

First E-SWAN school

Space Weather Data, Models and Services



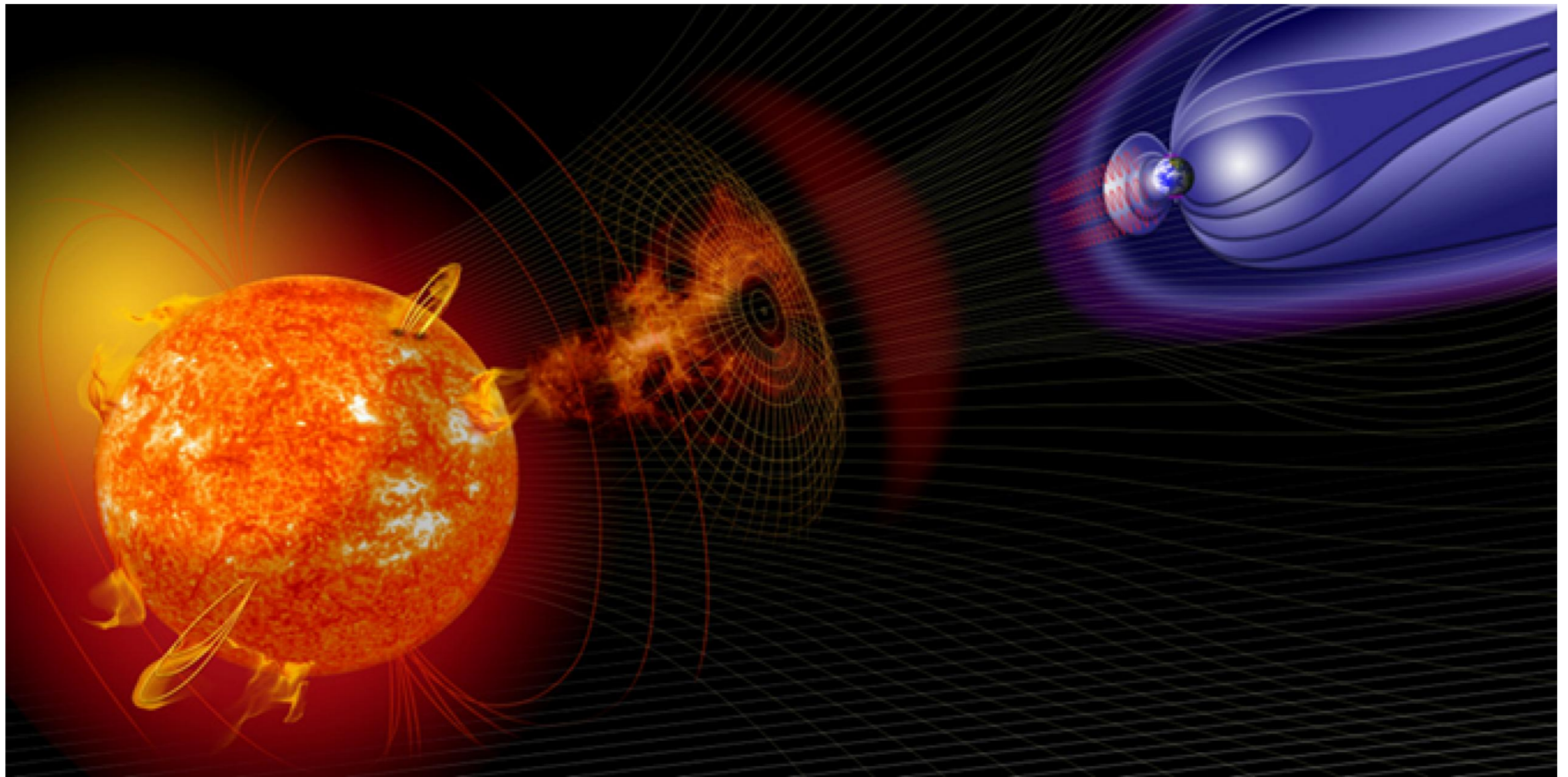
Collaboration of



Solar-Terrestrial Centre of
Excellence



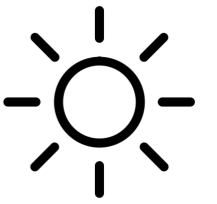
European Space Weather and
Space Climate Association



