

By Tom W9N BG

The Sun Spots and DX

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**Sun Spots promote DX
Sometimes!!!
I have GOOD NEWS
and
BAD NEWS.**

- **The Sun Spots**
promote DX radio
contacts by a chain
of events.

**We will look at
each simple link,
one at a time.**

? ? ? ?

Questions, &

Helpful Comments

any time.

? ? ? ?

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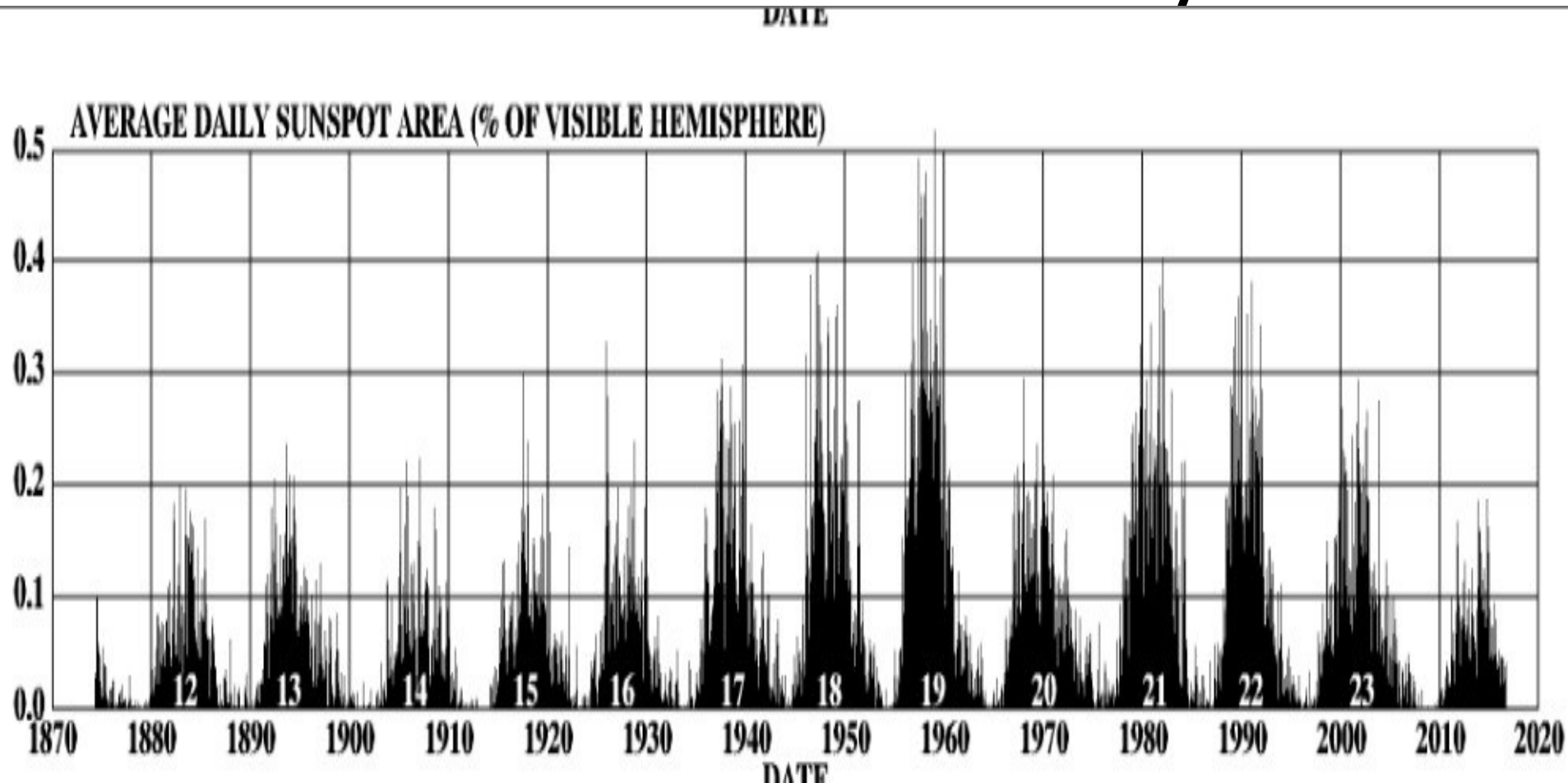
Sun is on FIRE!!!

**Fear not, help is on
the way. Qualified
men have been sent
to the Sun.**



**The information
presented here has been
gathered over the
approximately 70 years
of being a ham.**

- **That's about 70 Sun Spot Cycles.**
See below that the Cycles are different in intensity.



**Ham Radio uses a
lot of Jargon.**

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lot of Jargon.**

WHY?

**In the beginning of
Ham Radio every
one used Mores
code.**

**It took years for
voice
transmissions to be
invented.**

Jargon or short
substitutes for long
words or phrases
were invented.

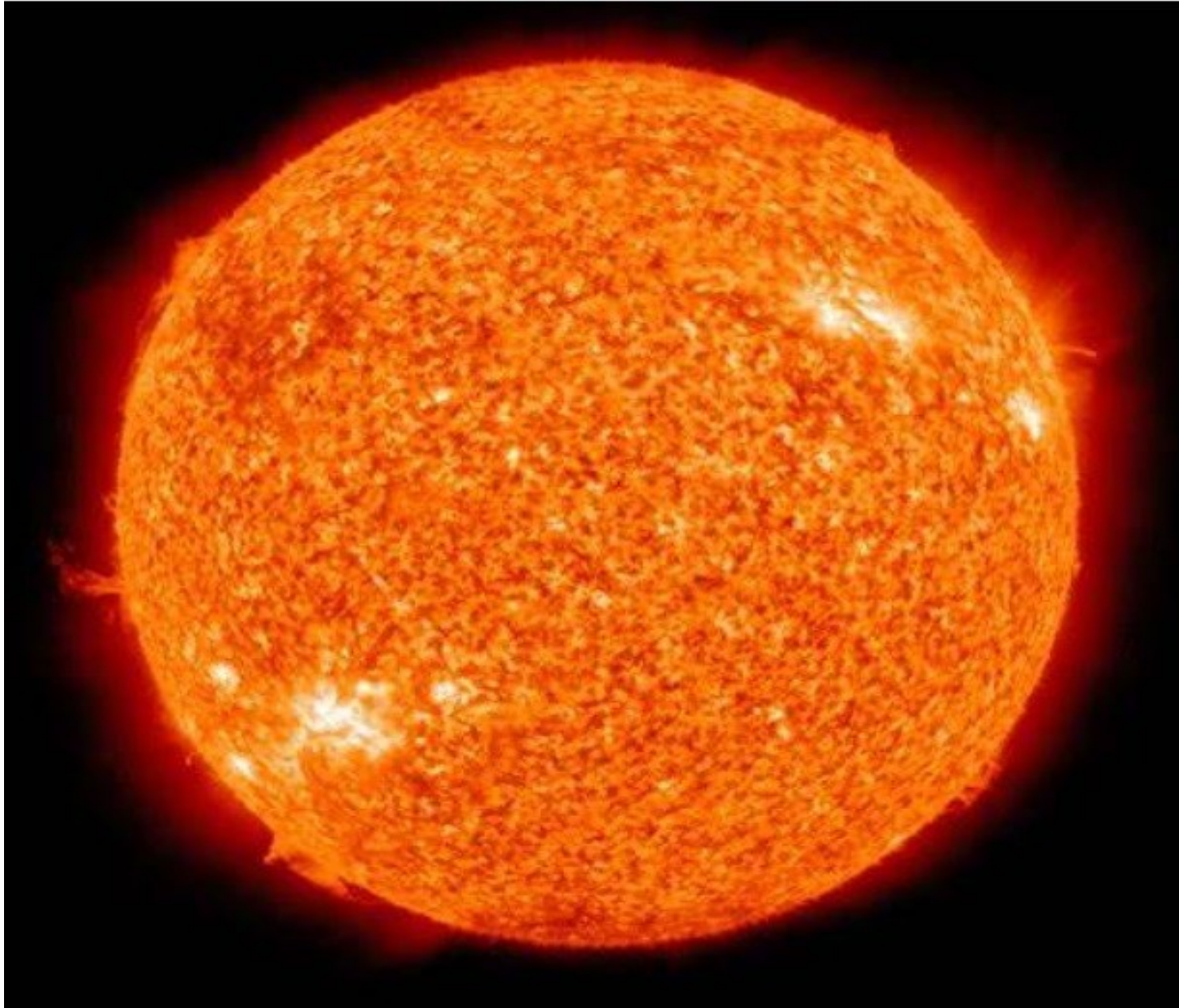
**Some definitions are
now required so
new and old hams
are on the same
page.**

