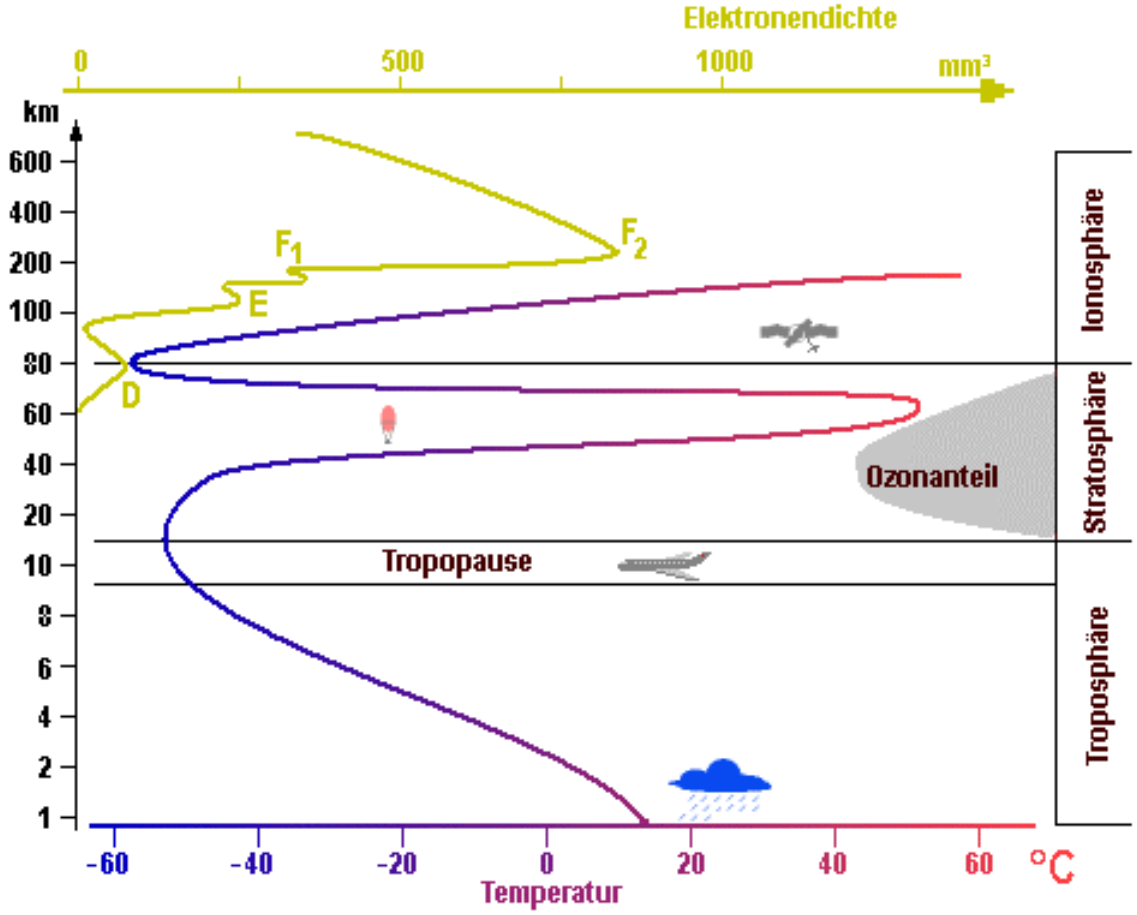
Ausbreitung der Funkwellen auf KW

- Schichtung der Atmosphäre
- Schichtung der Ionosphäre
- Ausbreitungswege
- Grenzfrequenzen
- MUF
- KW-Bänder
- Sonnenfleckenzyklus
- Störungen

