El DX en los 6 meters desde el sur de Europa

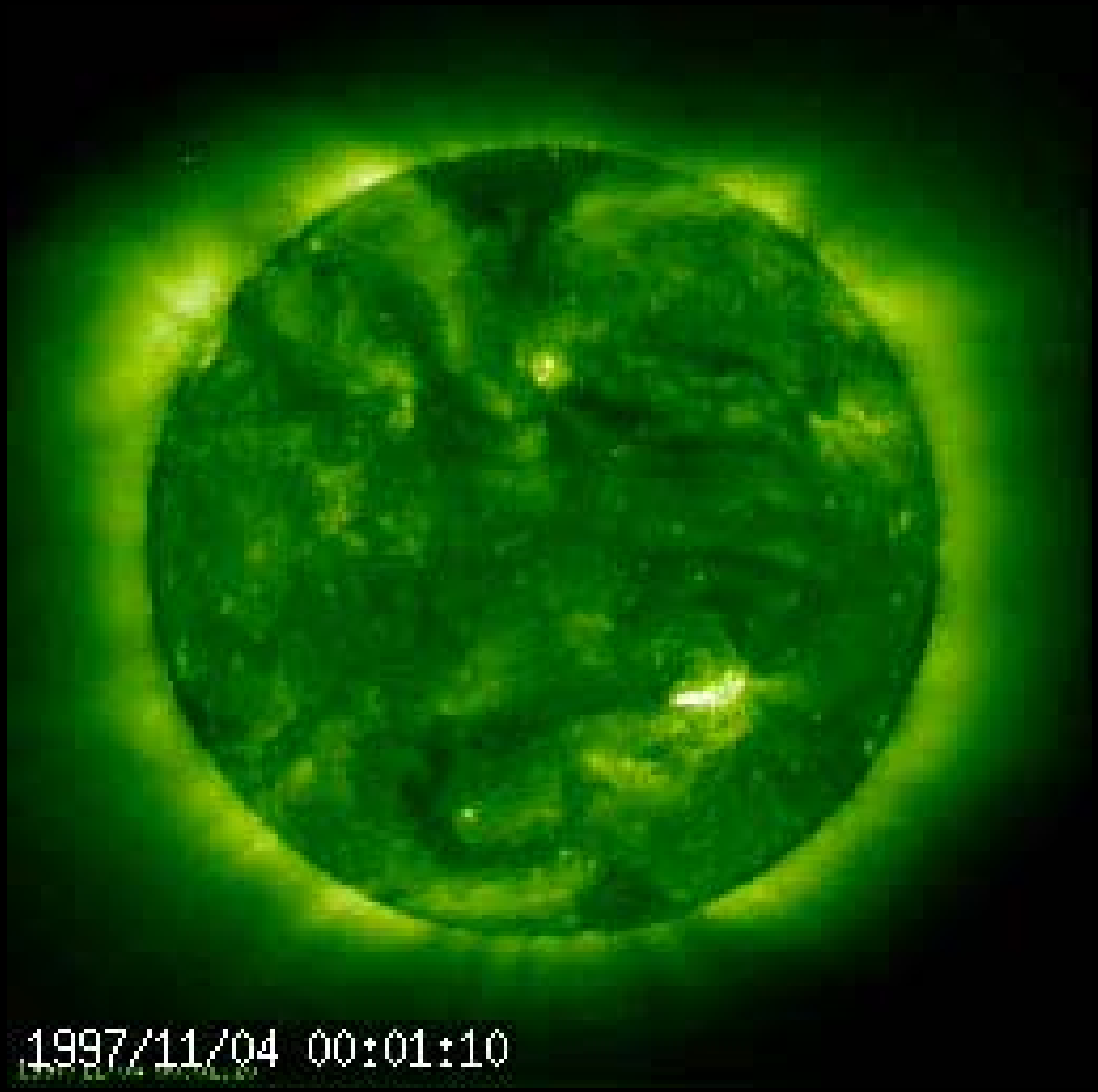
6 metros
¿ Banda Tragica ?

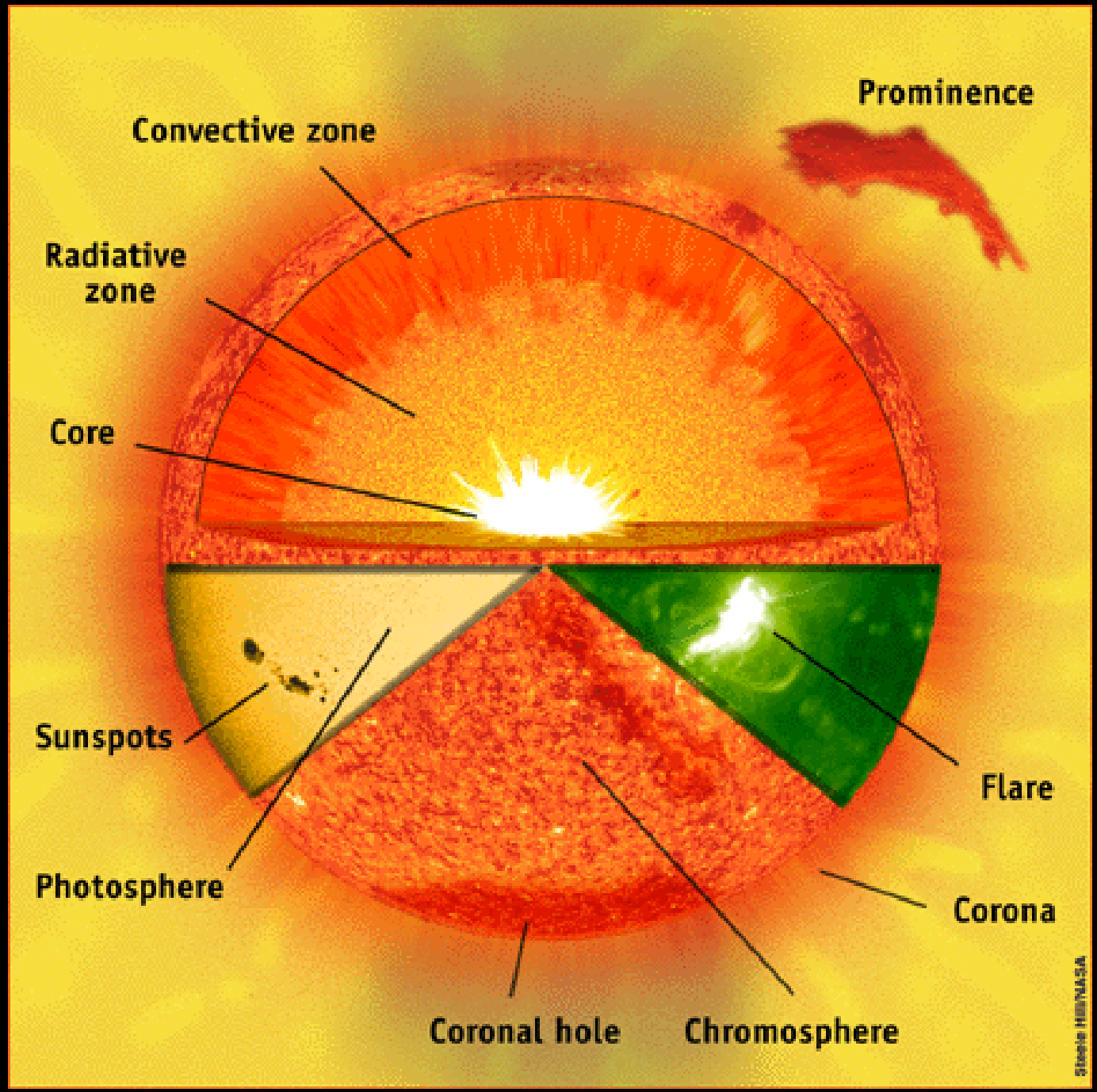
o quizás ...

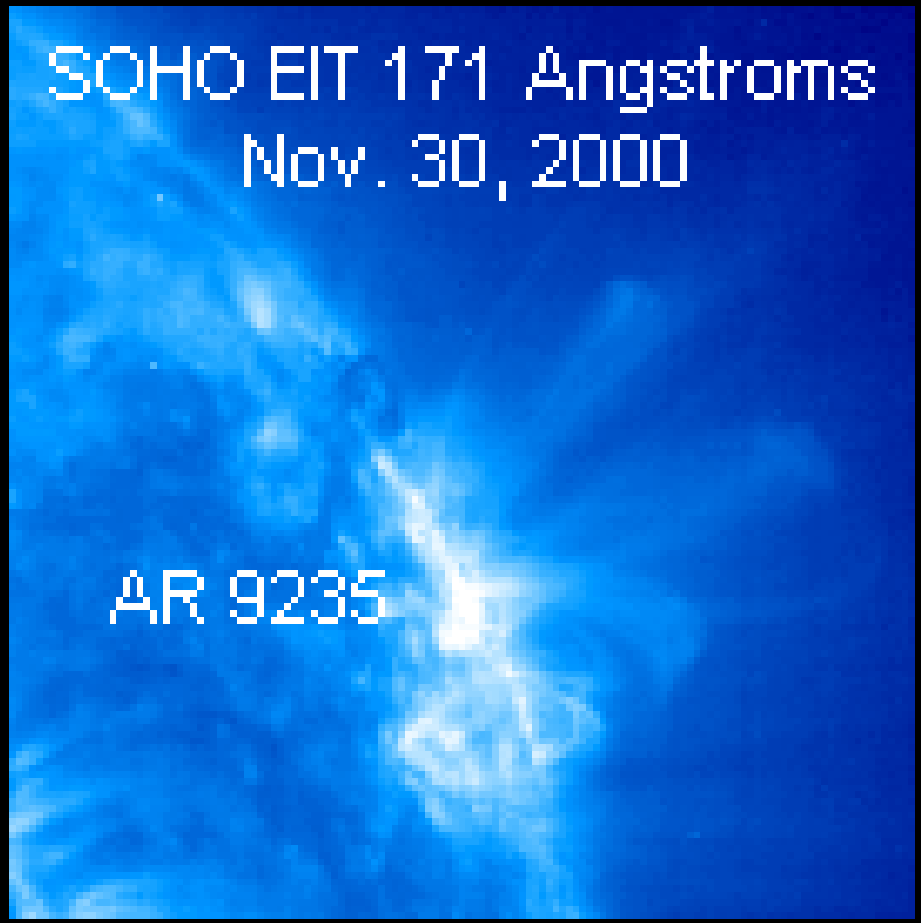
¿ mágica ?