- **73s = Good by and good hunting.**
- **88s = Good by, Love and Kisses to Ham YLs or XYLs.**
- **“Q” signals are a list of phrases made up of 3 letters all starting with “Q”.**

- **Such as:**
- **QSO = A Ham Radio conversation or “Qs”.**
- **QTH = Location.**
- **QRM = Interference man made.**
- **QRN = Interference made by nature like Lighting.**

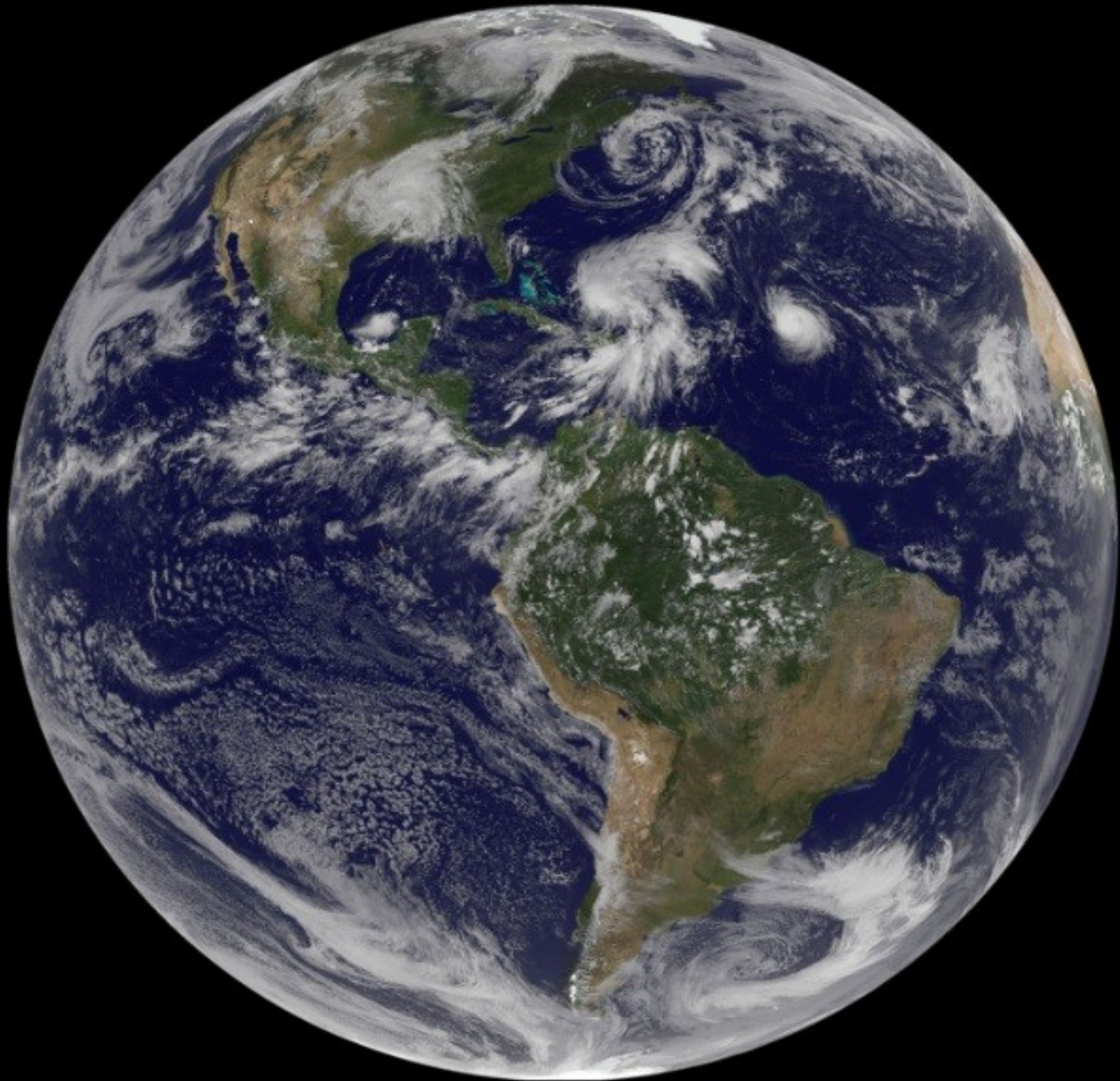
•The Sun

- That big yellow thing in the sky that you can see during the day. Will burn your eyes out if you look to long!!!



- **The Moon**
- **White thing in the sky that has nothing to do with this talk.**

- **The Earth**
- **Where McDonald's is,
where you watch TV
and where you are
now.**



What is a Ham Band?

Like AM & FM Radio, the FCC licenses Hams to transmit on frequencies grouped together.

What is DX?

**A Ham Radio
conversation or QSO
over long distances.**

What is DX?

On HF bands Ham signals can travel hundreds or thousands of miles to

What is DX?

On VHF bands and higher, DX is an unusual contact 2 or more states away.

What is DX?

D=Distance

X=Unknown

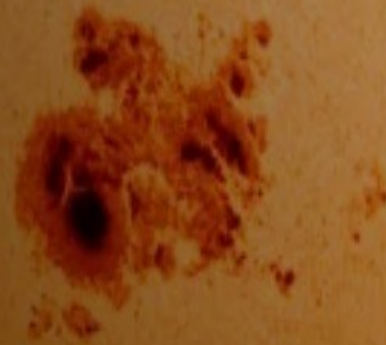
What are Sun Spots?

Blemishes on the surface of the Sun that appear in pairs like 2 ends of a “U” shaped magnet.