Schichtung der Atmosphäre

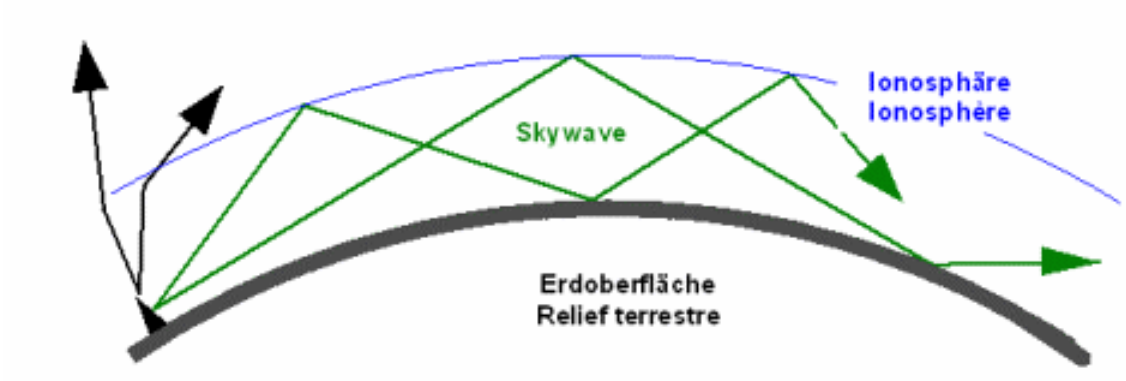


Andreas Lüer, DJ7IK

Schichtung der Ionosphäre

- **D-Schicht** ca. 60 - 80 km Höhe ist nur tagsüber vorhanden, wobei die Ionisation entsprechend dem Sonnenstand verläuft,
- **E-Schicht** ca. 100 - 130 km Höhe ähnlich der D-Schicht,
- **Es-Schicht** ca. 100 km Höhe sporadisch tagsüber im Sommer auftretende Schicht,
- **F1-Schicht** ca. 200 km Höhe nur tagsüber vorhanden, geht nachts mit der F2-Schicht zusammen,
- **F2-Schicht** ca. 250 - 400 km Höhe wegen der nur sehr langsam ablaufenden Veränderungen in dieser Schicht ist sie nur unwesentlich vom Sonnenstand abhängig, sondern Tag und Nacht vorhanden.