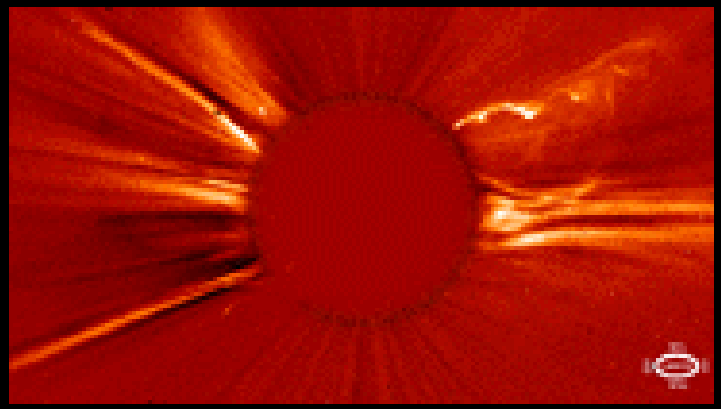
Por José R. Hierro, EA7KW

Primer evento del ciclo solar 23

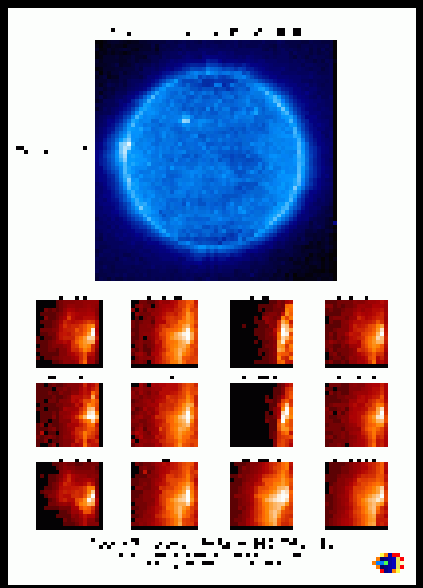


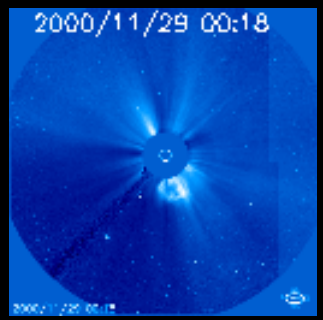

Prominence
Convective zone
Radiative zone
Core
Sunspots
Photosphere
Flare
Corona
Coronal hole
Chromosphere