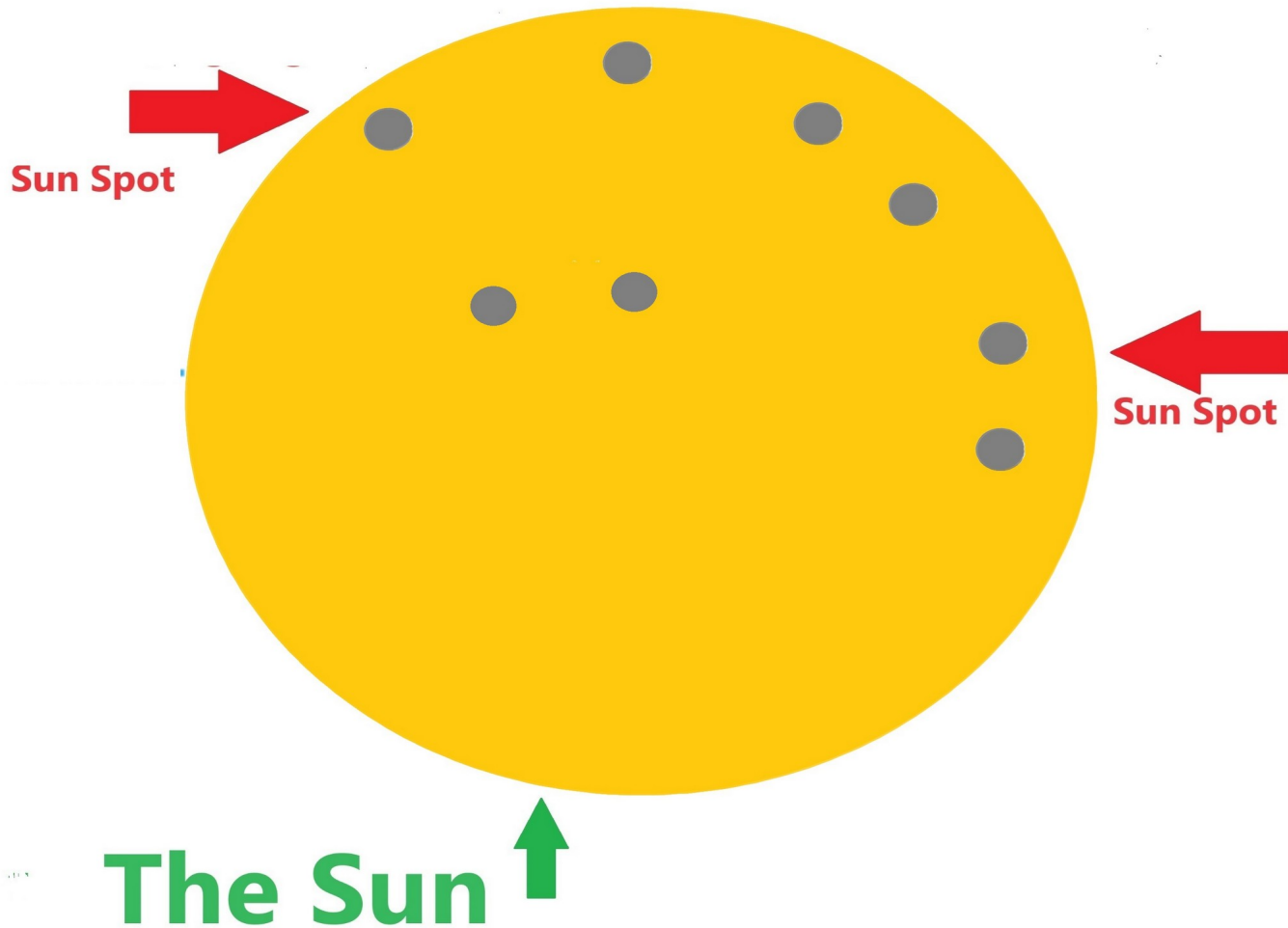
Sunspots

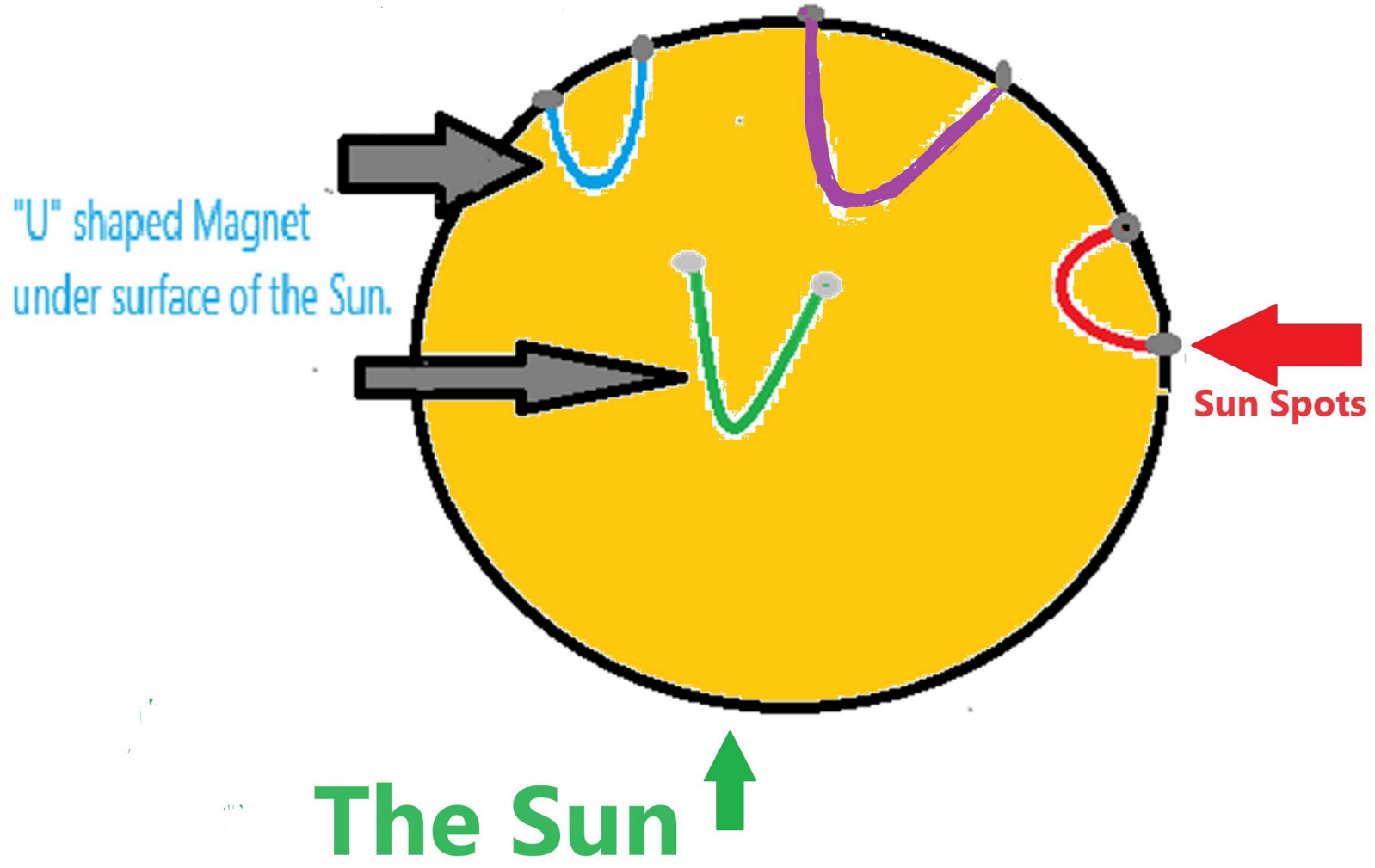
Sunspots are cooler regions on the Sun caused by a concentration of magnetic field lines.

Some photos are from NASA Websites.



Sun Spots in pairs.

