an ambulance, the police or firefighters. No firefighters and no water might equate to burning cities.
- Factory farms need to shutdown (slaughter and burn their livestock), because without power they cannot milk cows (fatal mastitis), ventilate the coops (suffocation), or do anything, really. Food shortages are quite possible.
- Stores have no windows, cash registers need power. They might close, but get raided.

To summarize: It only takes one idiot to download the grid map, read the time tables, and blow up the right junction at the right time to transport me into a fully-fledged post-apocalyptic movie scenario. Now, that's not a recipe for a calm mind, is it? Things might be better in the North America (eg, probably no public grid maps, and would be much faster at black starting the grid, because the infrastructure to do that is in place, lower population density, et cetera), but regardless, things like the Northeast blackout of 2003 do happen – and who is to say this can't happen for longer?

Clearly, to worry avoidably is an unnecessary pain. To relieve me of it, some years ago, I've decided to always keep the basics stocked to last for a month: Water, water filters, food, shelter, first-aid, basic tools such as a knife, torch, flint, fire extinguisher, a compass and a water-proof, physical map with nearby springs marked, batteries, a radio, this and that. It didn't cost me a fortune, and stashes away quite nicely. Once every summer, I check it all and I simply eat (and restock) the emergency rations as they expire on a rolling basis. They're not exactly haute cuisine, but not much worse than stale vending machine crackers 🙂

Does this absolutely ensure my safety and survival to 100%? No, of course not – but no such guarantees are possible, anyway: I might get run over by a bus tomorrow. What it does do, however, is calm my mind and give me the confidence to shrug and say: “Everything's going to be fine.” Being prepared doesn't have to be an all-consuming lifestyle. We don't need to sleep in a camouflage nightdress (unless it brings us pleasure). But I firmly believe every home

should have the basics (or the tried and tested assurance that state actors can and will reliably provide them), because as humans, we're bound to think ahead, we're evolutionary worry-machines, especially when what's natural and necessary is concerned. After all, that's how we survived for millennia, and spread to even the most hostile terrain, even though, compared to other animals, our bodies aren't very powerful, are quite sensitive, and do require continuous and high-quality nutrition. Now, with all of that said, I hope I've hit the ball quite nicely, so please allow me to bring this full-circle, back to home base:

There's a first-aid kit in every school, just in case, to not be negligent. Then why shouldn't there be food and shelter in every home, just in case, to not be negligent? We don't fret about crafting scissors, running or even chemistry class. So let's not fret about natural disasters, wars, or diseases. We don't watch the school play and wonder how many rusty nails went into building the stage decoration – and we shouldn't watch the beauty of the night sky and wonder how it might kill us. Instead:

Let's just buy a first-aid kit.

(And learn to use it.)

Post by “Cassius” of May 11, 2024 at 7:04 AM

I think that something like "self-sufficiency in time of crisis" is a good topic for continued discussion as I am very interested in doing some preparation myself. I spend a lot of time in a rural area subject to possibly weeke-long interruption in power from ice storme and hurricanes, so this is of practical interest.

In this case I have "copied" (rather than moved) the last several posts into a new forum here:

Thread

Dealing With Electric Grid Disruption

Admin Edit - This thread was split off from the Solar Flare Discussion Started HERE.

[…]

I've been down this trail of thoughts – let me give you my travel notes, as they might simplify your journey through this rabbit hole

🙂

Why blackouts can happen anytime, anywhere:

- There is no advance warning: Back in 2006, when the European grid was still in quite good condition, one operator negligence in northern Germany split the entire grid into three segments (an automatic fail-safe procedure), in the

...

Julia
May 11, 2024 at 4:49 AM

Please try to pursue the discussion of "self-sufficiency in time of crisis" in that forum, and in this one let's keep the specific issue of solar flares and the like.