SOHO EIT 171 Angstroms
Nov. 30, 2000
AR 9235

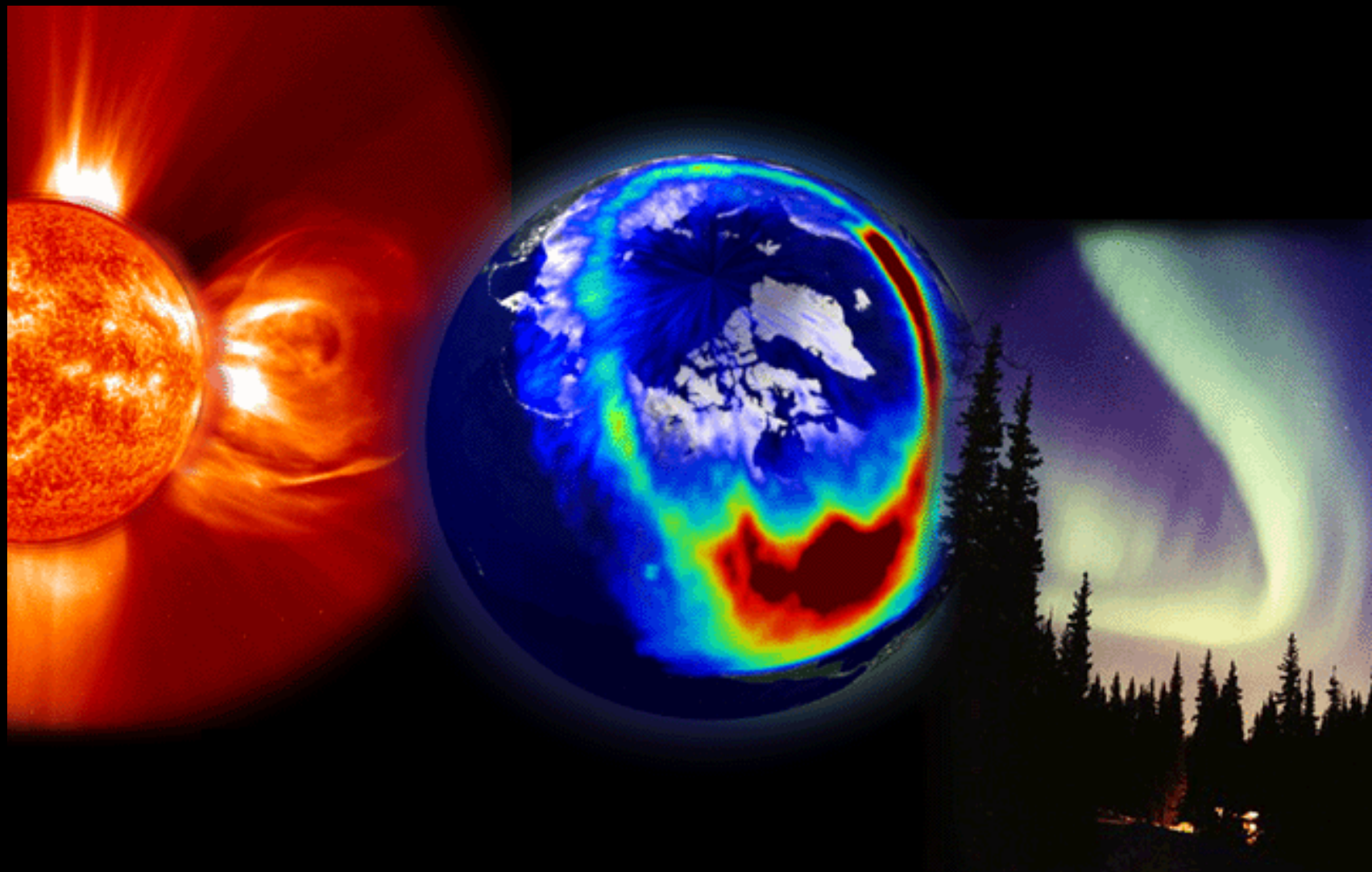




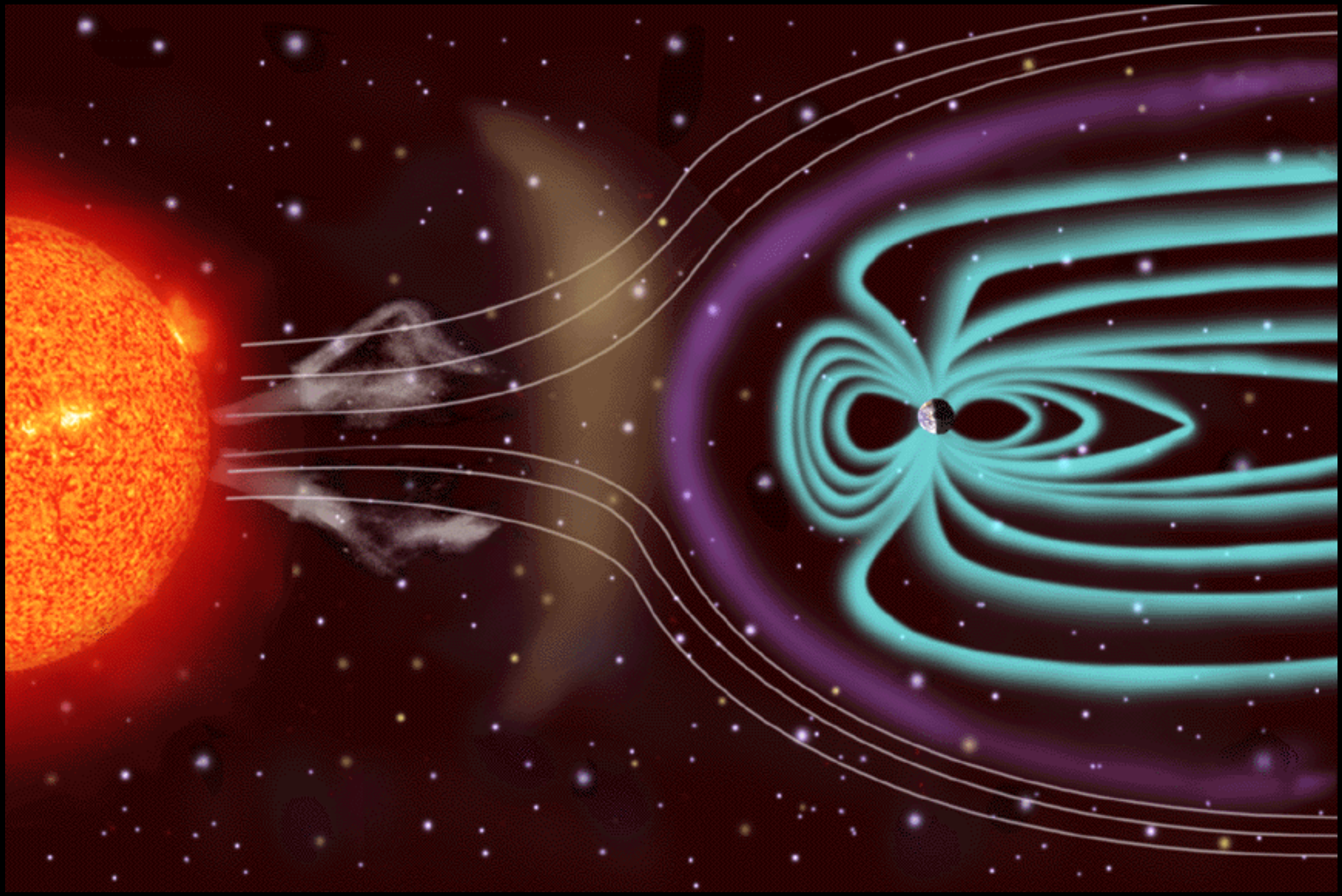


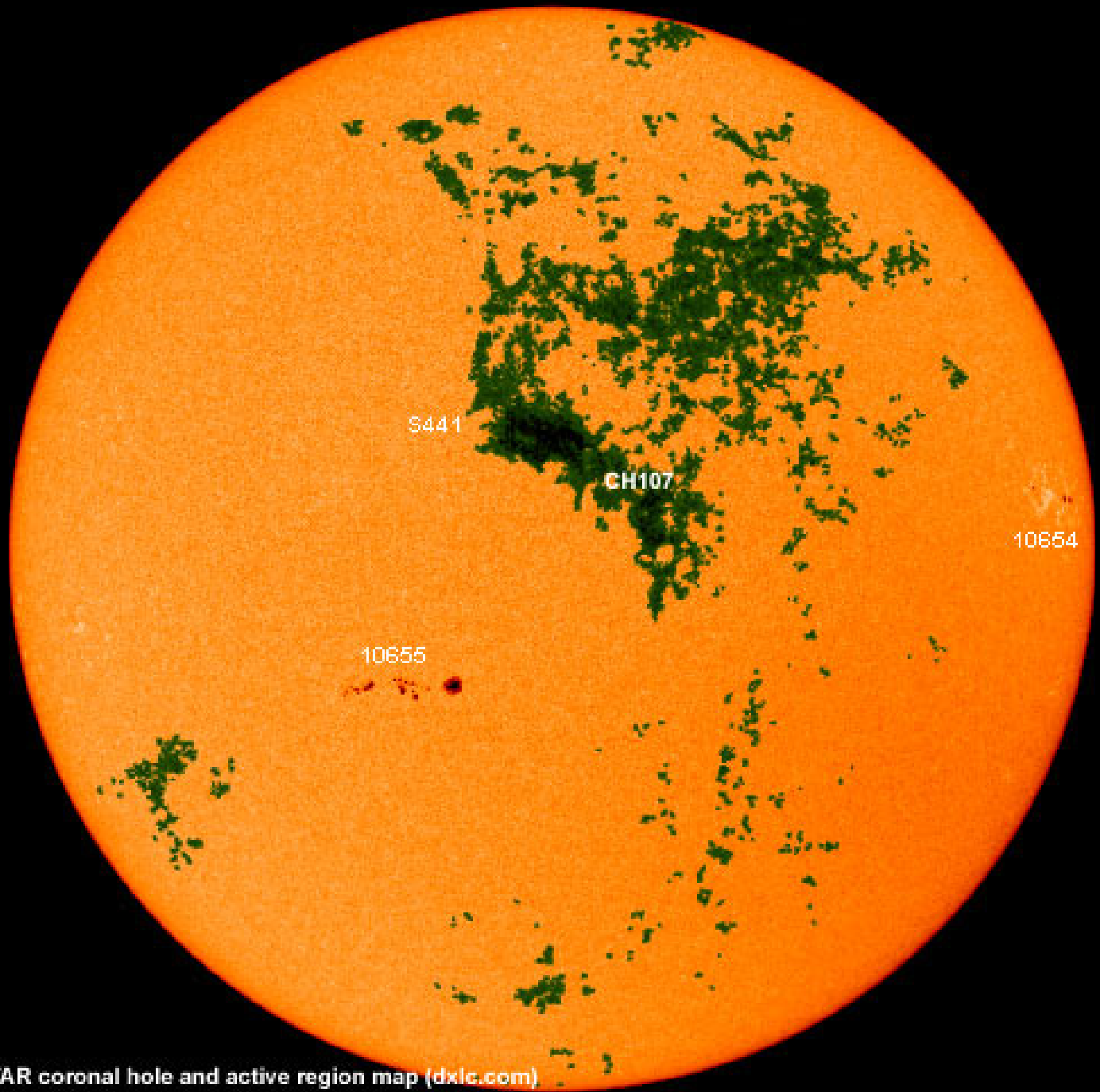

2000/11/29 00:18


SOHO
EXPLORING THE SUN
esa
NASA



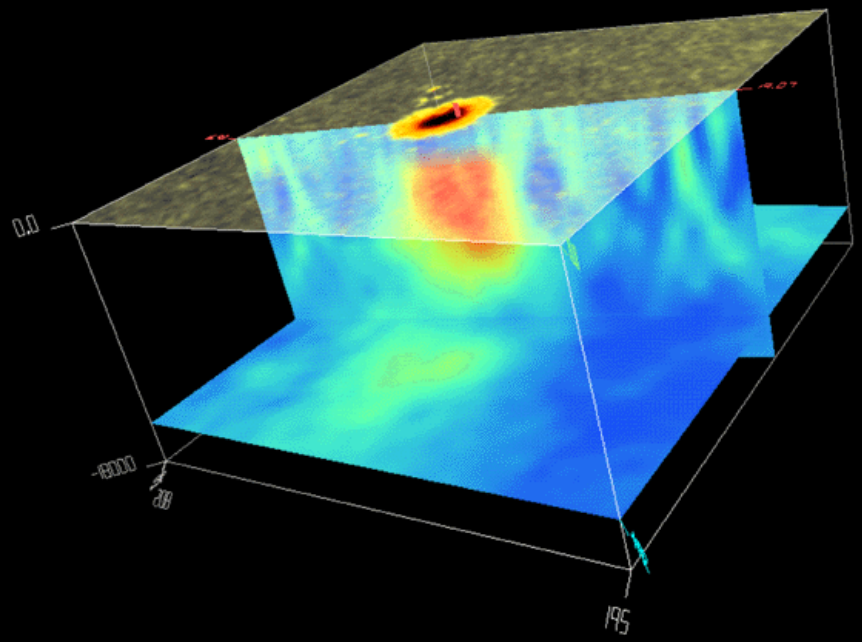
El Campo Magnético

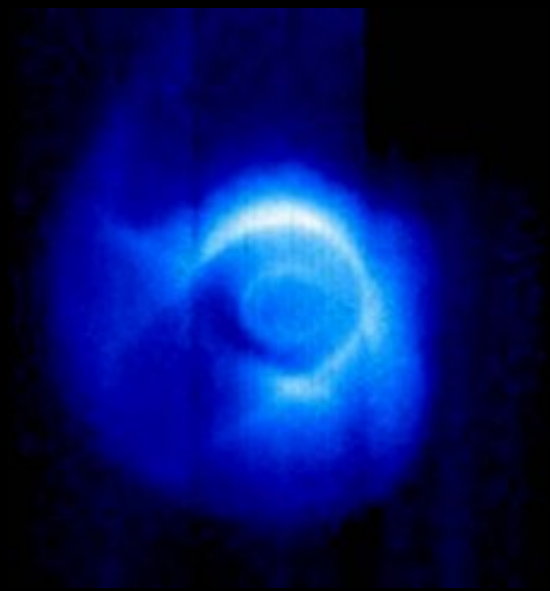




STAR coronal hole and active region map (dxlc.com)
Image base: SOHO/MDI continuum at 22:24 UTC on August 3, 2004