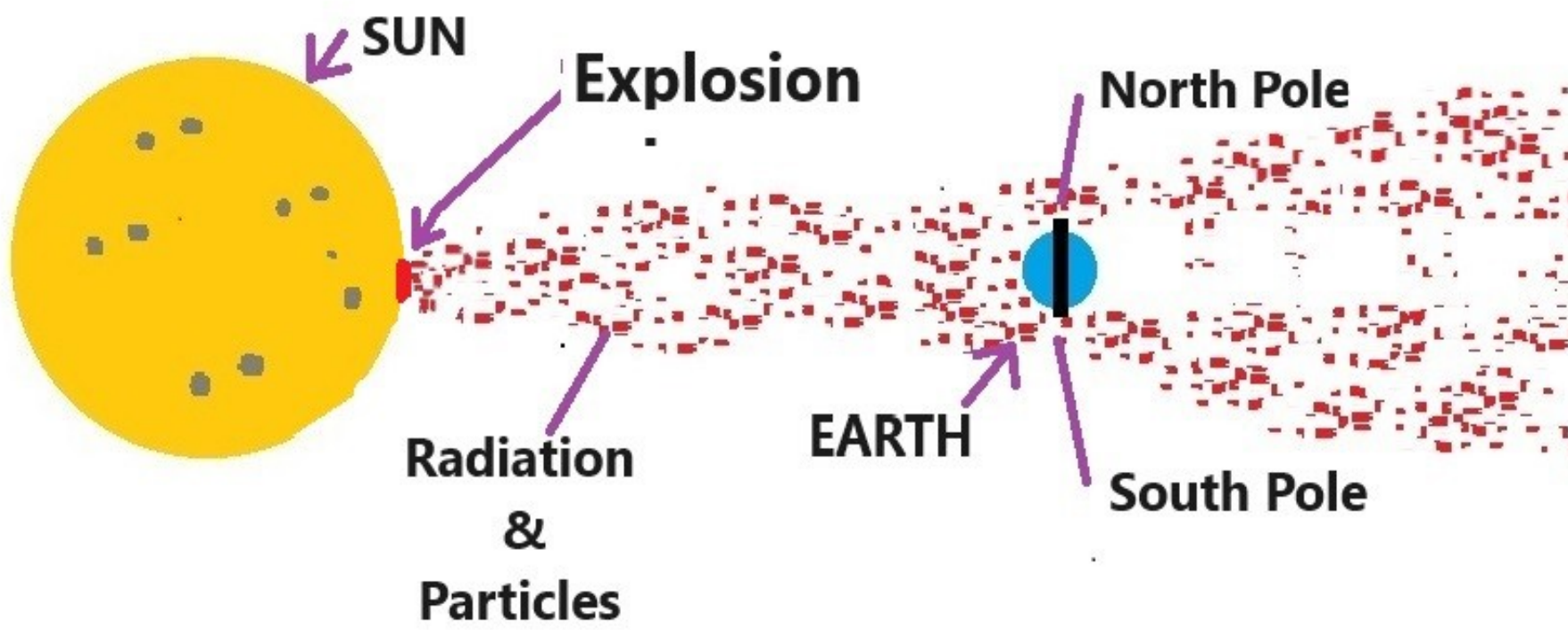




**The Sun Spot Cycles
usually happen every 11
years.**

**But there have cycles that
have been missed.**

- **The activity in the Sun is much more violent when Sun Spots are present and very large explosions through into space particles and electromatic waves that can be aimed in the direction of the Earth.**



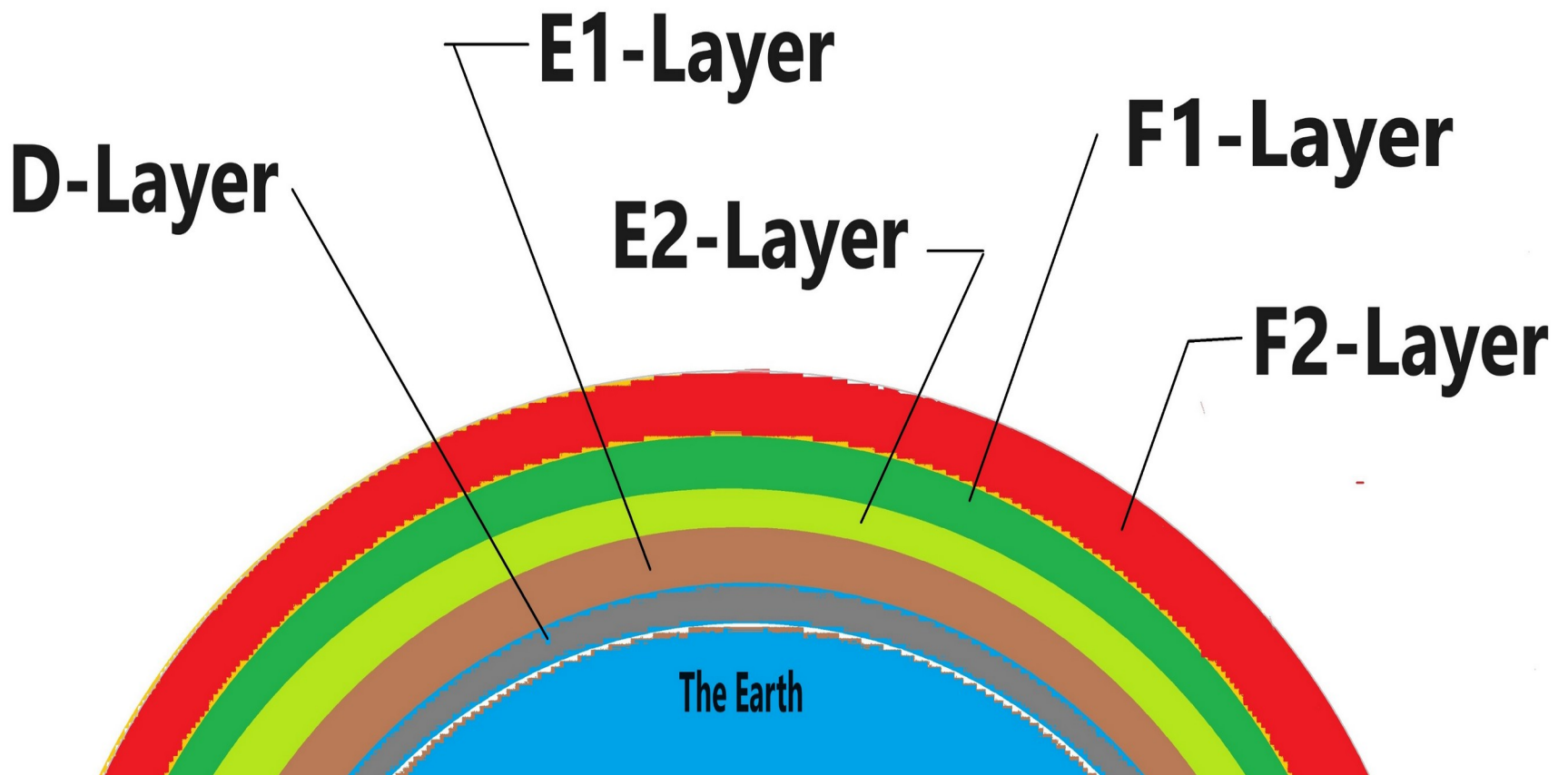
- **The Magnetic Field of the earth decreases the radiation and particles to protect life here on Earth.**

- **BUT there is danger to us in space and on other planets like Mars and moons that do not have an IRON CORE that produces a Magnetic Field.**

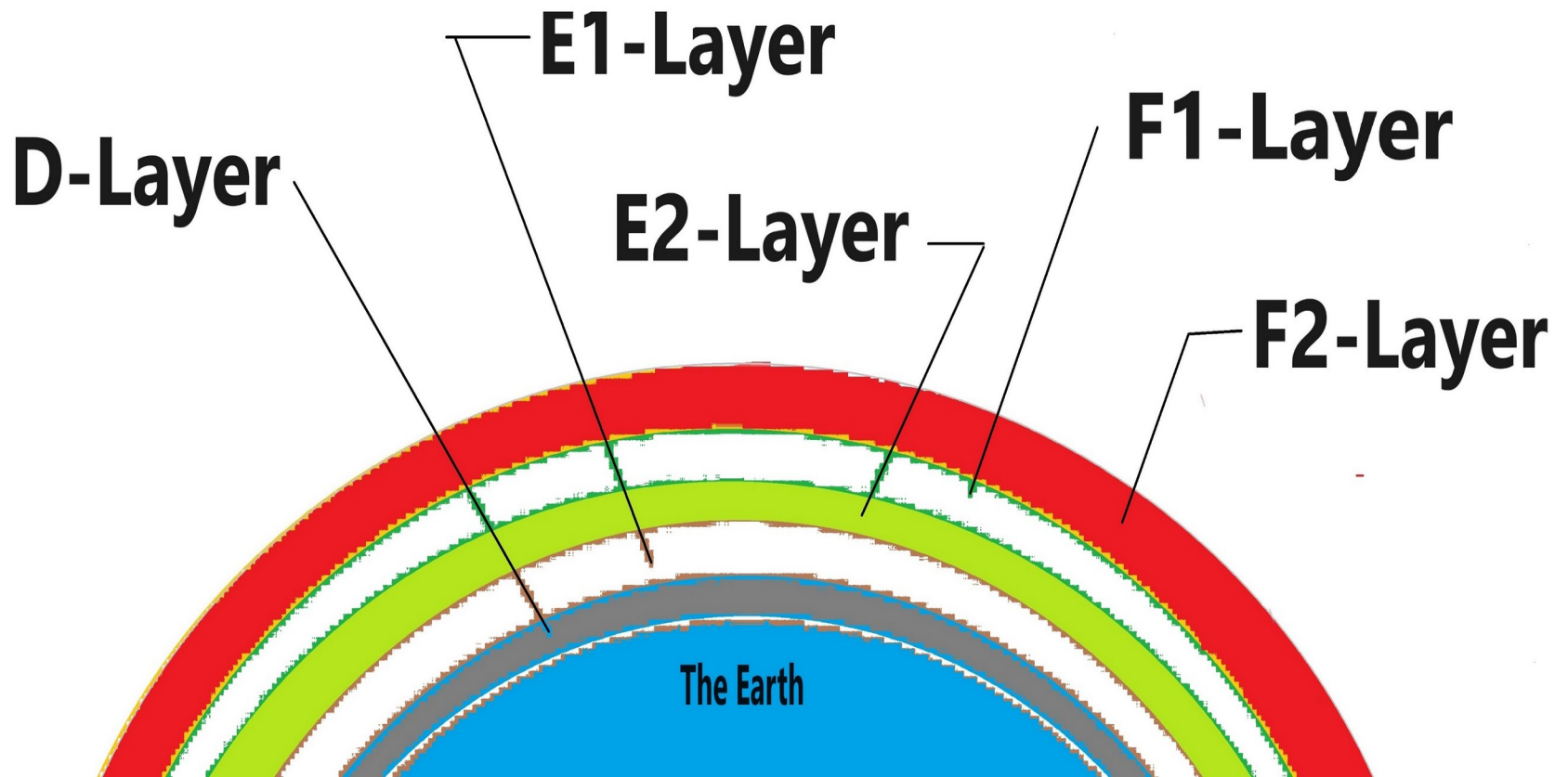
- **How do the Sun Spots help to have long distance Ham contacts?**