Ausbreitungswege



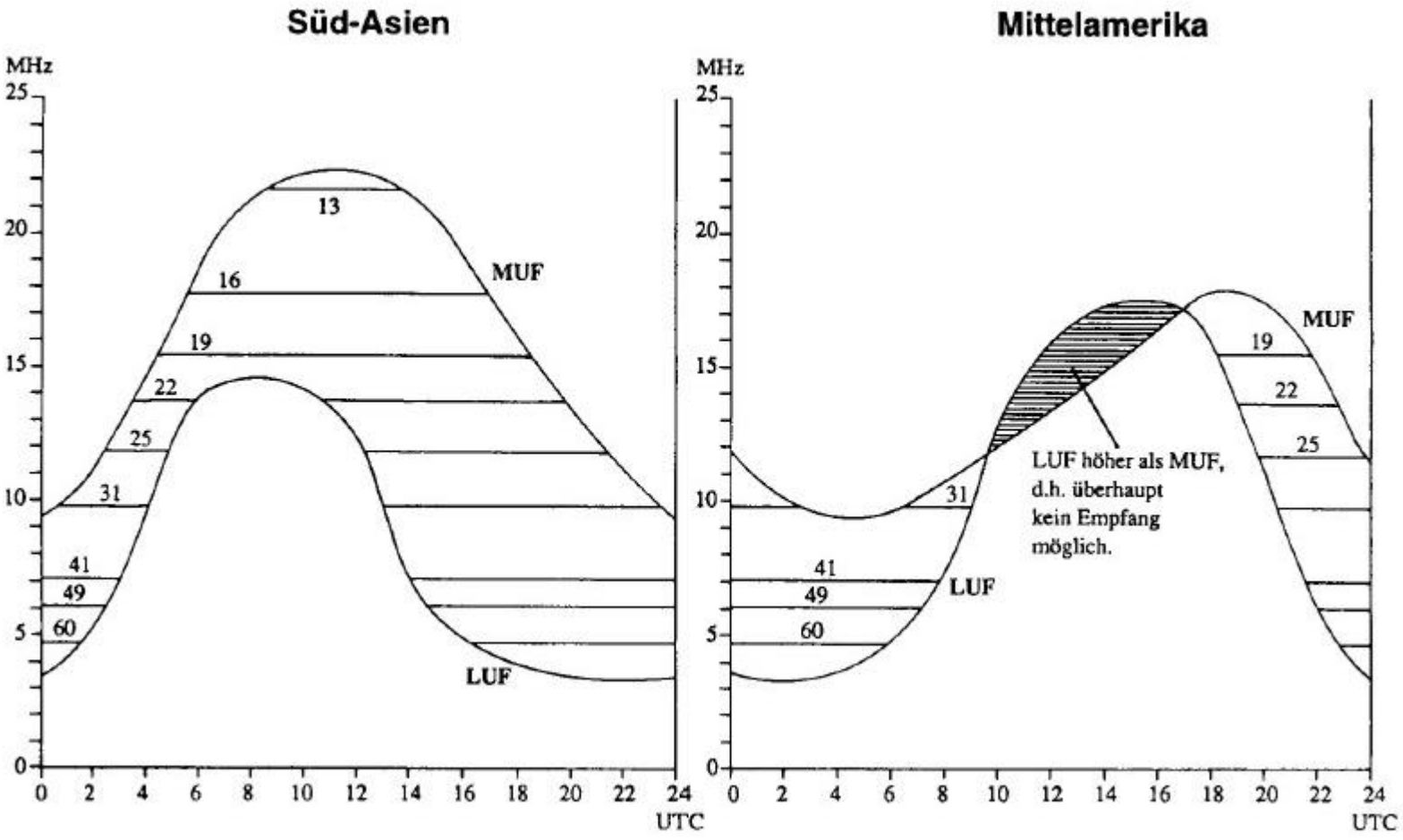
- Beugung
- Brechung
- Reflexion

Grenzfrequenzen

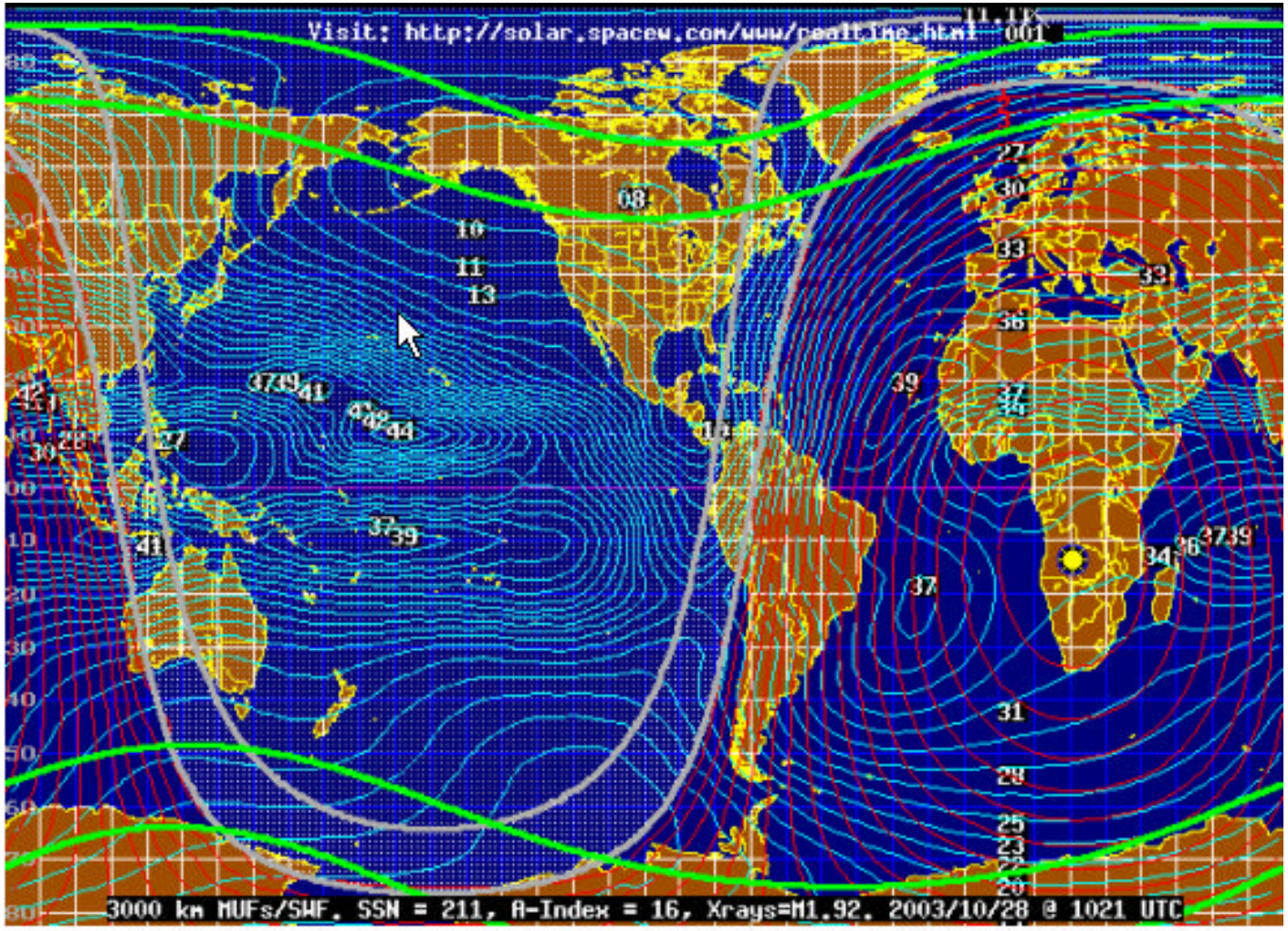
- **LUF** - Die niedrigstmögliche Frequenz (LUF - lowest usuable frequency) ergibt sich aus Berechnungen der Signaldämpfungen durch die D- und E-Schicht. Die LUF ist diejenige Frequenz, auf der noch eine Mindestsignalstärke am Empfangsort erreicht werden kann.