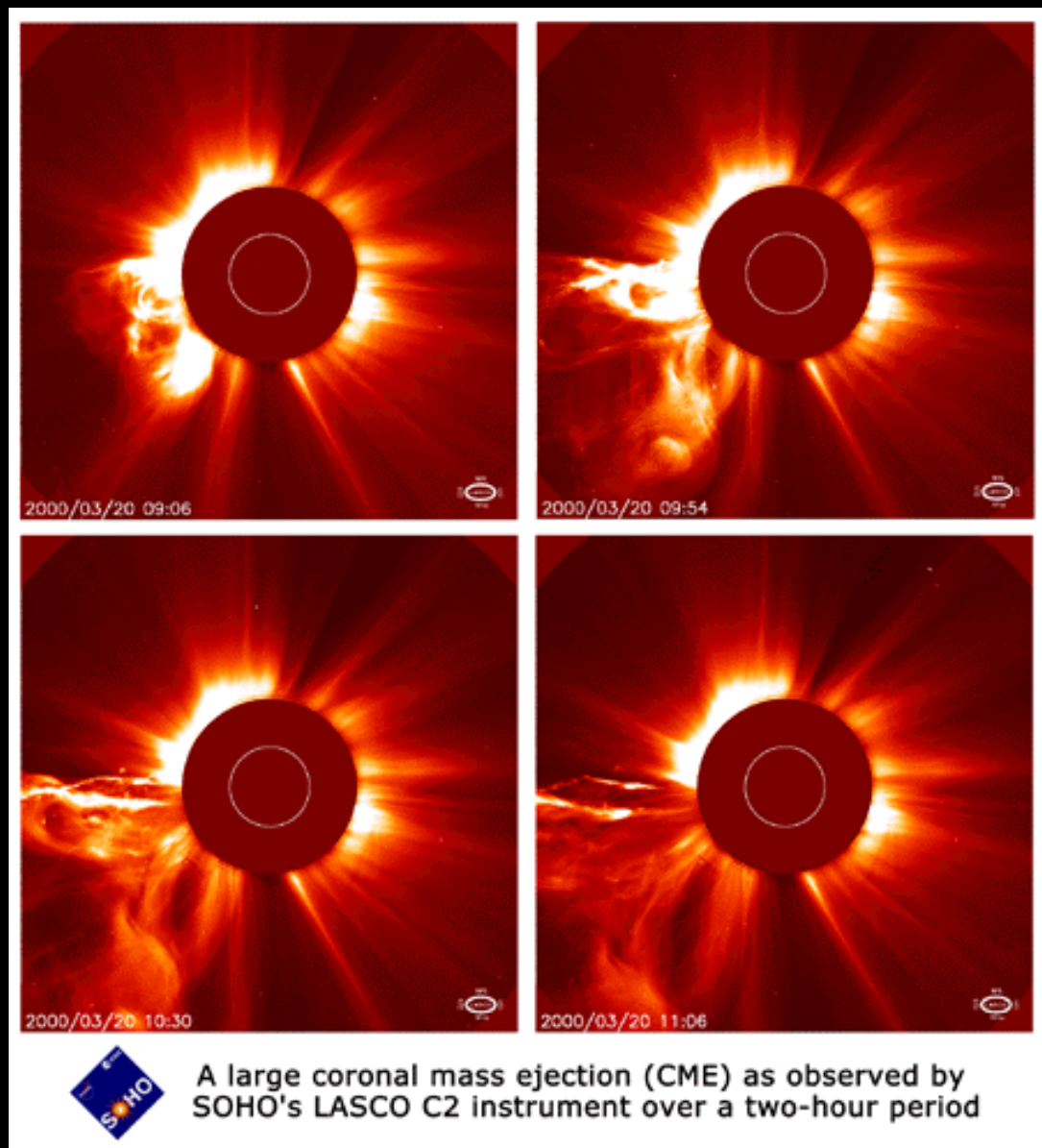
Mancha Solar



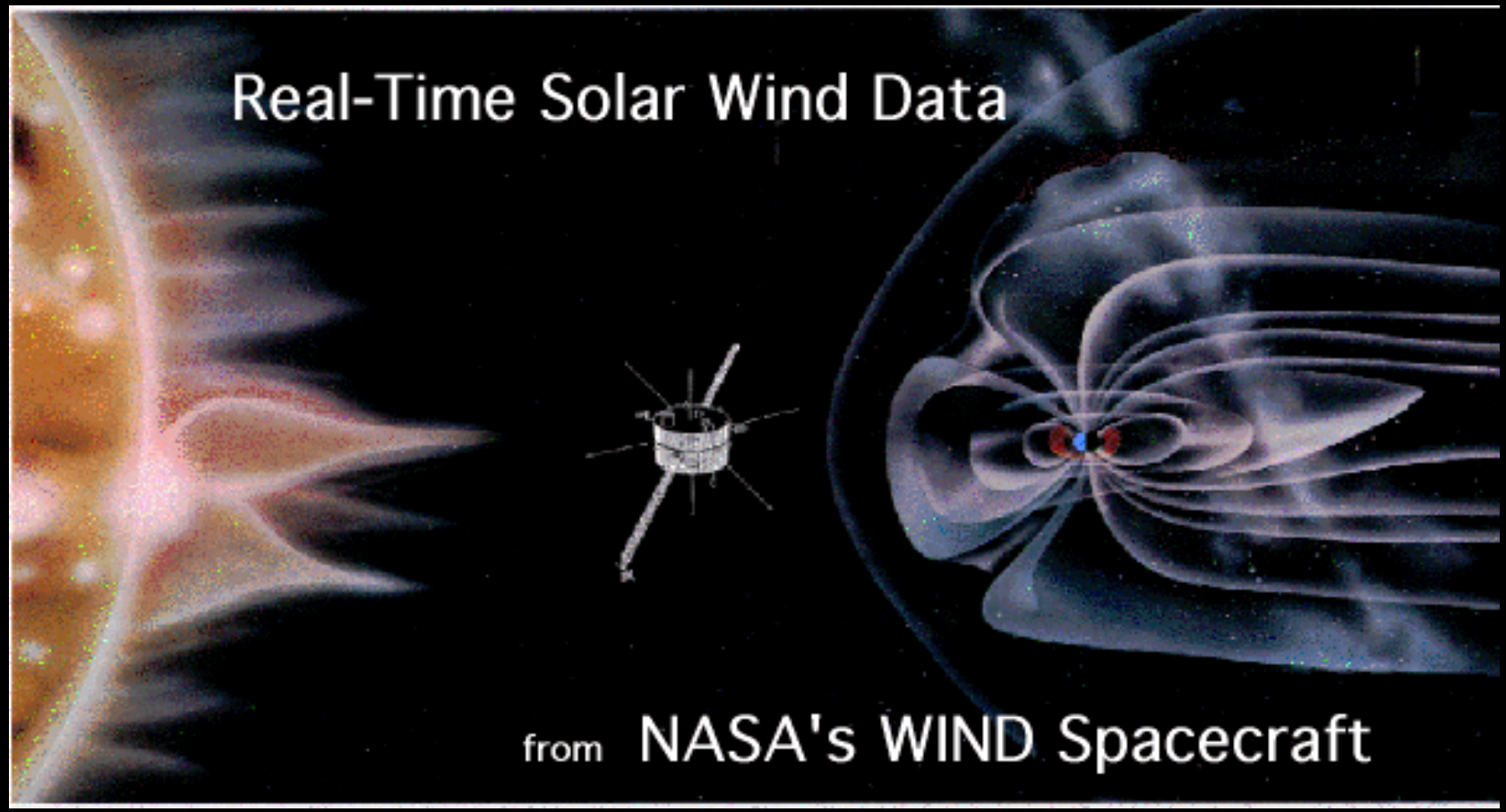


Primera imagen tomada la magnetoesfera terrestre

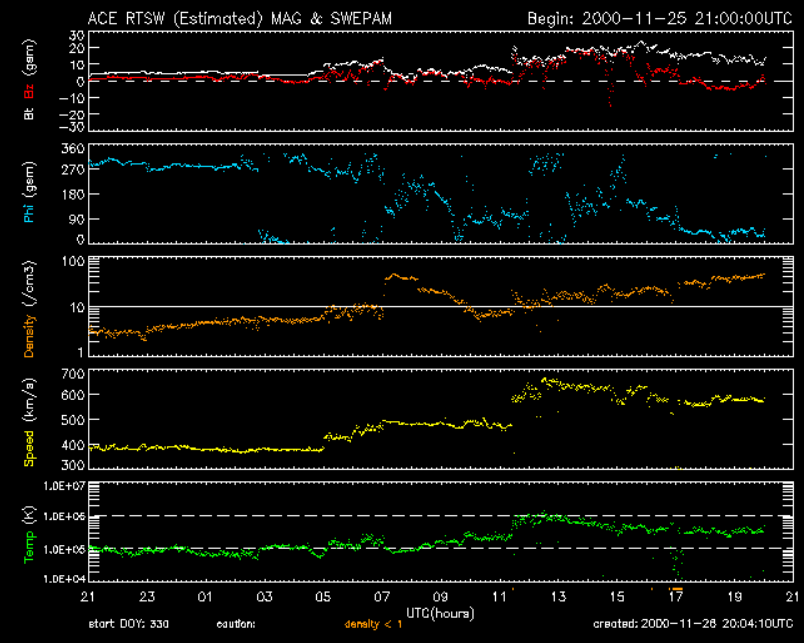
CME



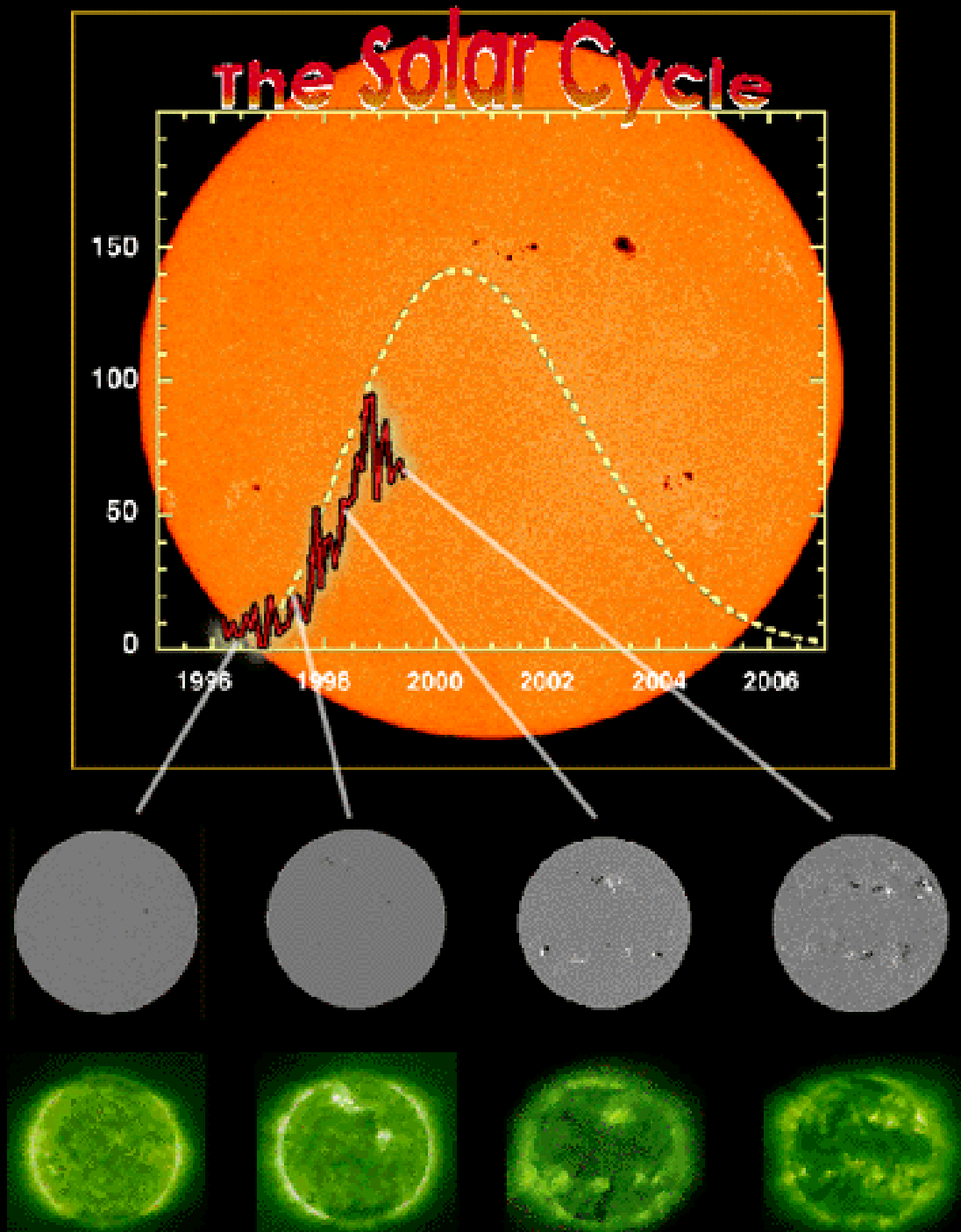




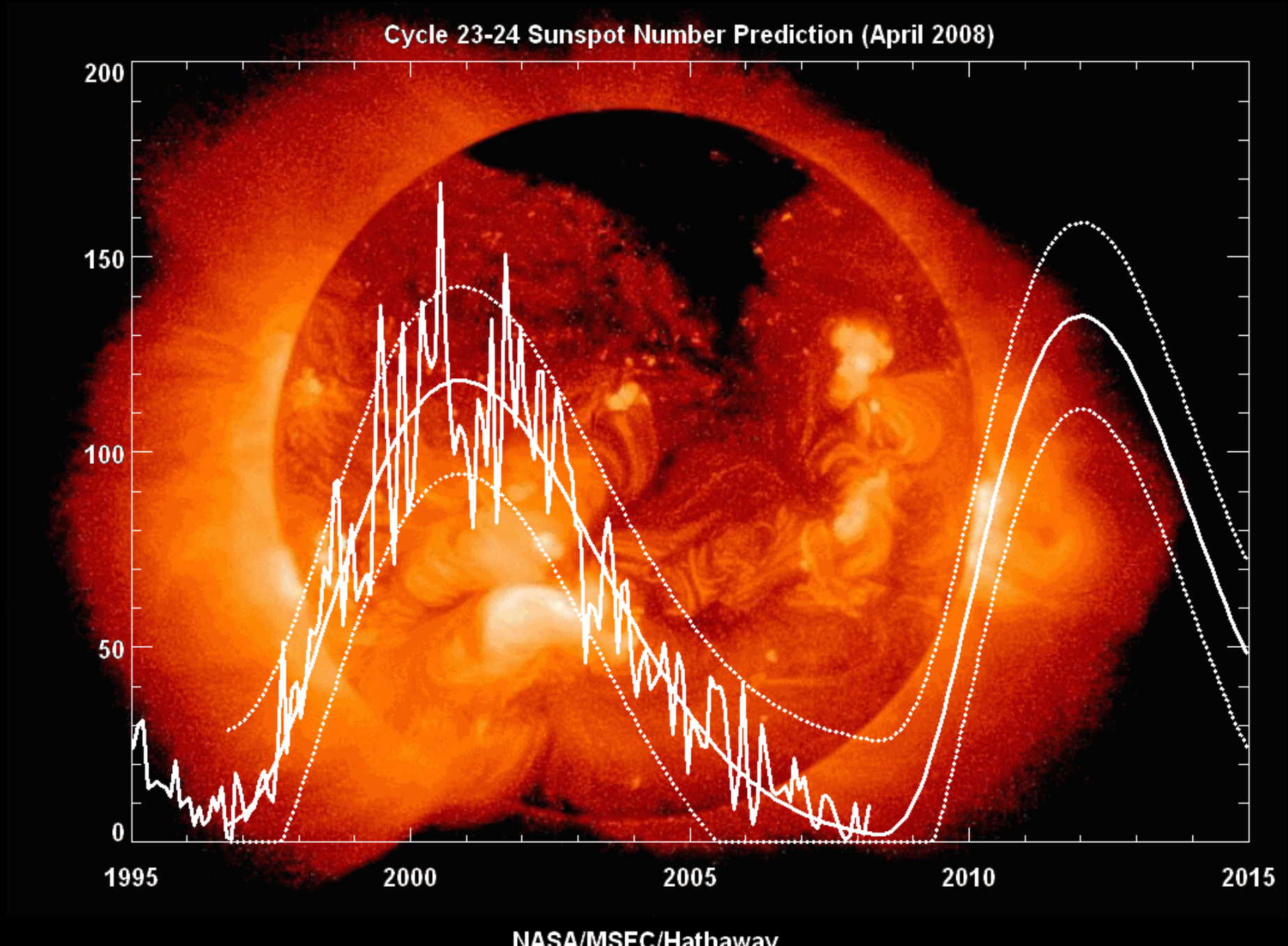
El Viento Solar



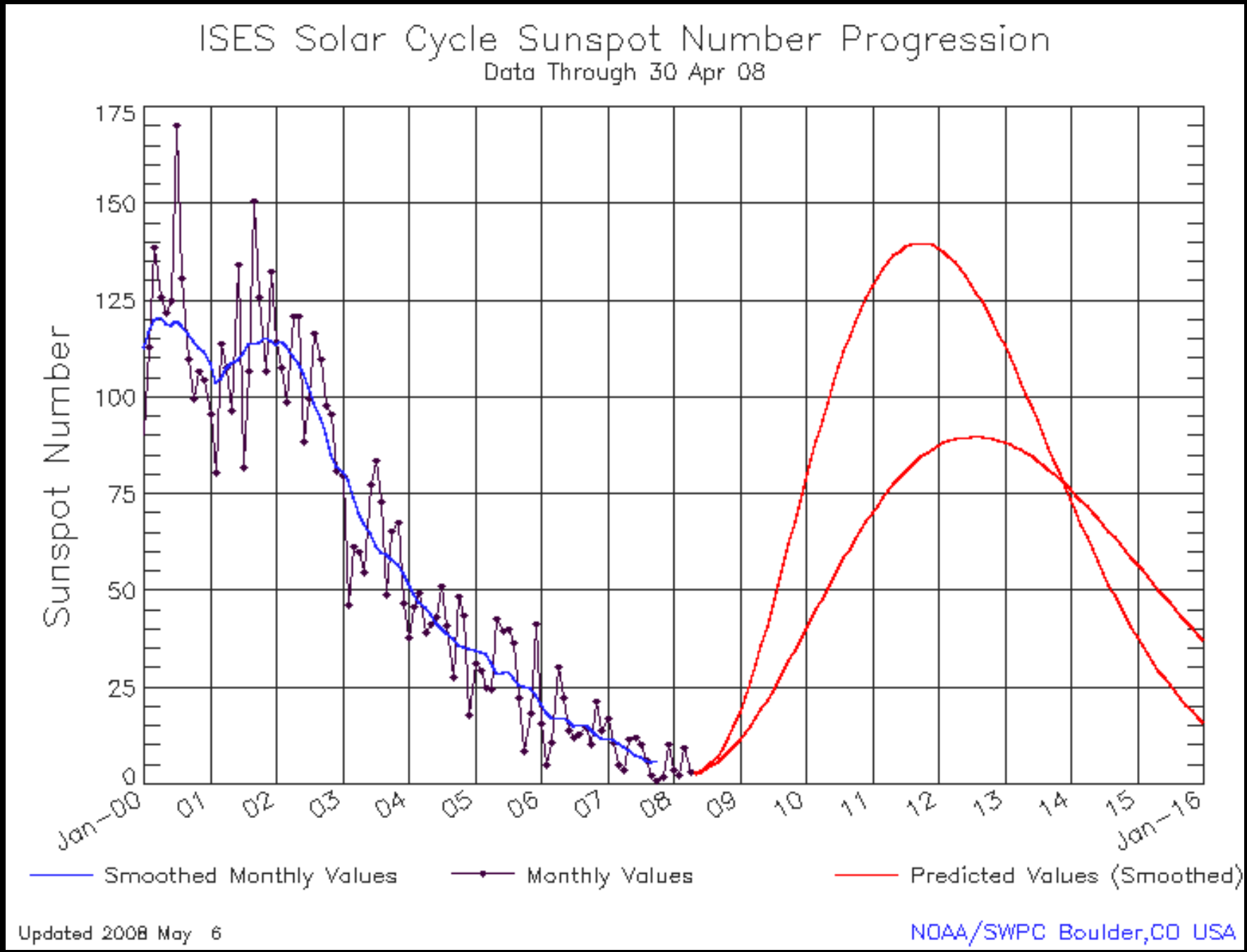
http://sec.noaa.go


The Solar Cycle
150
100
50
0
1996
1998
2000
2002
2004
2006

Predicción del ciclo solar - NASA

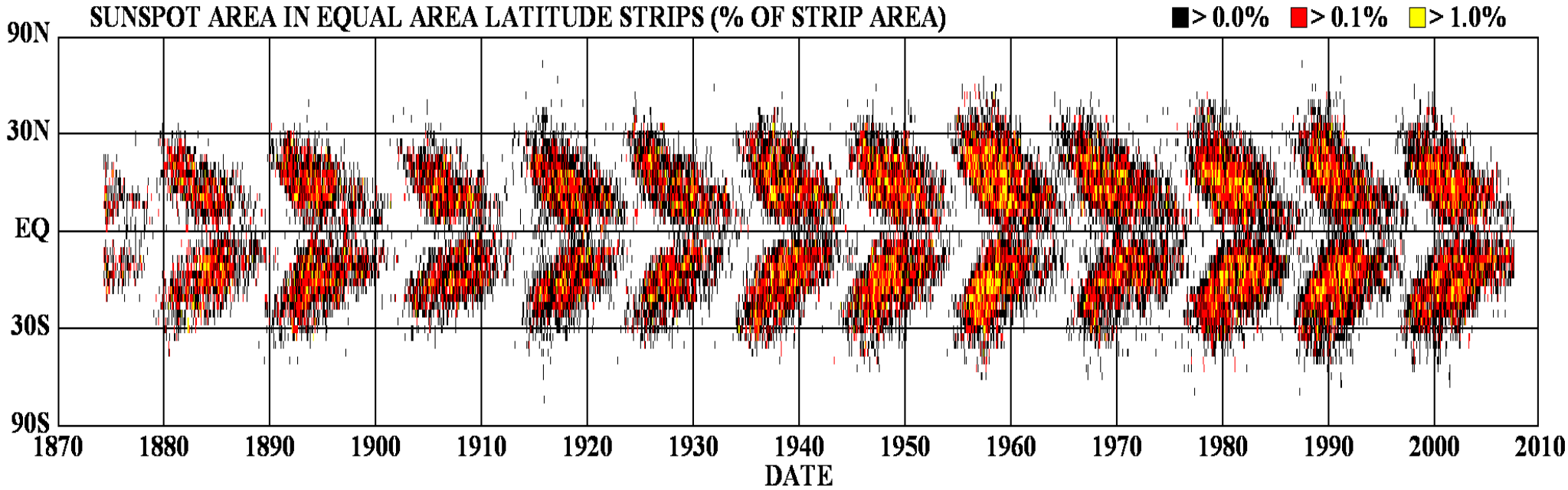


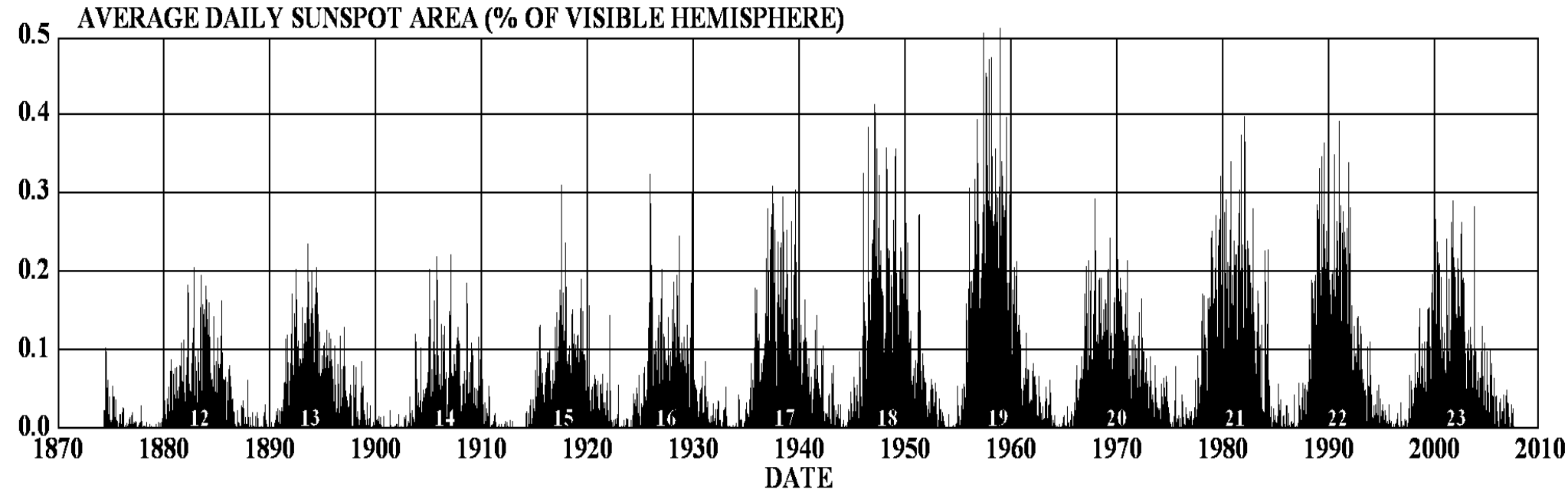