- **The radiation and particles that get through the Magnetic Field, ionize the layers in our atmosphere.**

LAYERS: With no Sun Spots



LAYERS: With Sun Spots 2 Layers DISSAPPEAR!



- With the 2 layers gone the D layer is not active at this time, but the E2 and F2 layers become ionized and signals bounce off of them.

- **What do we mean by bounce???**

- Reflection like light bouncing from merrier is not what is happening.

- Here comes the
good news.

- REFRACTION of the radio signals is what happens as they pass through some layers.

- **WHAT IS**

REFRACTION?

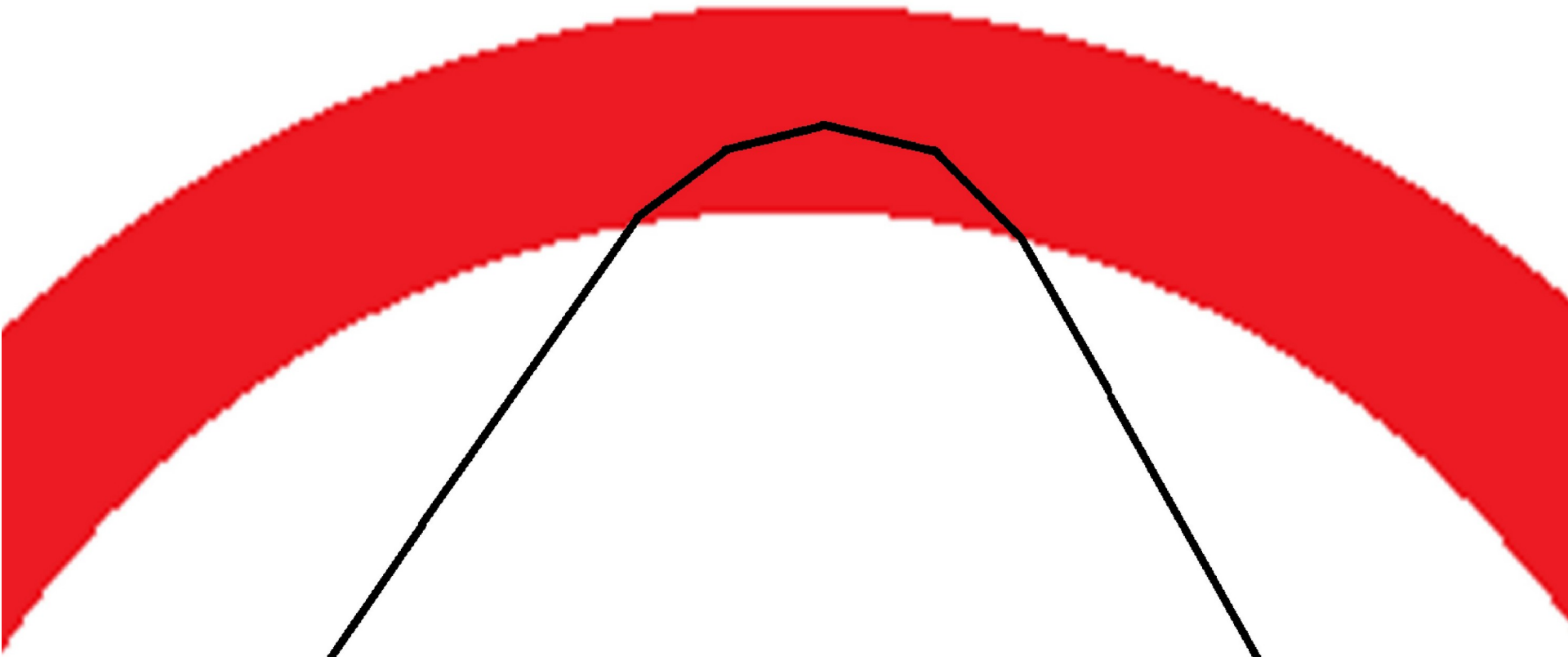
- **WHAT IS**

REFRACTION?

A bending of Radio Signals as they pass through Ionized Layers.

- Refraction happens smoothly as a curve, but is shown here as straight lines for clarity.