- **MUF** – Die höchstmögliche Frequenz, bei der noch eine Reflexion der Welle stattfindet.
  Im Frequenzbereich zwischen der niedrigstmöglichen Frequenz LUF und der höchstmöglichen Frequenz MUF ist eine Funkverbindung möglich. Dabei wird die höchste Signalstärke in der Regel auf einer Frequenz erreicht, die nur wenig unter der höchstmöglichen Frequenz MUF liegt.

Grenzfrequenzen



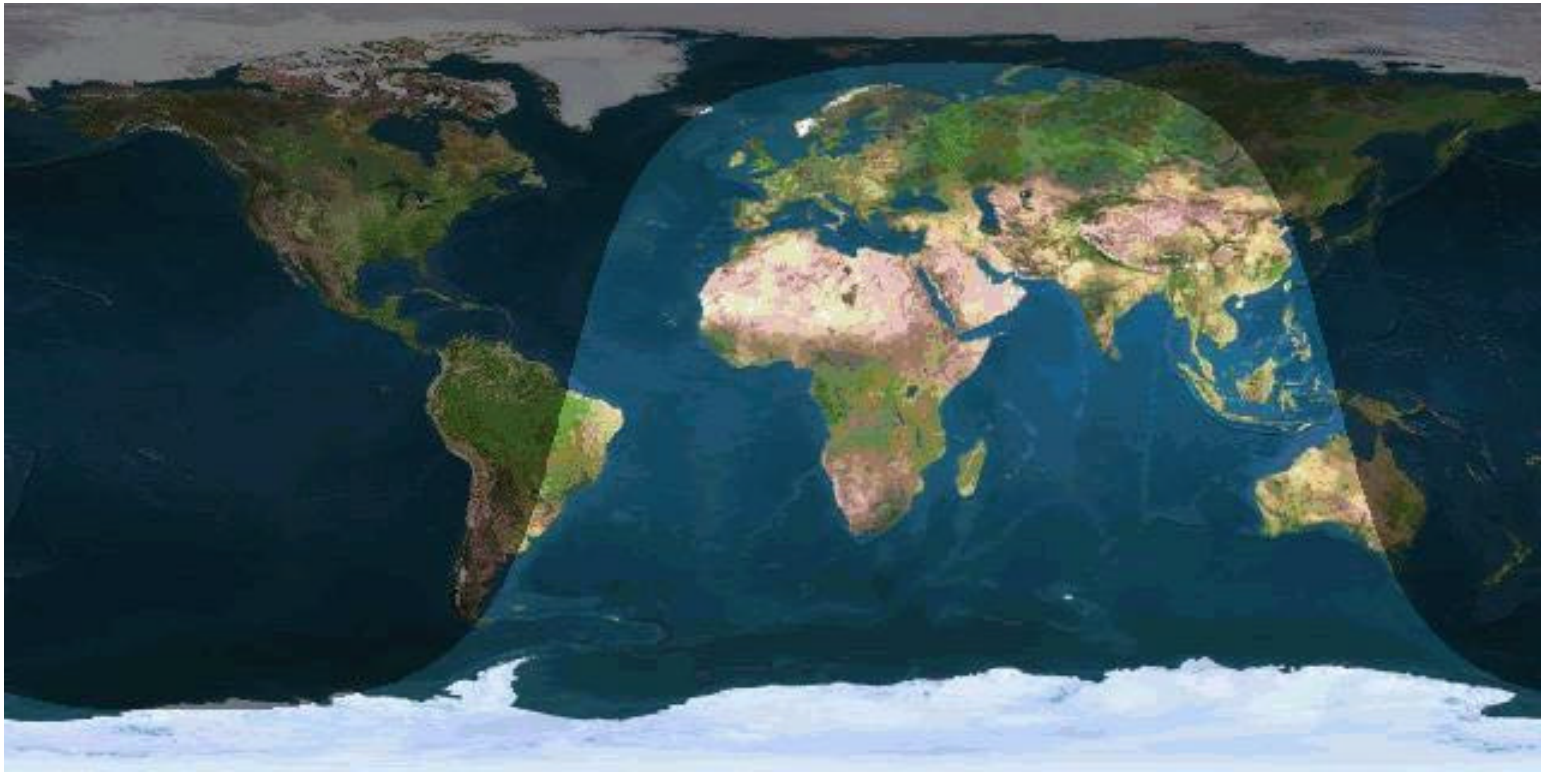
MUF



Andreas Lüer, DJ7IK

MUF

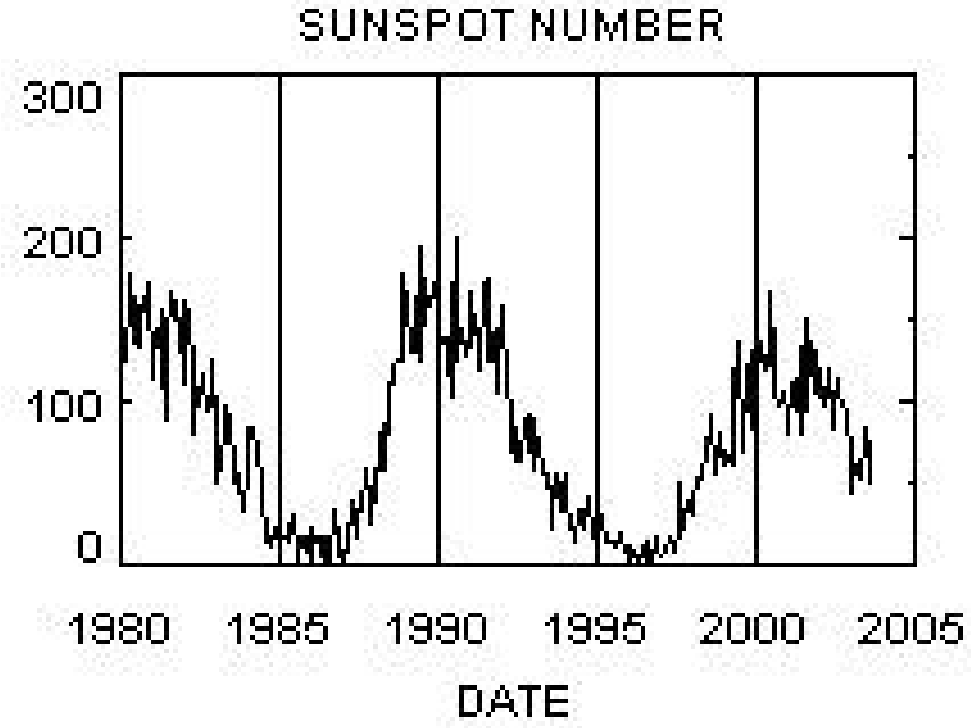
Greyline



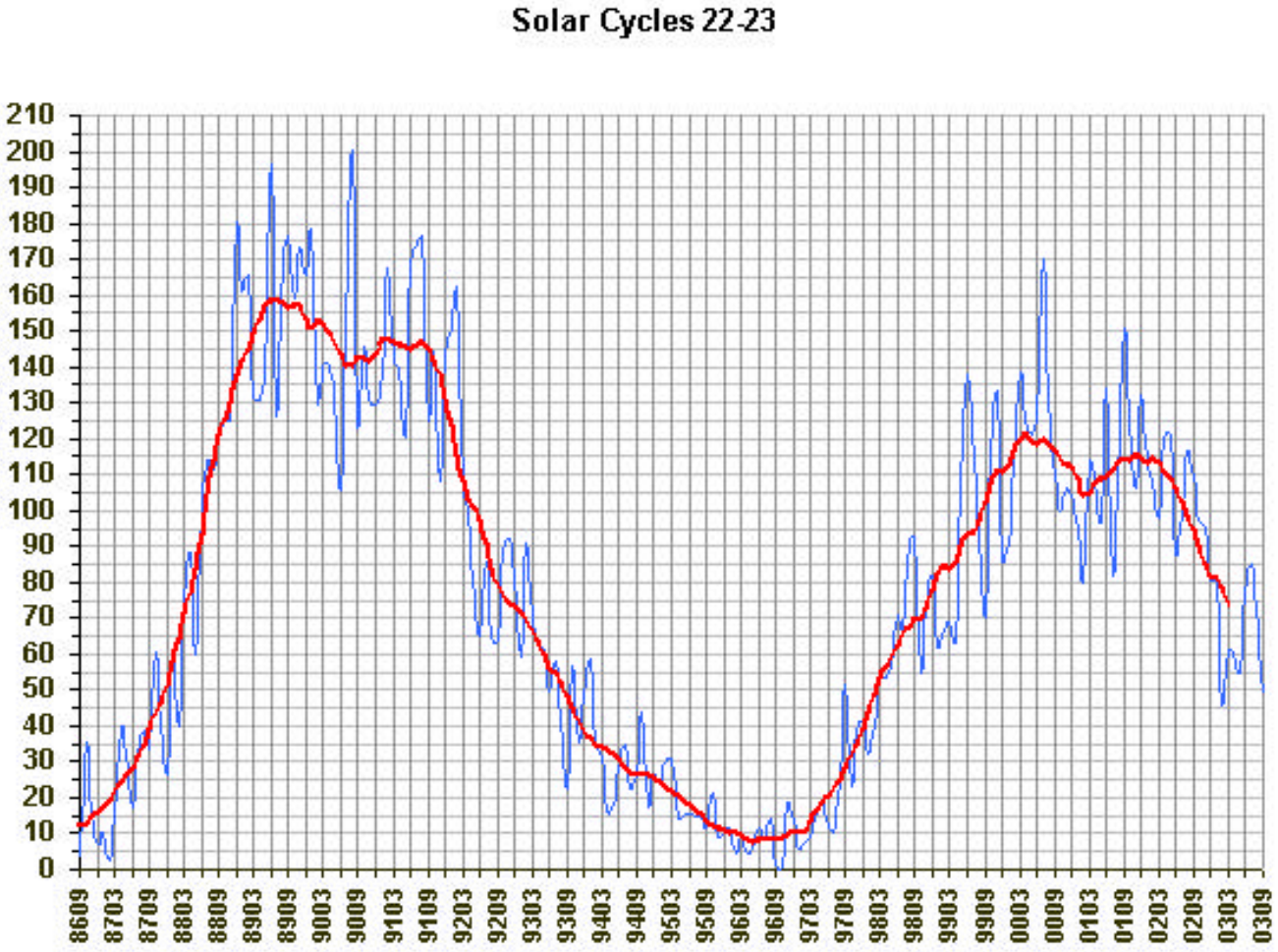
Andreas Lüer, DJ7IK

Sonnenfleckenzyklus

Ca.alle 11,5 Jahre



Sonnenfleckenzyklus



Andreas Lüer, DJ7IK

Sonnenaktivität

Current Solar Indicies from WWV