Predicción del ciclo solar - NASA



http://www.swpc.noaa.gov/SolarCycle/

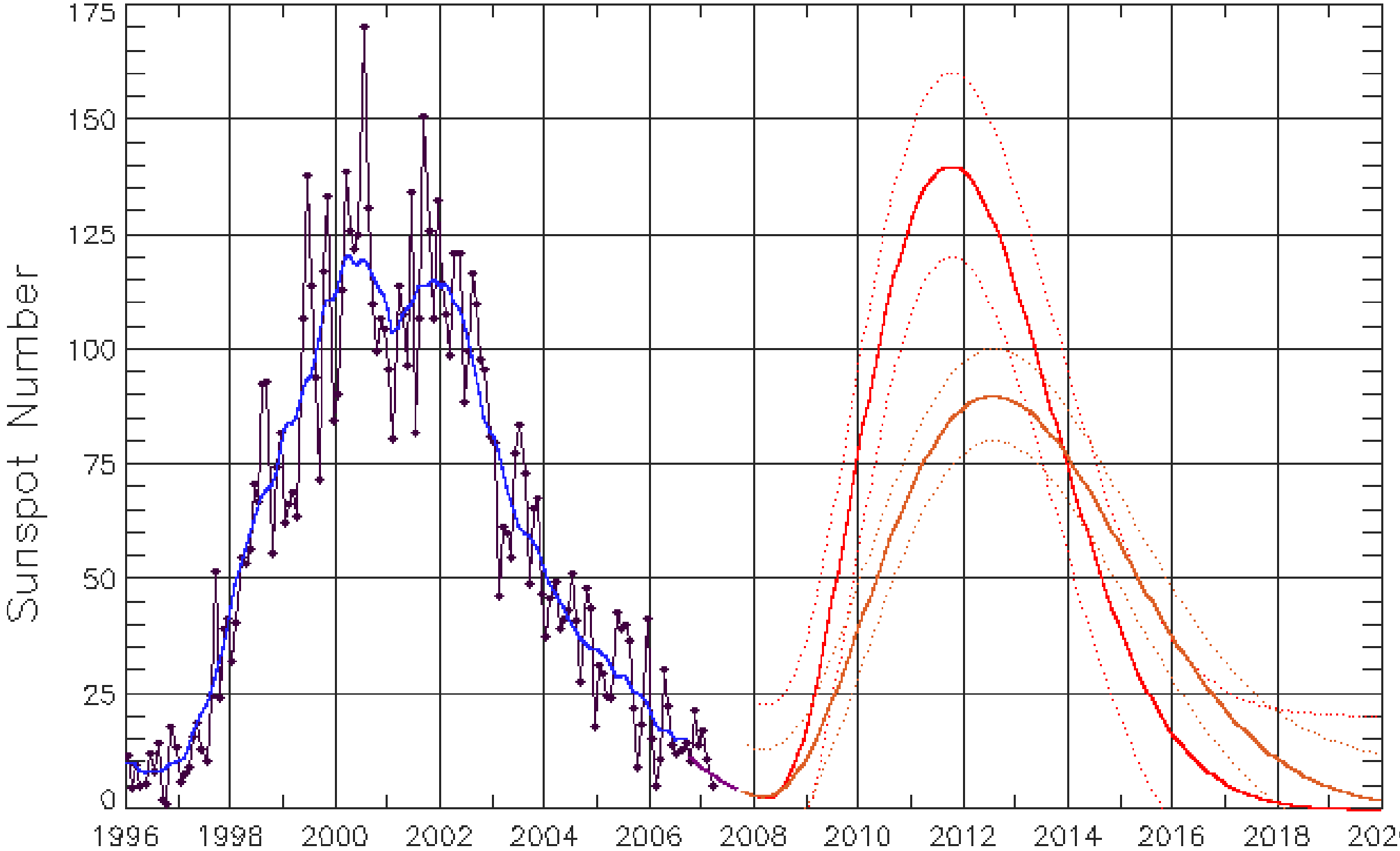
DAILY SUNSPOT AREA AVERAGED OVER INDIVIDUAL SOLAR ROTATIONS





Solar Cycle 24 Sunspot Number Prediction

Data Through 31 Mar 07

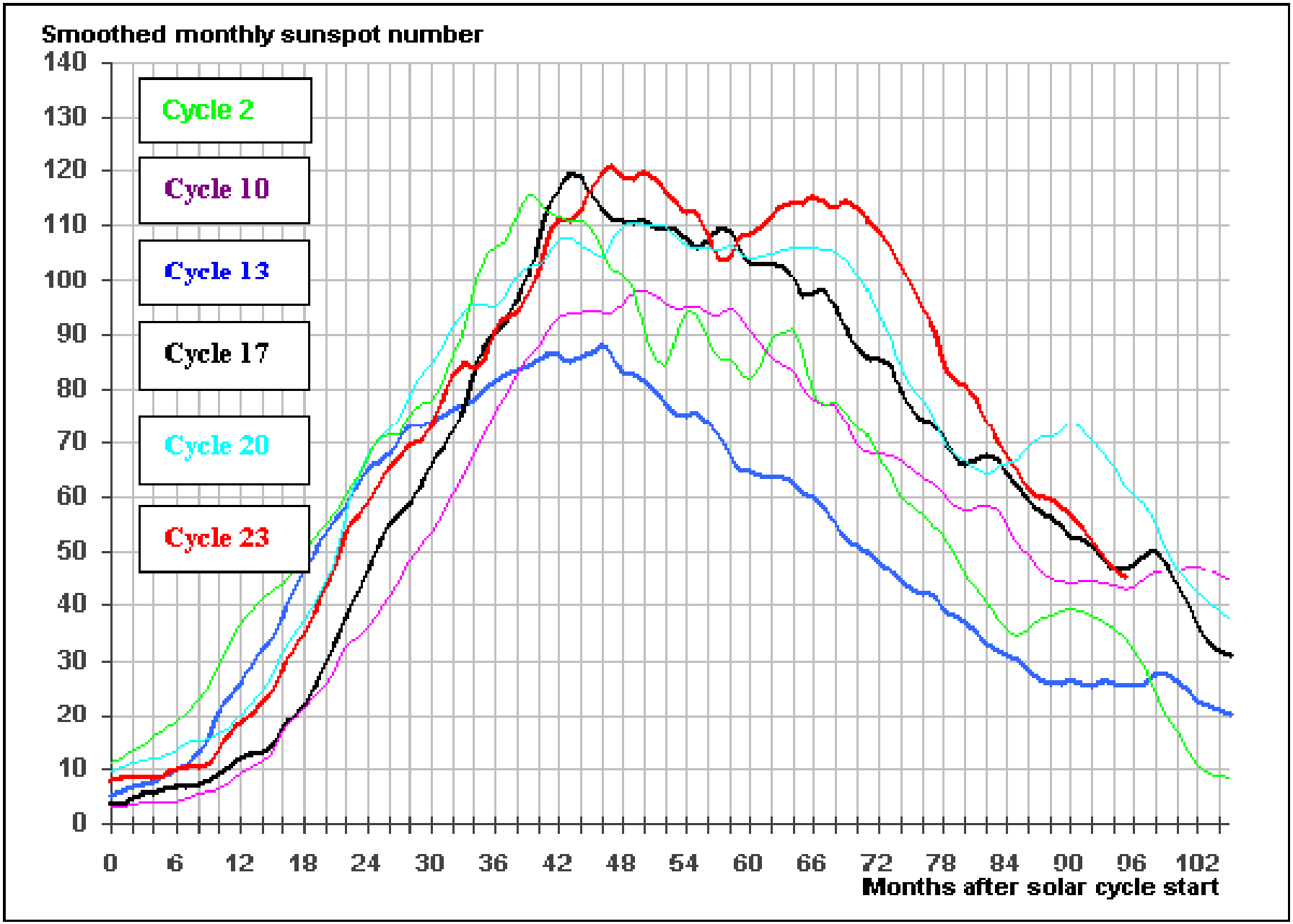


Low Prediction (Smoothed)
High Prediction (Smoothed)
1-Sigma Error
Smoothed Monthly Values
Monthly Values

Updated 2007 Apr 20

NOAA/SEC Boulder,CO USA

Comparación de los ciclos 2, 10, 13, 17, 20 y 23