SPACE WEATHER PHENOMENA

Solar Radio Bursts

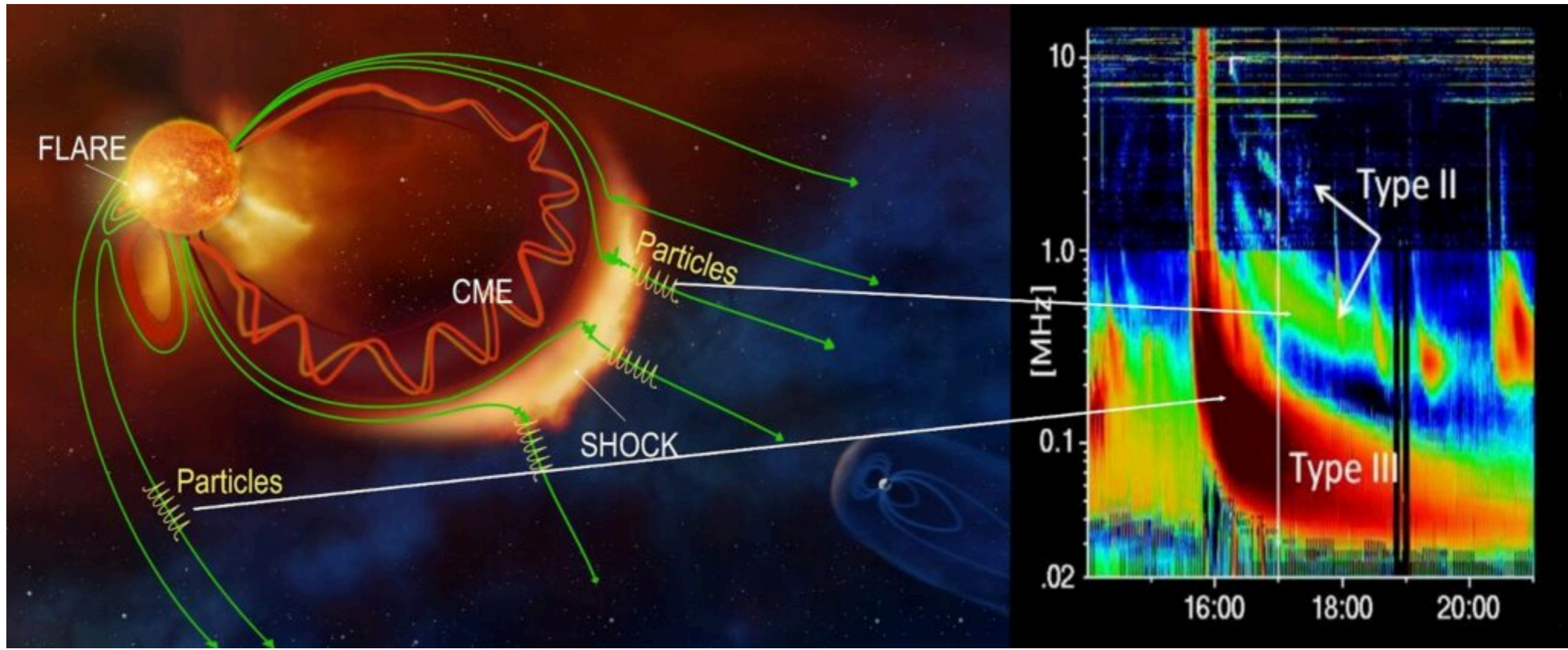
Petra Vanlommel



Observations in the e.m. spectrum

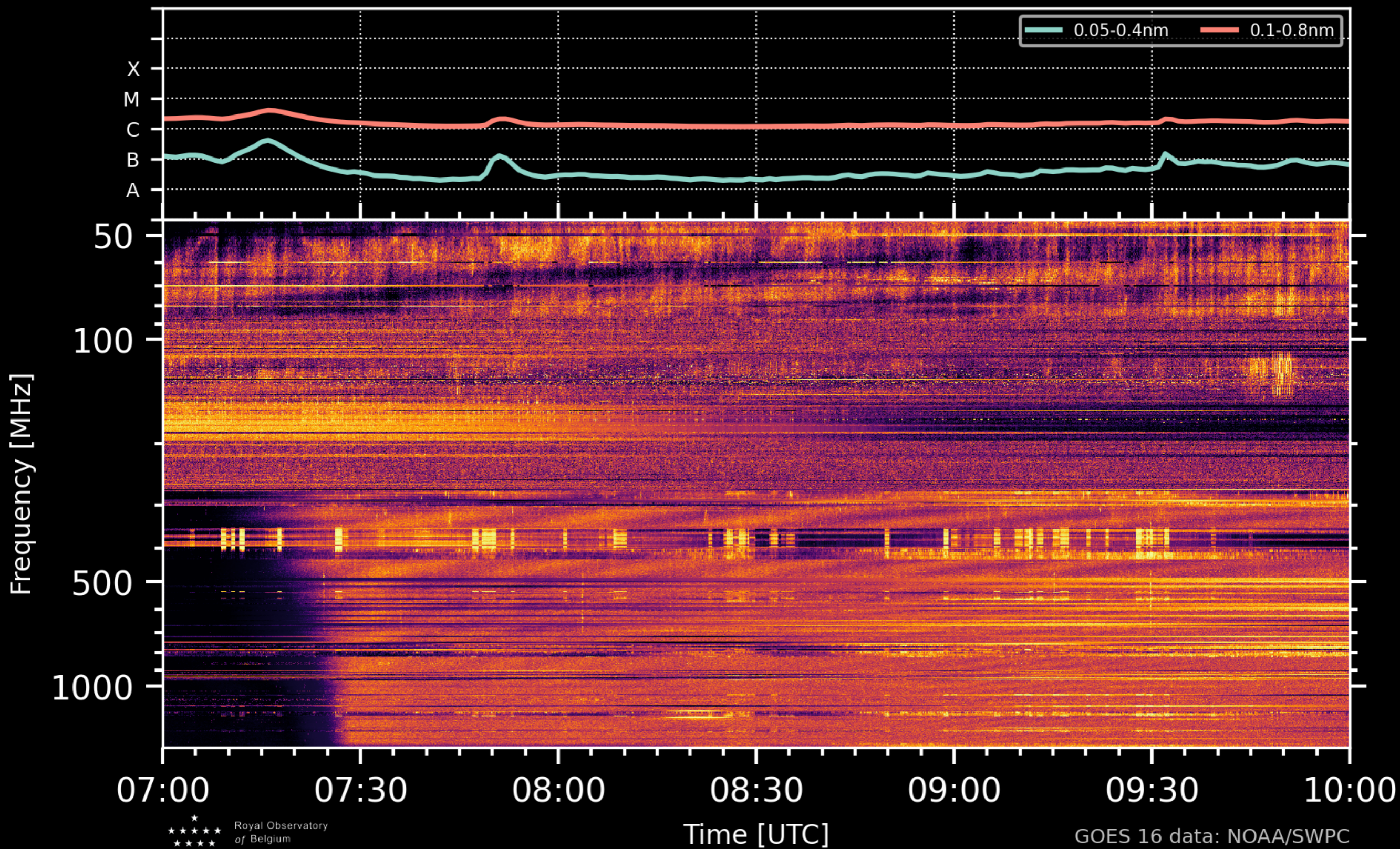
- 10 cm flux \rightarrow index for solar activity, similar like the sunspot index
- Solar Radio Bursts