F2 Layer Refraction



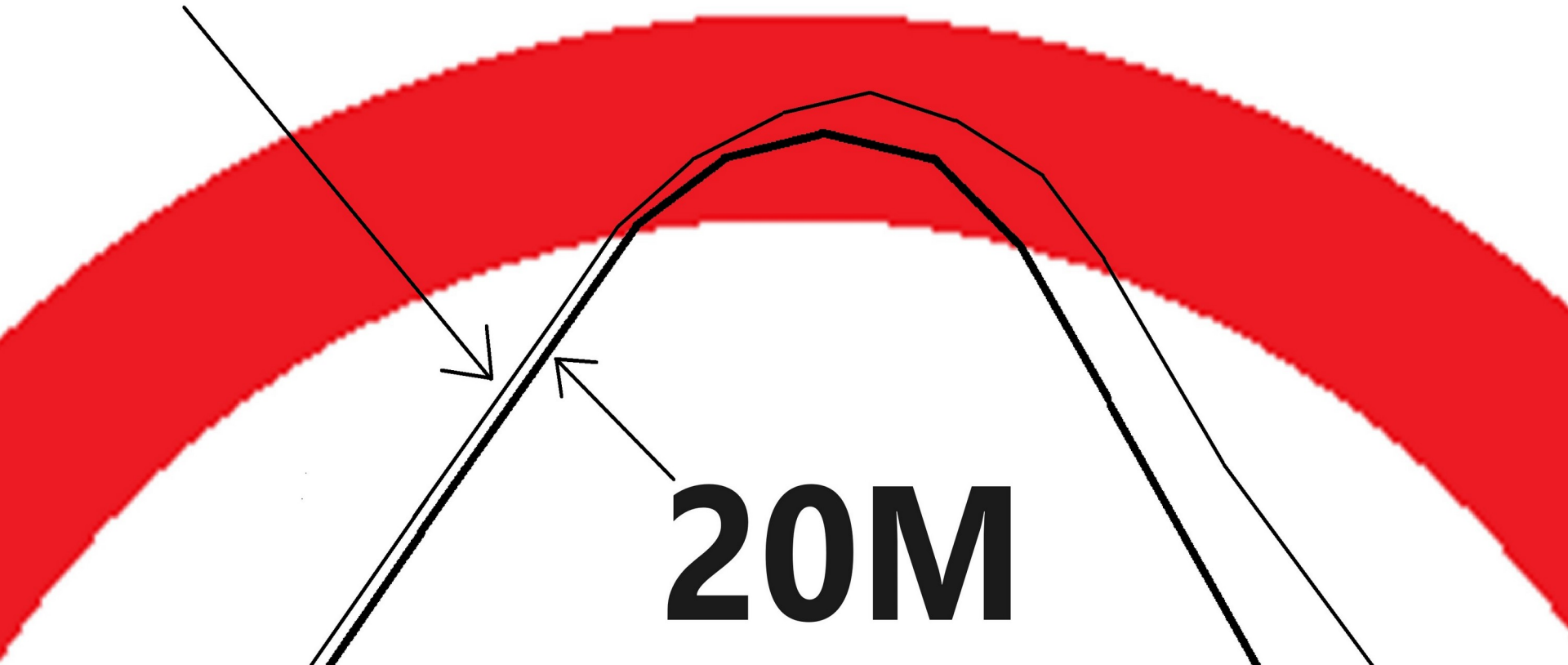
- The higher the signals frequency the

- **LESS THE**

BENDING!!!

F2 Layer

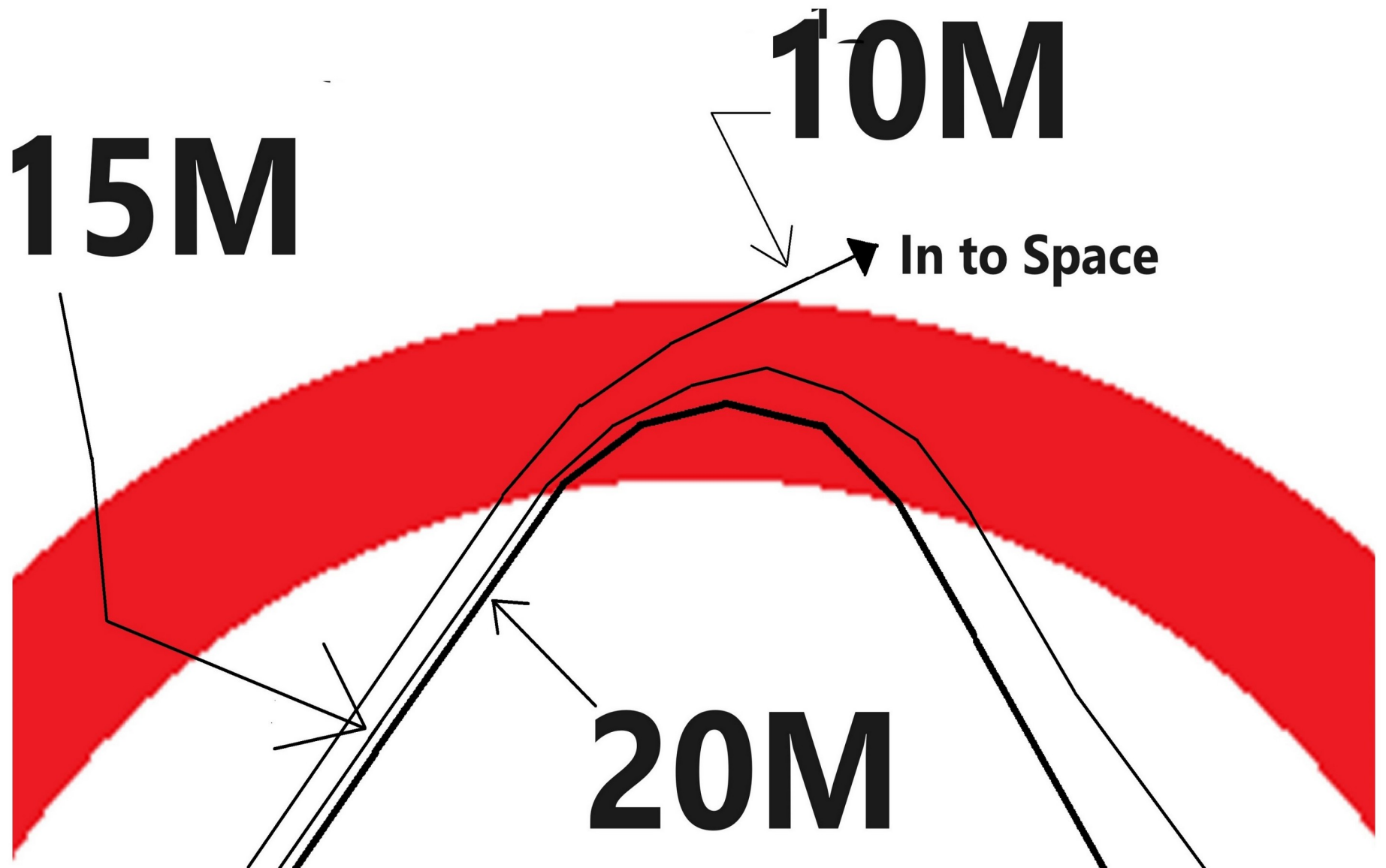
15M Refraction



20M

- **That's why signals on different bands end up on different places on Earth!!!**

F2 Refraction



- That's why some bands are not open to work
DX!!!

- What about the E2 Layer???

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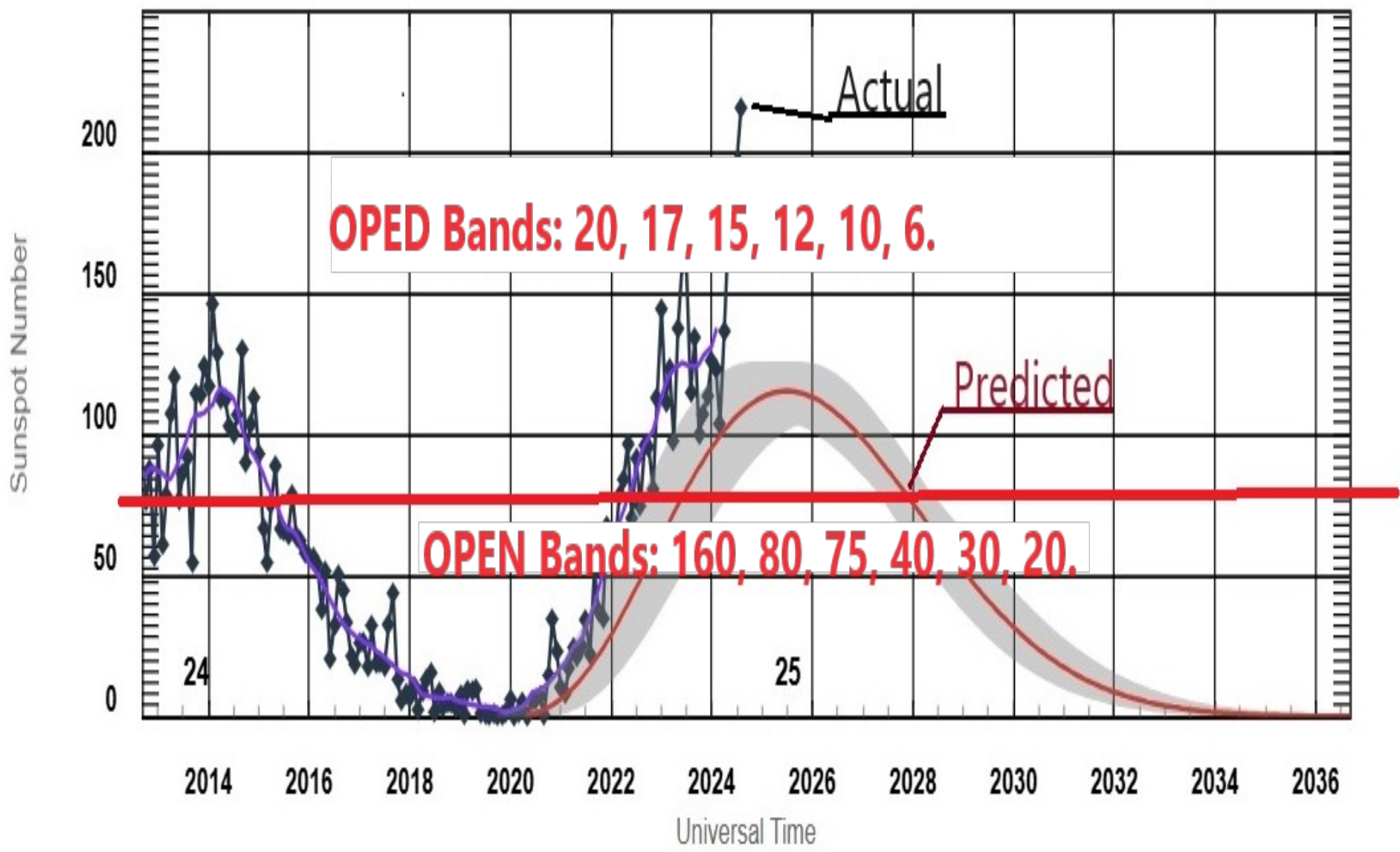
- The E2 Layer can cause 6 Meters to open.