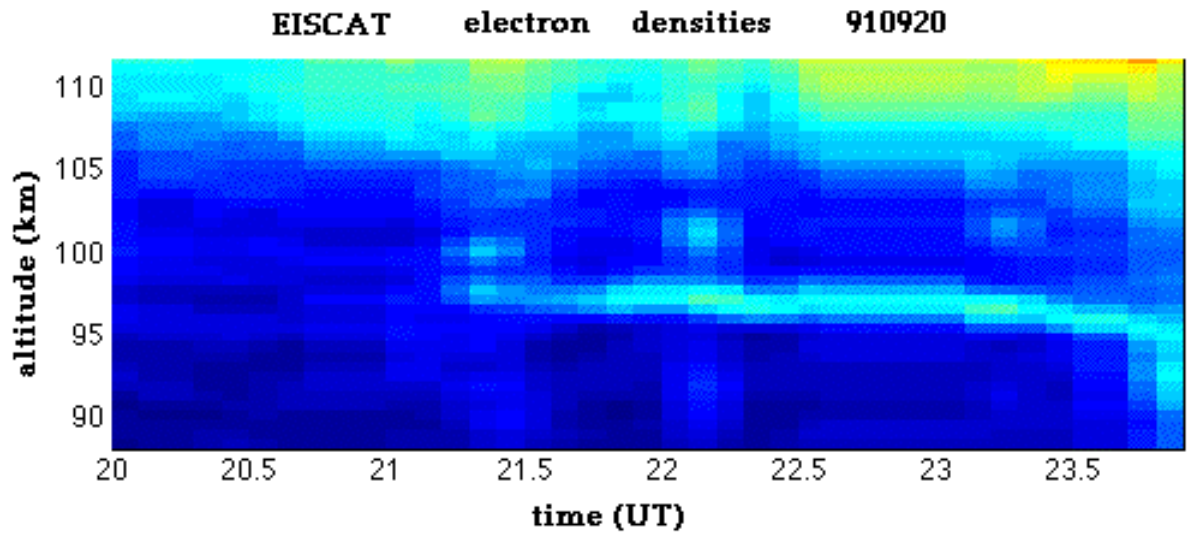
http://www.dxlc.com/solar/

Los misterios de la propagación en los 6 metros

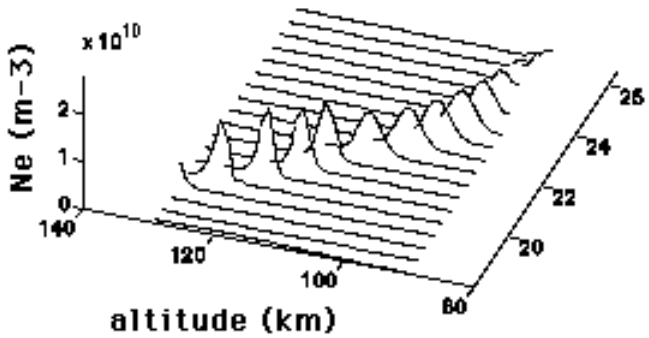
- Tropospérica - troposcatter
- Esporádica E – multi-salto
- Transecuatorial - scatter
- F2 – pasos doblados - scatter
- Aurora - AuEs
- EME
- FAI
- Meteor scatter
- Salto Cordal

50 MHz

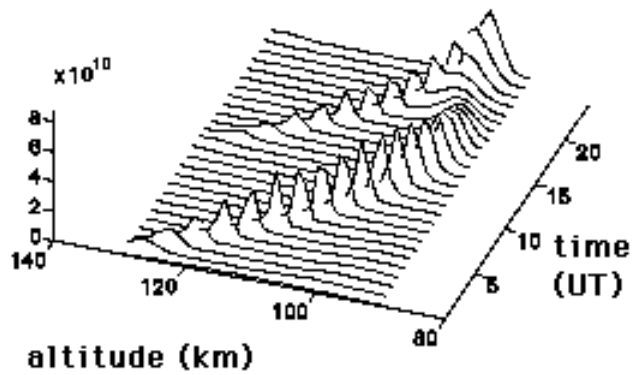
Esporádica E



simulation 1-
Es formed by electric field



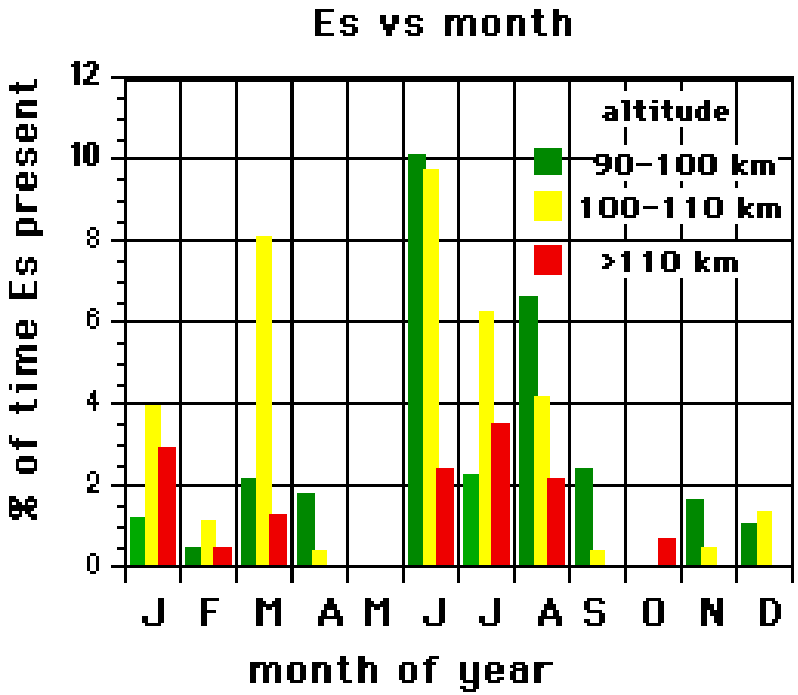
simulation 2-
Es formed by semidiurnal tide