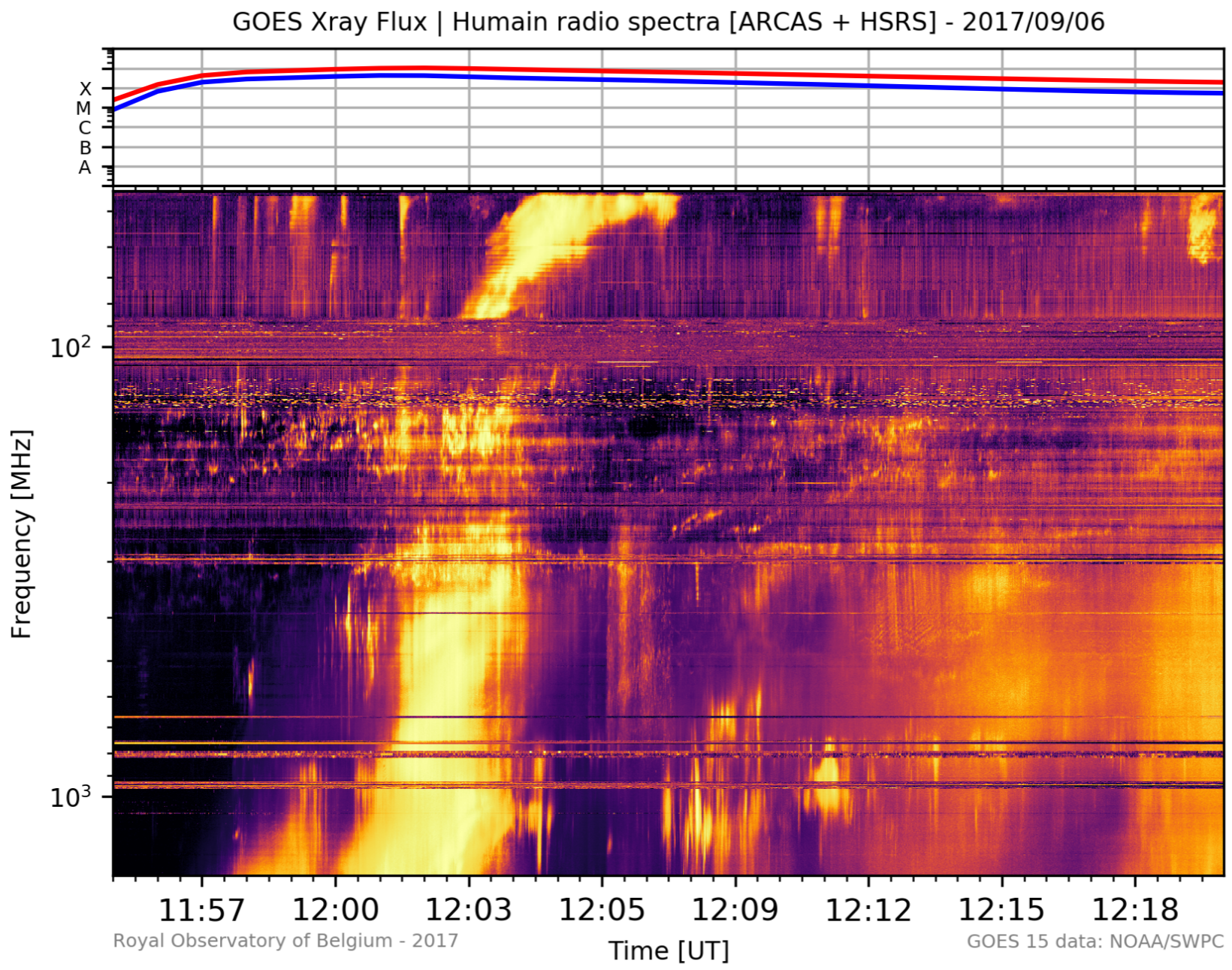
2023-05-23 - GOES X-ray Flux | ARCAS + HSRS (HUMAIN)