31-Oct-2003 at 0605 UTC
SFI = 271 A = 147 K = 6

Conditions during the last 24 hours

Space weather for the past 24 hours has been extreme.
Geomagnetic storms reaching the G5 level occurred. Solar radiation storms reaching the S3 level occurred. Radio blackouts reaching the R1 level occurred.

Forecast for the next 24 hours

Space weather for the next 24 hours is expected to be severe.
Geomagnetic storms reaching the G4 level are expected. Solar radiation storms reaching the S3 level are expected. Radio blackouts reaching the R3 level are expected.

Sonnenaktivität

Sonnenflecken-Relativzahl

NOAA (American) Sunspot Number

This number is reported daily around 2025Z and reports
the number of sunspots observed in the previous 24 hour period

The NOAA Sunspot number for 30-Oct-2003 was:	293

Most recent five days (oldest first): **139 191 238 230 330**

Störungen

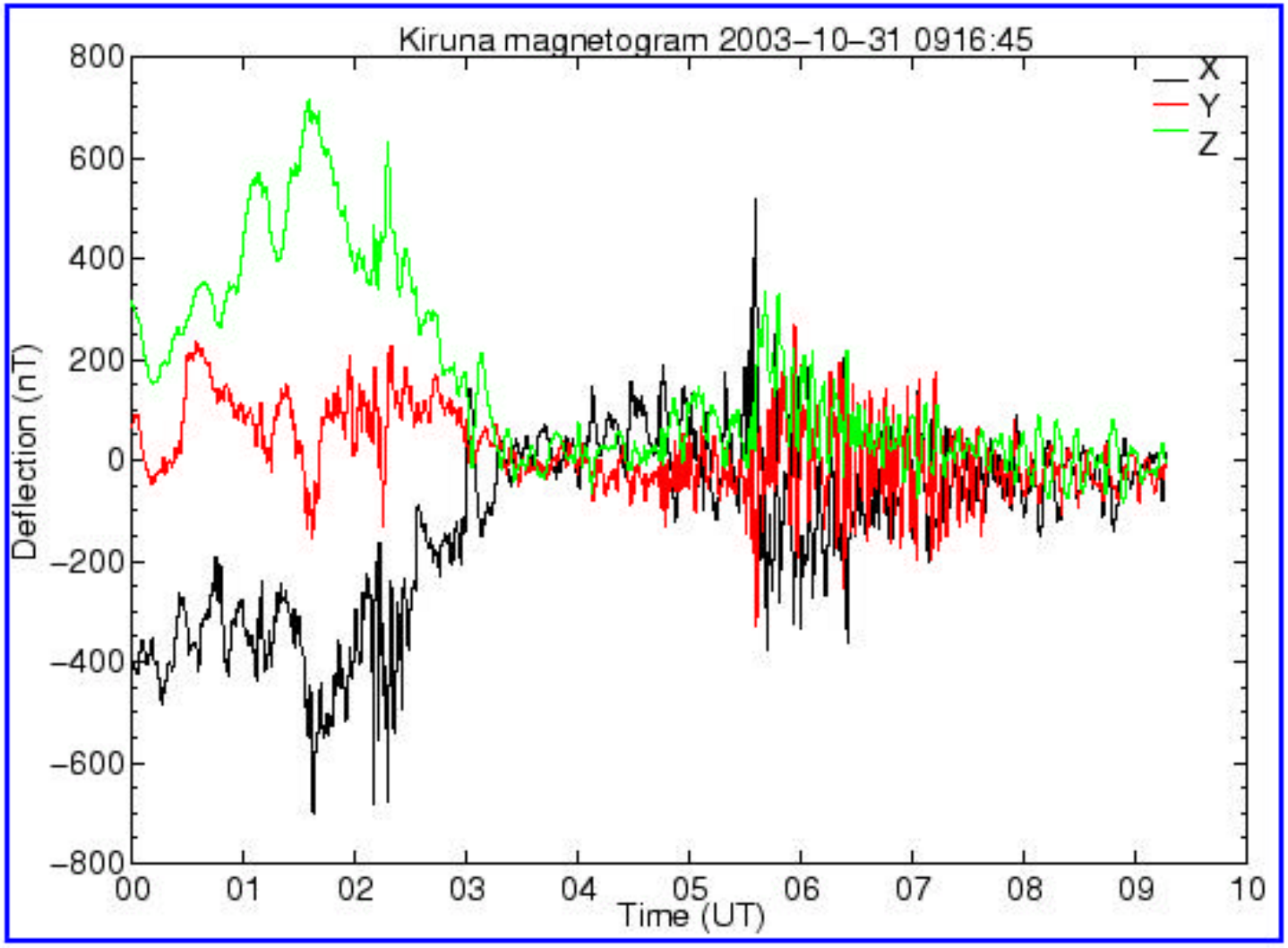
Region 486 is now the largest sunspot complex of the solar cycle. It is BIG! It now covers a surface area of over 7.8 BILLION square kilometers (or slightly over 3 BILLION square miles)! And it's still growing larger! Although this is difficult to place into perspective, it may help to understand that you could map the entire surfaces of the 4 inner planets (Mercury, Venus, Earth and Mars) together with the giant gas planet Neptune, all within the area encompassed by sunspot complex 486 - with room to spare.