- What about the D Layer???

- When the Sun Spots are between the midway and the usable highest level, the D Layer absorbers the signals from 160 to 40 meters.

ISES Solar Cycle Sunspot Number Progression

Zoom:

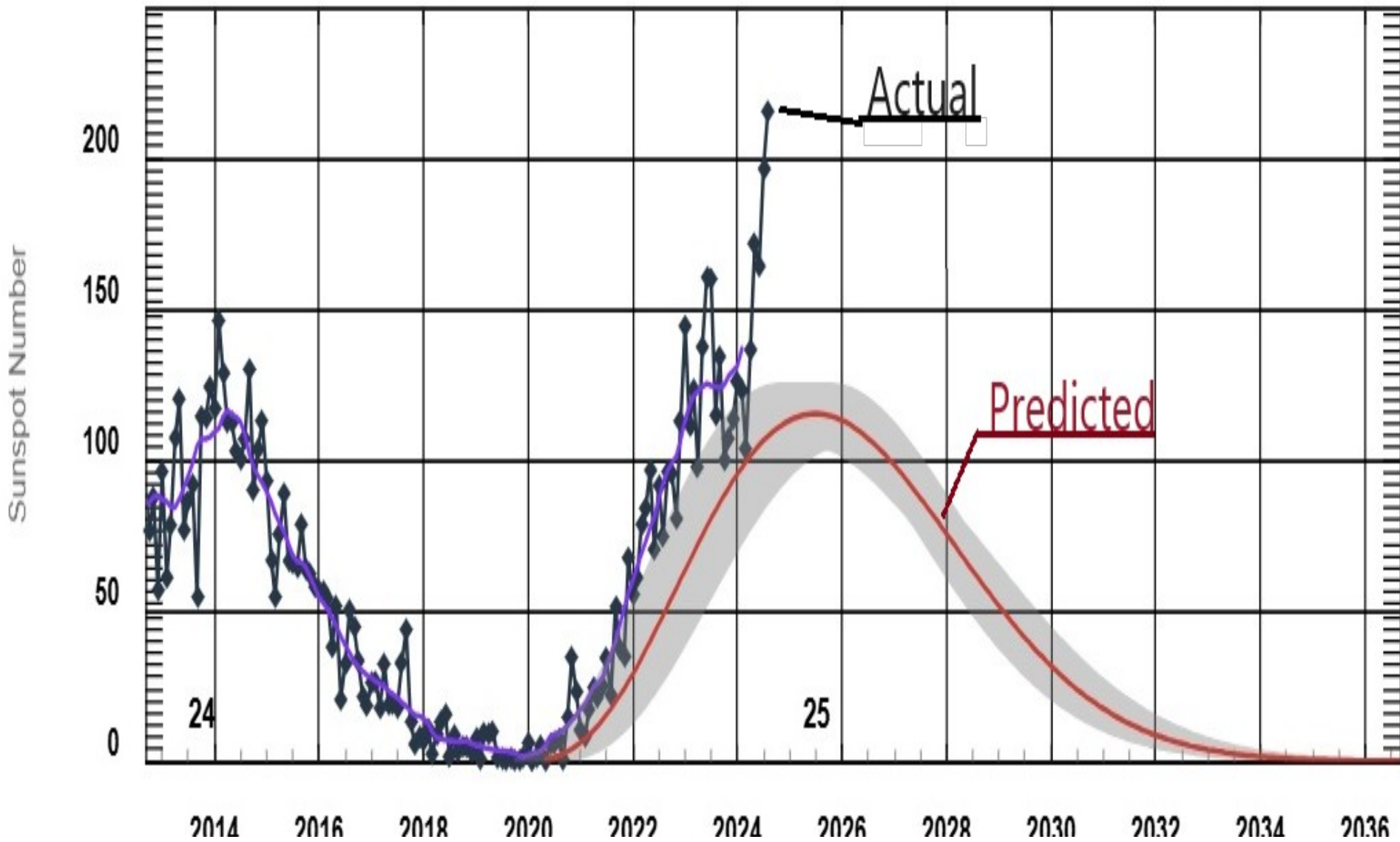


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• **Now the BAD
NEWS.**

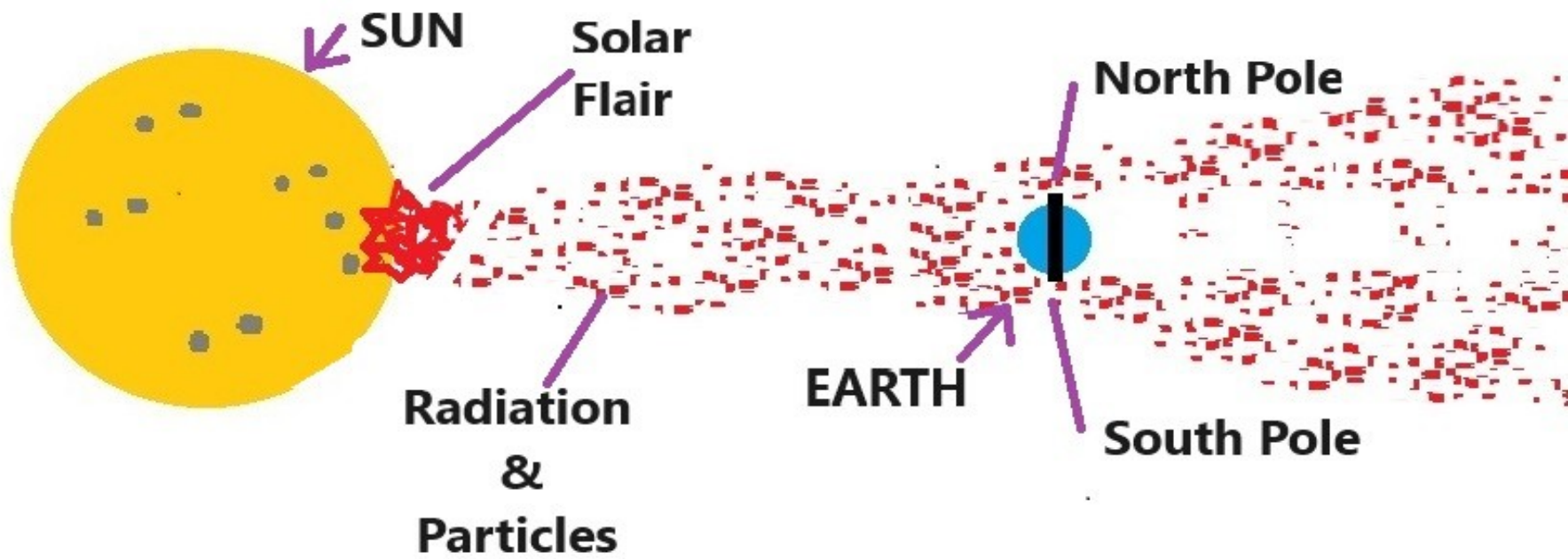
ISES Solar Cycle Sunspot Number Progression