SOLAR RADIO BURSTS

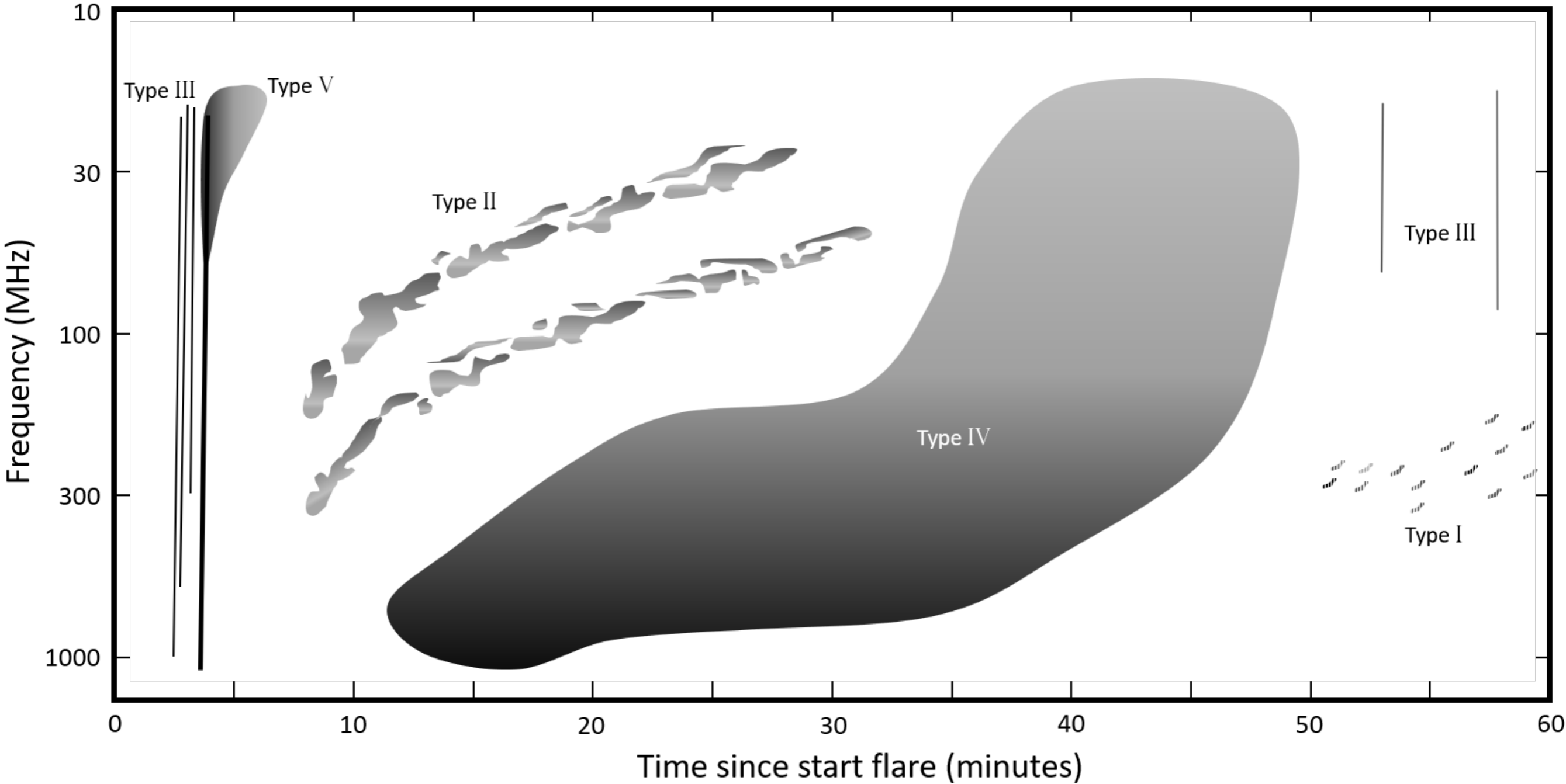
SRB are produced by electrons energised by solar eruptive events, like flares, coronal mass ejections. Their radial signature - how it looks like in a spectrogram - tells something about the fate of these electrons.





SOLAR RADIO BURSTS