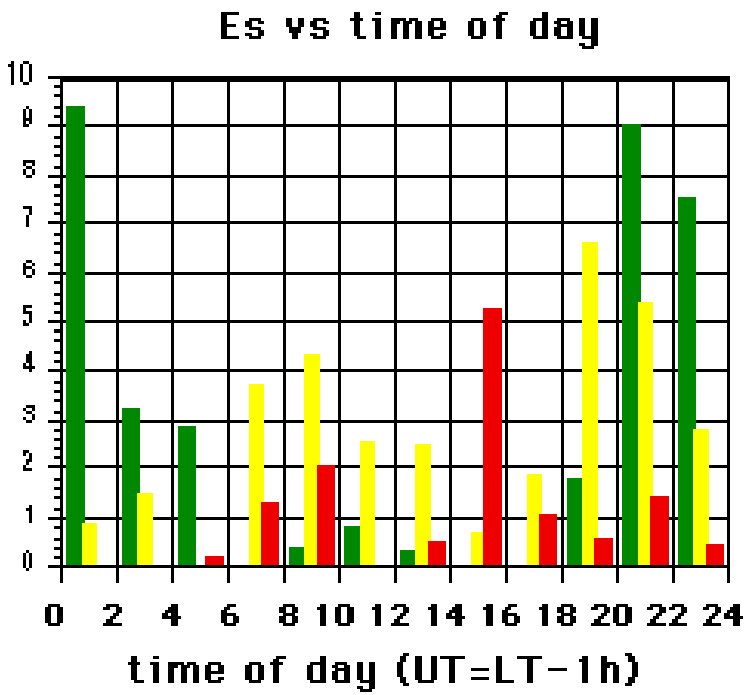


La Esporádica E

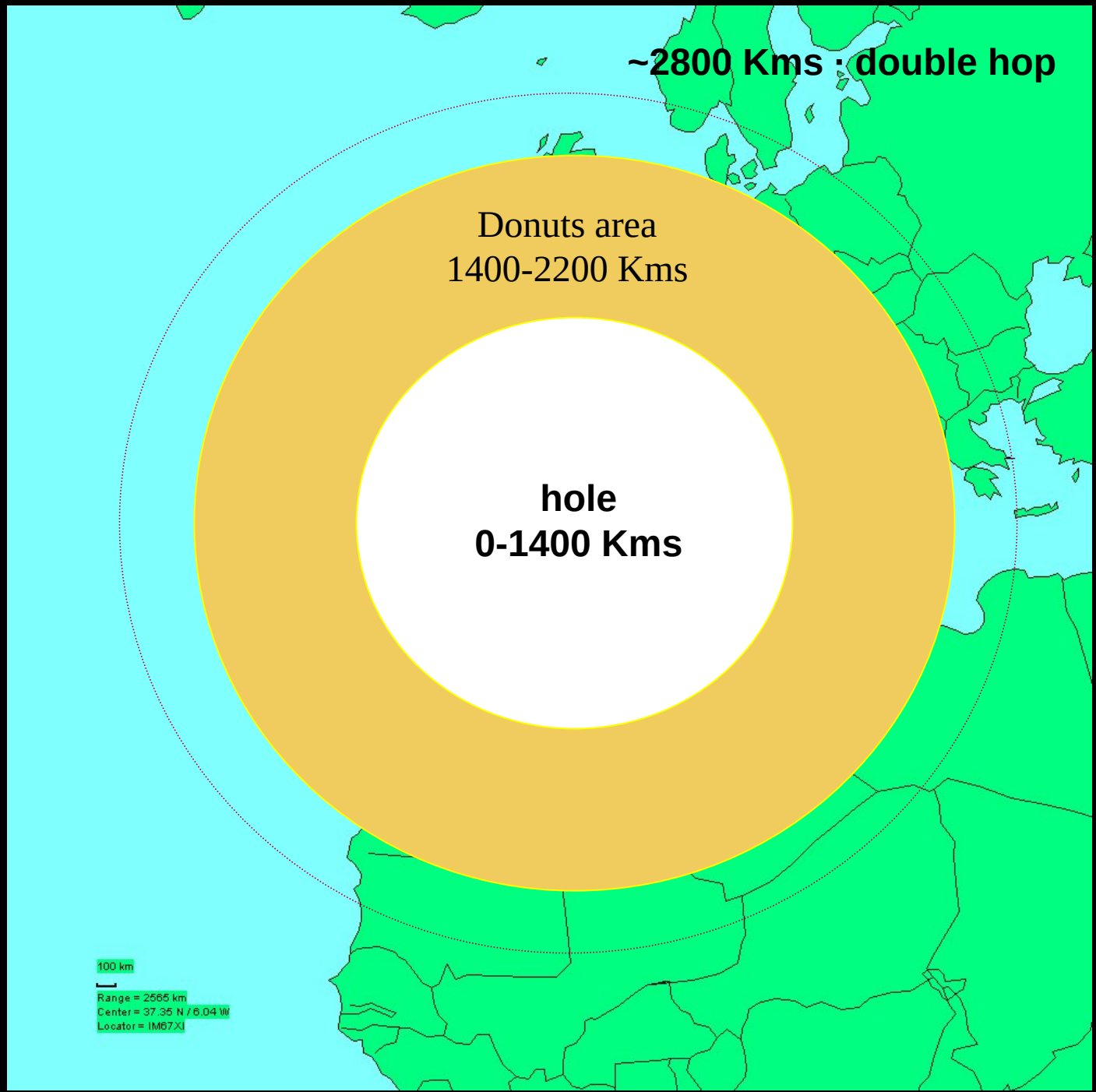
- Se desarrolla principalmente en los meses de Mayo, Junio, Julio y Agosto
- Tan pronto como las 7 de la mañana o tan tarde como las 4 de la madrugada.
- La Es de hasta 5 o 6 saltos proporciona QSOs de hasta 9.000 Kms
- El efecto “donuts” – el salto entre 1600 y 2200 Kms
- No correlación aparente con la actividad solar
- Aún no se sabe mucho acerca de los mecanismos que la desencadenan
- Puede arruinar la F2 y TEP