Störungen

Recent Major Solar Flare Activity
(usually reported within 30 minutes of event peak)

Date	Time	Magnitude
30-Oct-2003	1528Z	M1.5
30-Oct-2003	0207Z	M1.6
30-Oct-2003	0206Z	M1.7
29-Oct-2003	0511Z	M3.5
29-Oct-2003	0151Z	M1.1
28-Oct-2003	1110Z	X17.2
27-Oct-2003	2151Z	M1.9
27-Oct-2003	1243Z	M6.7
27-Oct-2003	0927Z	M5.0
27-Oct-2003	0833Z	M2.7
27-Oct-2003	0439Z	M1.2
26-Oct-2003	1819Z	X1.2
26-Oct-2003	1420Z	M1.0

Störungen



Andreas Lüer, DJ7IK

Links

Magnetogramm Kiruna: http://www.irf.se/mag-bin/pmag
Aktuelle Ausbreitungsbed.: http://dx.qsl.net/propagation/
Zyklen: http://www.dxlc.com/solar/solcycle.html
Activity: http://www.dxlc.com/solar/index.html
Greyline: http://dx.qsl.net/propagation/greyline.html

Bilder

Es folgen beiendruckende Bilder der aktuellen Polarlichter

Andreas Lüer, DJ7IK

Rekordflare 4.11.2003

A s t r o A l e r t
Sun-Earth Alert

Solar Terrestrial Dispatch
http://www.spacew.com

Images and Movies of this event are available at:
http://www.spacew.com/astroalert.html

05 November 2003

A RECORD-BREAKING SOLAR FLARE & MID-LATITUDE AURORA WATCH

At approximately 19:47 UTC (2:47 pm EST) on 04 November, active sunspot complex 10486 spawned what is probably the most intense x-ray flare in history. X-ray sensors on-board the GOES spacecraft are only capable of registering x-ray intensities up to a class X17.4 level. X-ray intensities beyond this level saturate the detectors. This solar flare saturated the x-ray detectors for 11 minutes, leaving space weather forecasters and scientists with some work to try and extrapolate the true intensity of the event. Based on a preliminary extrapolation, it appears that this x-ray flare peaked somewhere between the X30 and X40 levels, which was unheard of until yesterday and is possibly as much as twice as energetic as the X17 solar flare observed on 02 November.

To place this event into historic perspective, it very likely ranks as the most powerful x-ray flare ever observed. During the last two weeks, active Region 10486 has produced three x-ray flares that have ranked within the top 10 of the most intense events in history. It has been quite a ride!