SRB are produced by energetic electrons accelerated by solar eruptive events, like flares, coronal mass ejections. Their radial signature - how it looks like in a spectrogram - tells something about the fate of these electrons.





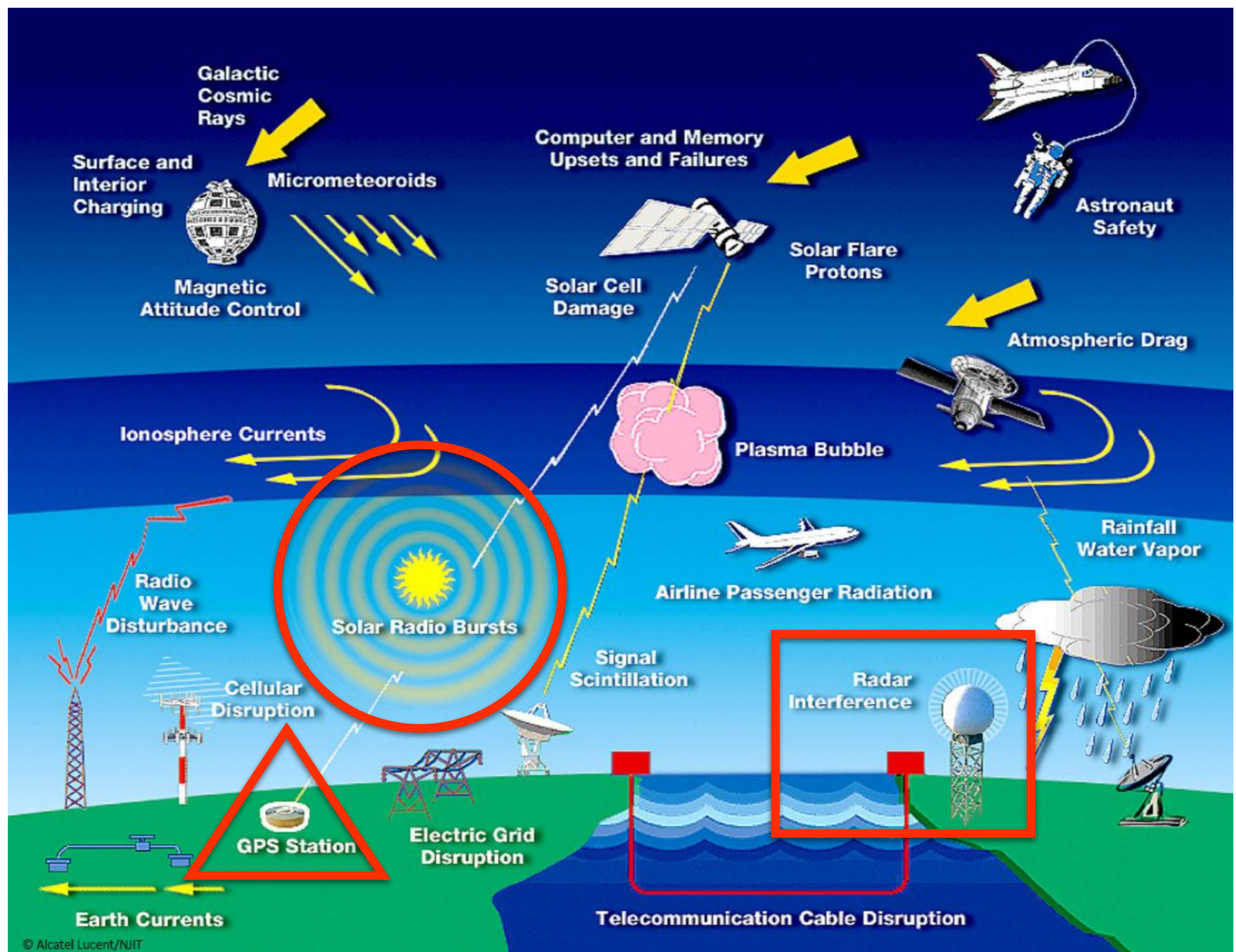
Can a Solar Radio Burst impact
the ionosphere?