Zoom:



Solar Flair





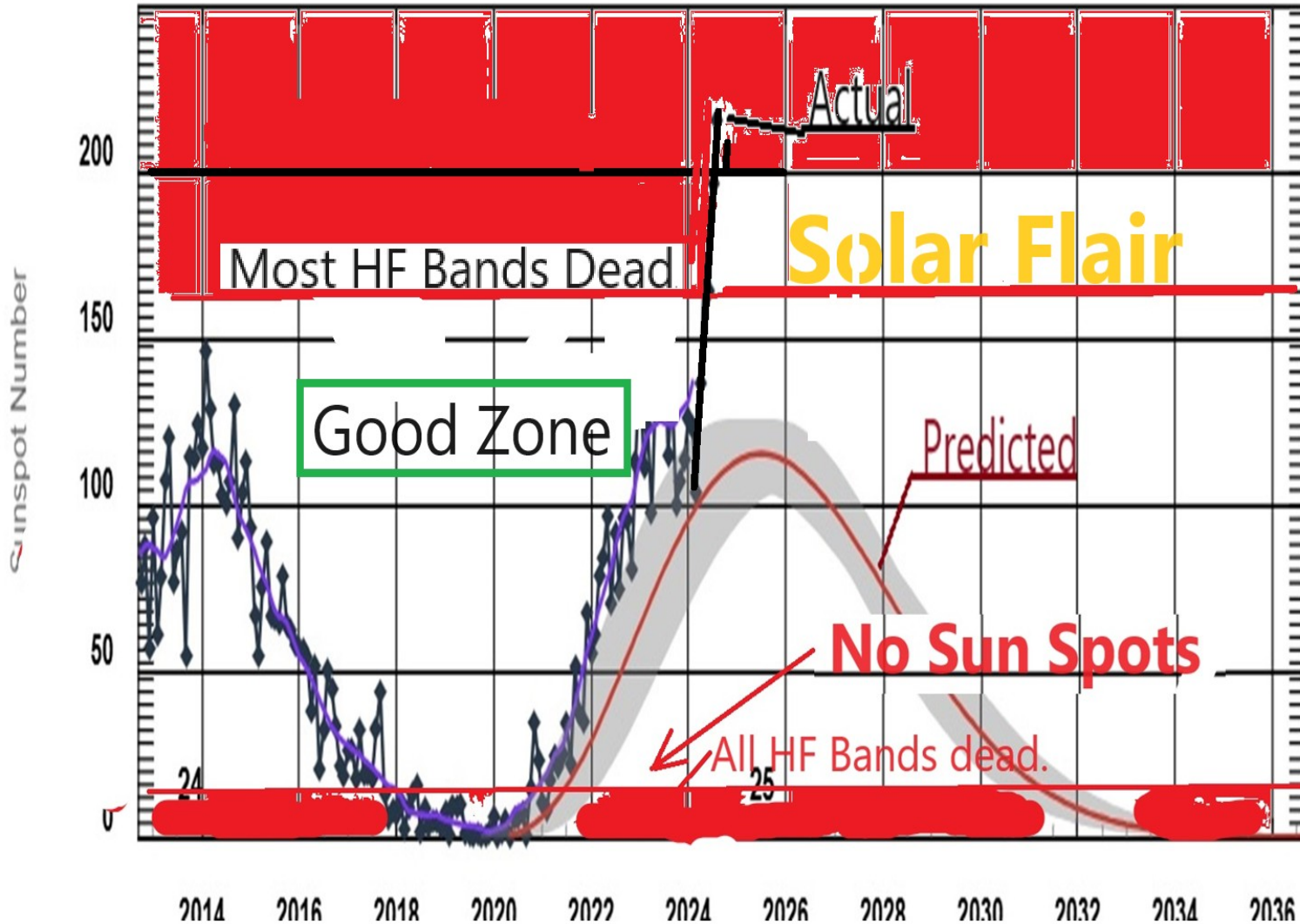
- **When a Solar Flair is too large, it overwhelms the layers and kills the propagation of the Radio Signals and the HF bands go dead.**

- **This can last for a number of days or weeks.**

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- **There can be some activity on 20 Meters.**

ISES Solar Cycle Sunspot Number Progression

Zoom:

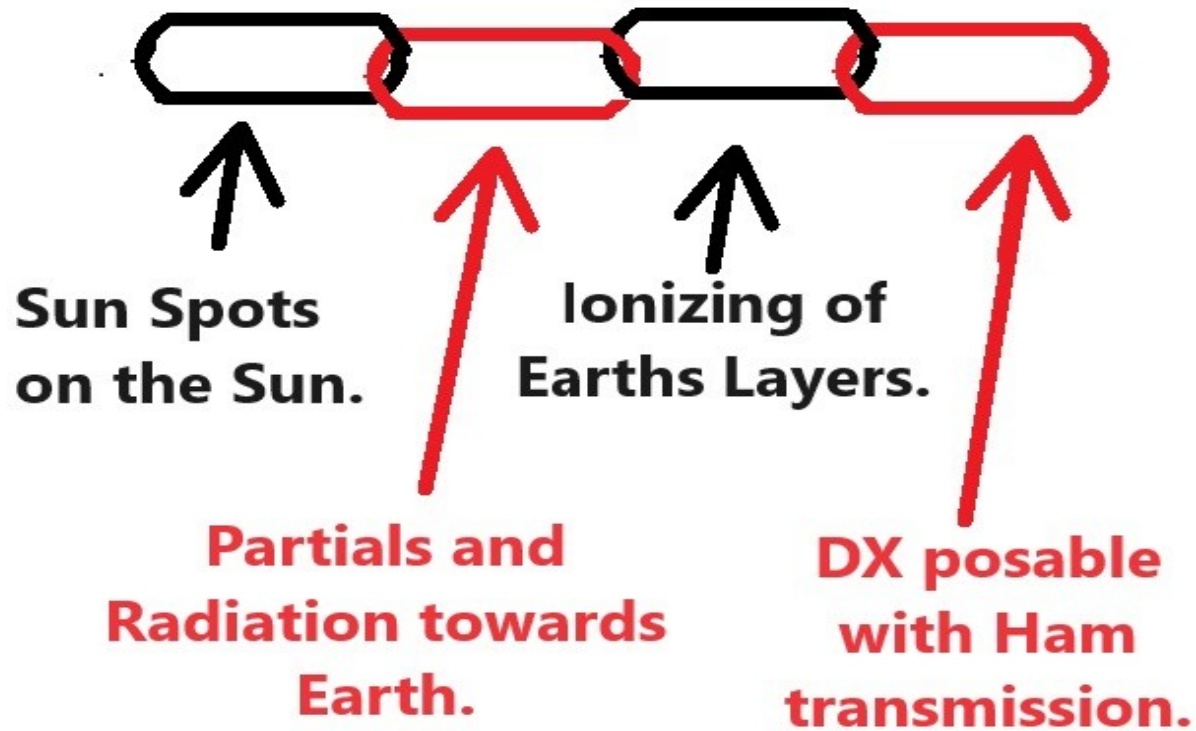


- Last remarks: Sun Spots cause the Aurora Borealis.
- VHF bands open and the Beam Antennas should be pointed North to work DX over the North Pole.

- Sun Spots also cause Ducting where the Radio Signals get caught between layers and come out far away.

- Subjects for another talk.

Review



Any Questions?

The End

By Tom W9N BG

The End