CONTRARY TO SOLAR RADIO BURSTS

Noise increase - the ionosphere is not impacted but the signal itself. The noise of the Sun is too loud, the GNSS receiver can't hear the satellite signal clear enough. Or the radar interprets the radio waves coming from the Sun as being a plane.





Royal Observatory of Belgium
GNSS Research Group



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LOGIN

SRB WARNING SYSTEM FOR GNSS APPLICATIONS IN EUROPE

Contact: iono@oma.be

To receive real-time alert emails, please contact us to be added to the mailing list.

Dear users,

The warnings starting from the 14th of February 2020 were not due to solar radio bursts.

Obviously because it occurs during the night time in Europe. The effect detected was due to a sudden change of the signal power of the GPS satellites of the block IIF and IIR-M. Description of the event [here](#). This should not impact the GNSS applications. The change operated is still on and is now considered as the "nominal" mode, so that there is no longer 'abnormal' variation of the estimated index.

Last update : 2022-05-16 09:34:30 UTC	L1	L2
Last 15min		
Last 24h		
Last week		

Events of the last 30 days:

Frequency	Date of the maximum fade	Maximum fade (in dB-Hz)	Beginning of the event (fade<-1dB-Hz)	End of the event (fade>-1dB-Hz)

To detect Solar Radio Burst (SRB) affecting the GNSS signal reception in Europe, the carrier to noise density (C/N0) of the real-time EPN GPS network are monitored in near-real time (updated every 15 minutes). The intensity of the SRB impacts on GNSS applications are indexed at 4 levels:

- **quiet**
- **moderate** : SRB detected but should not impact GNSS applications,
- **strong** : potential impact on GNSS applications,
- **severe** : potential failure of the GNSS receivers.

Previous SRB Events at the GNSS frequencies

- 2020-04-06 : GPS signal power change ([more here](#))
- 2020-02-14 : GPS signal power change ([more here](#))
- 2019-06-20 : GPS signal power change ([more here](#))
- 2018-04-13 : GPS signal power change ([more here](#))
- 2017-09-07 : Space weather event due to Solar Radio Burst ([more here](#))
- 2017-09-06 : Space weather event due to Solar Radio Burst ([more here](#))
- 2015-11-04 : Space weather event due to Solar Radio Burst ([more here](#))
- ... [more events here](#)

Humain Radioastronomy Station

Welcome

This is the website of the solar radio observations in Humain, managed by the Royal Observatory of Belgium



This project is funded by the Solar Terrestrial Center of Excellence ([STCE](#))

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Telescopes

Science