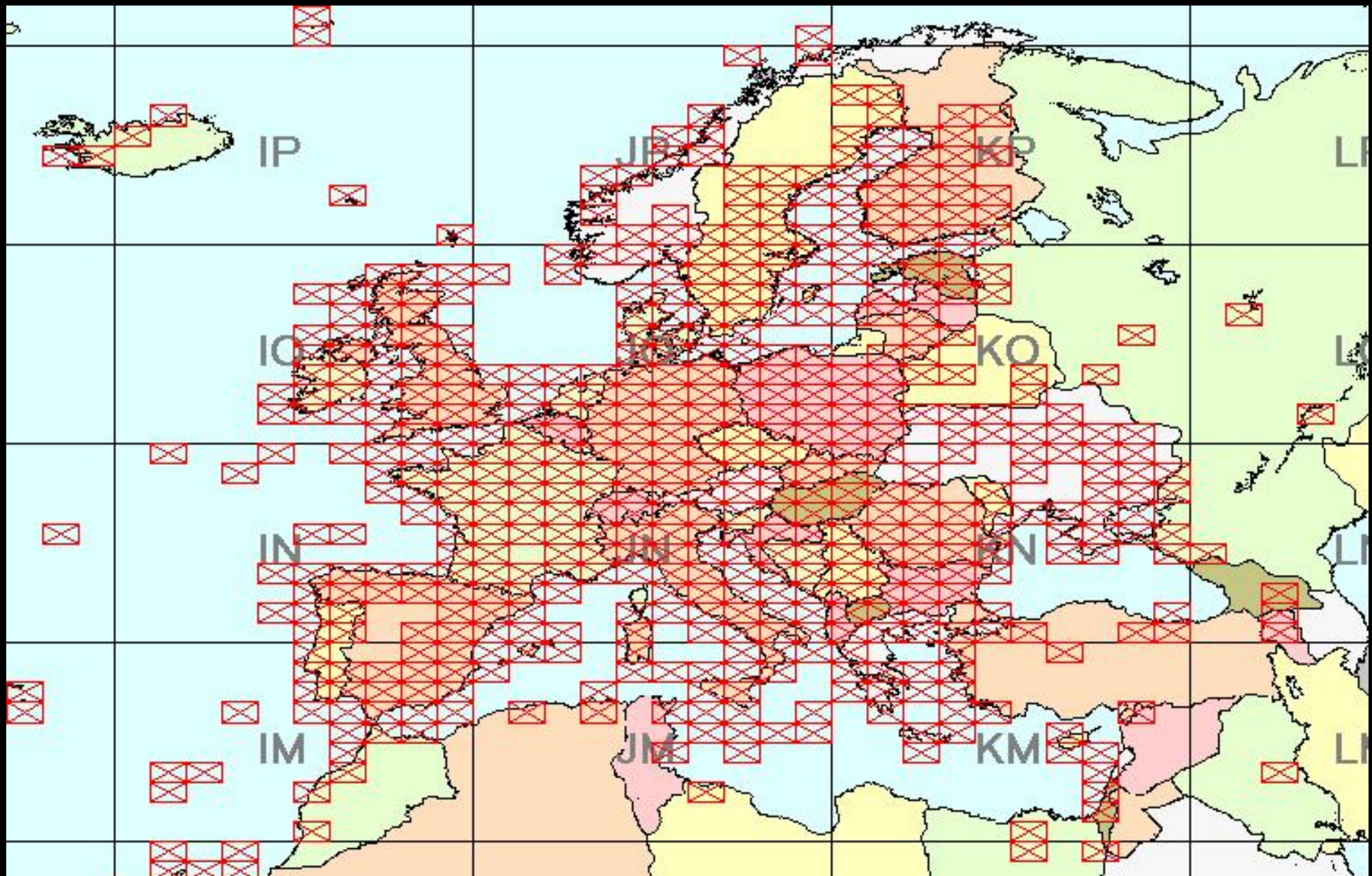


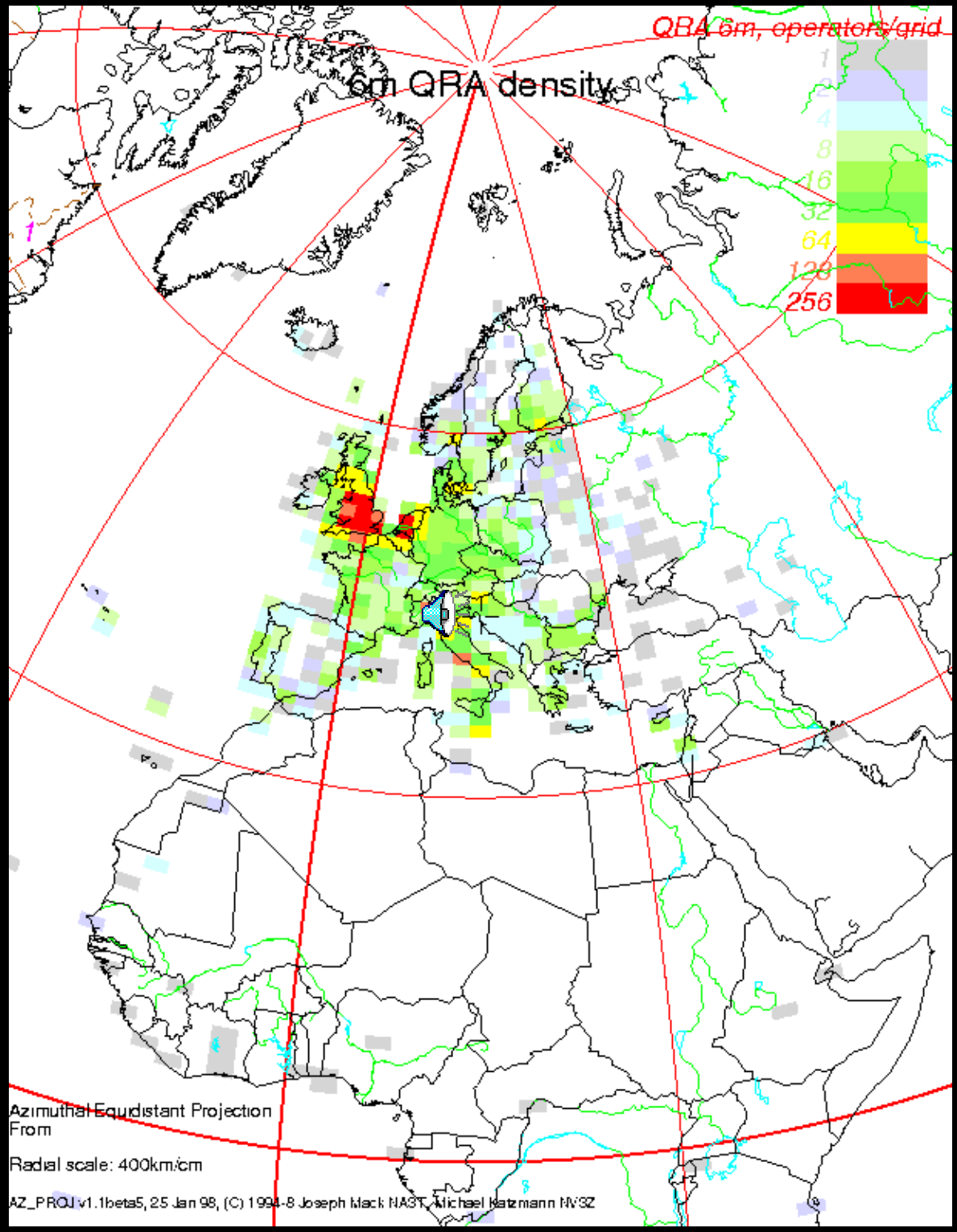
El Efecto Donuts



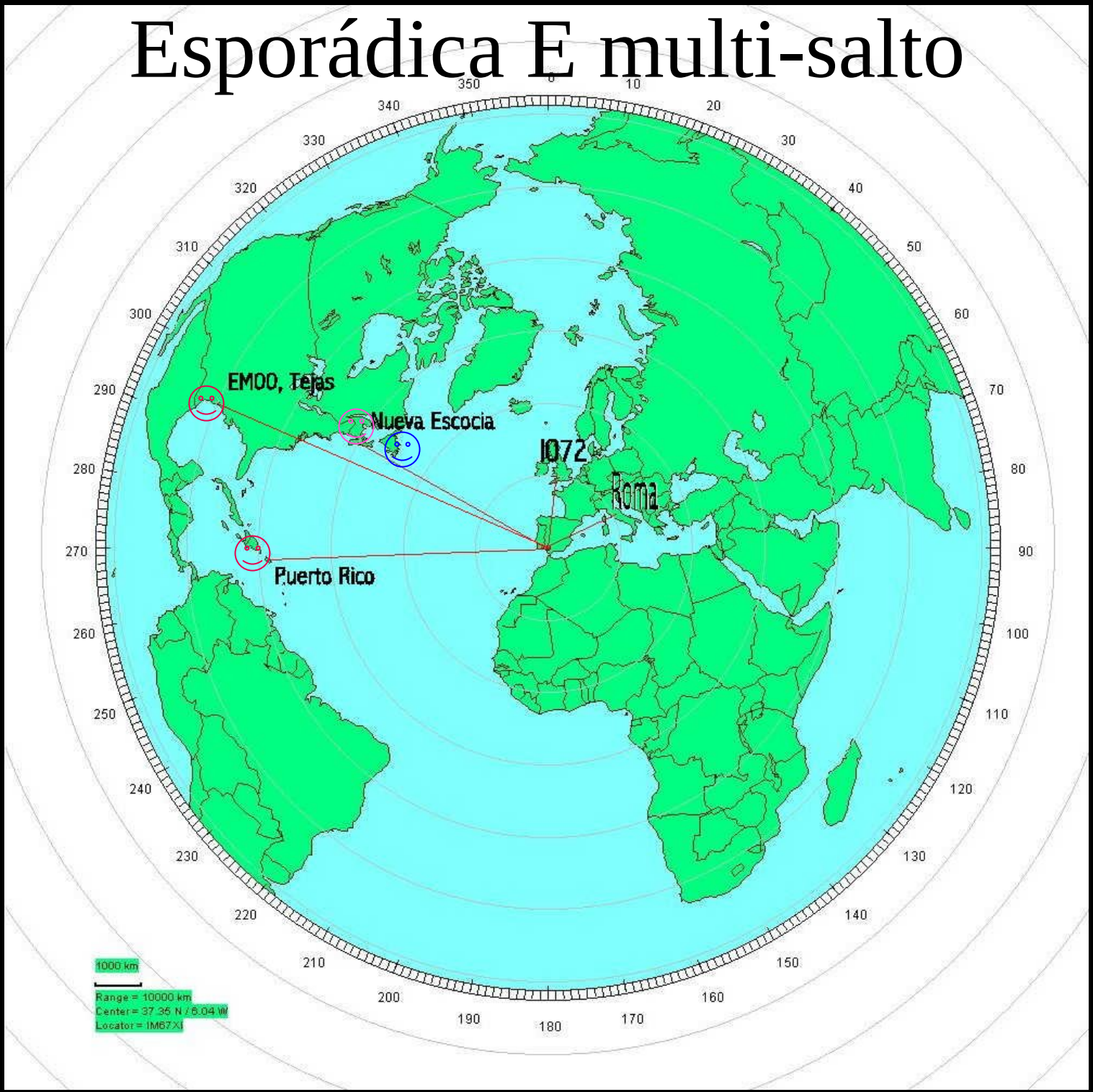
Grids trabajados en Europa

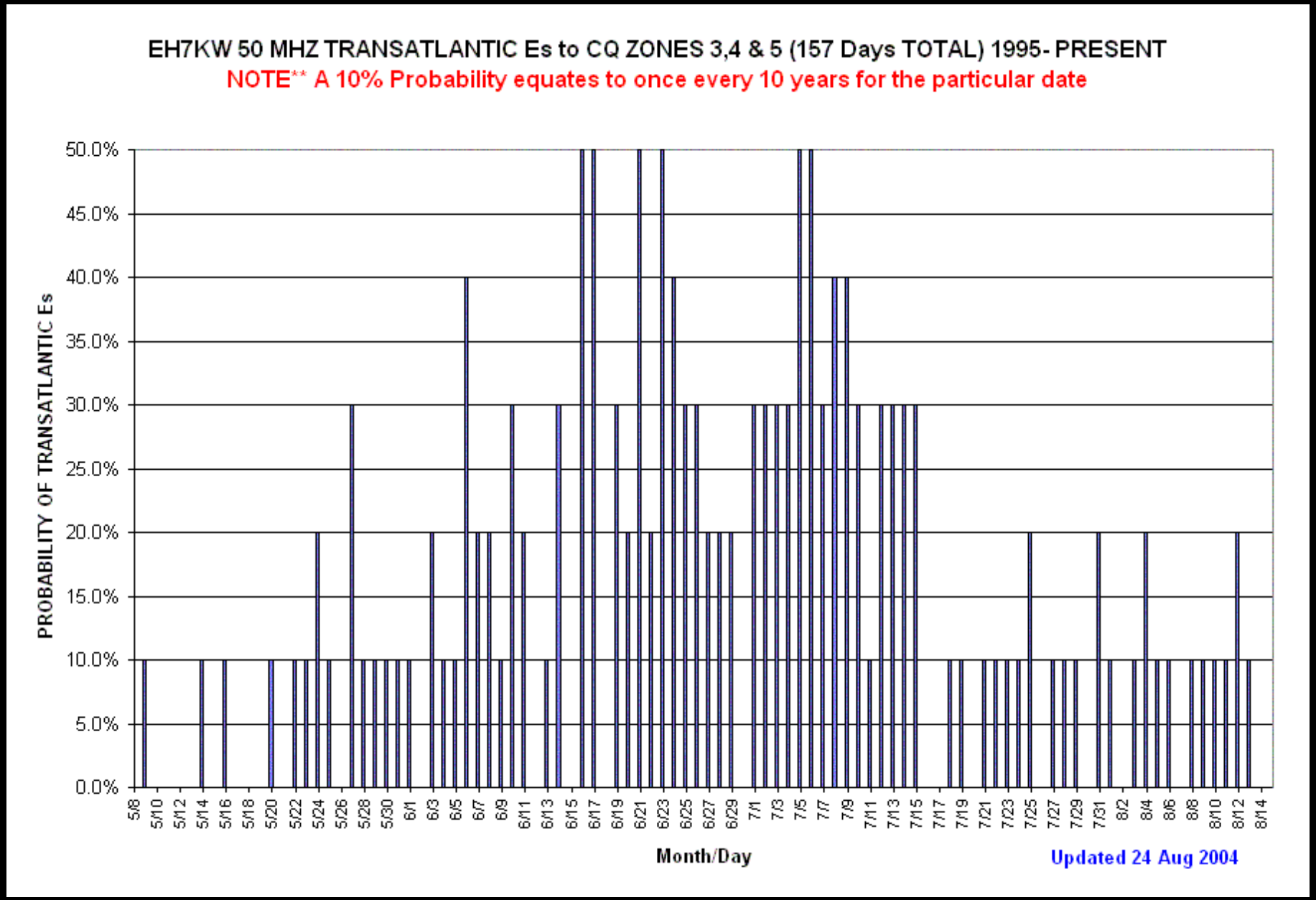
EA7KW



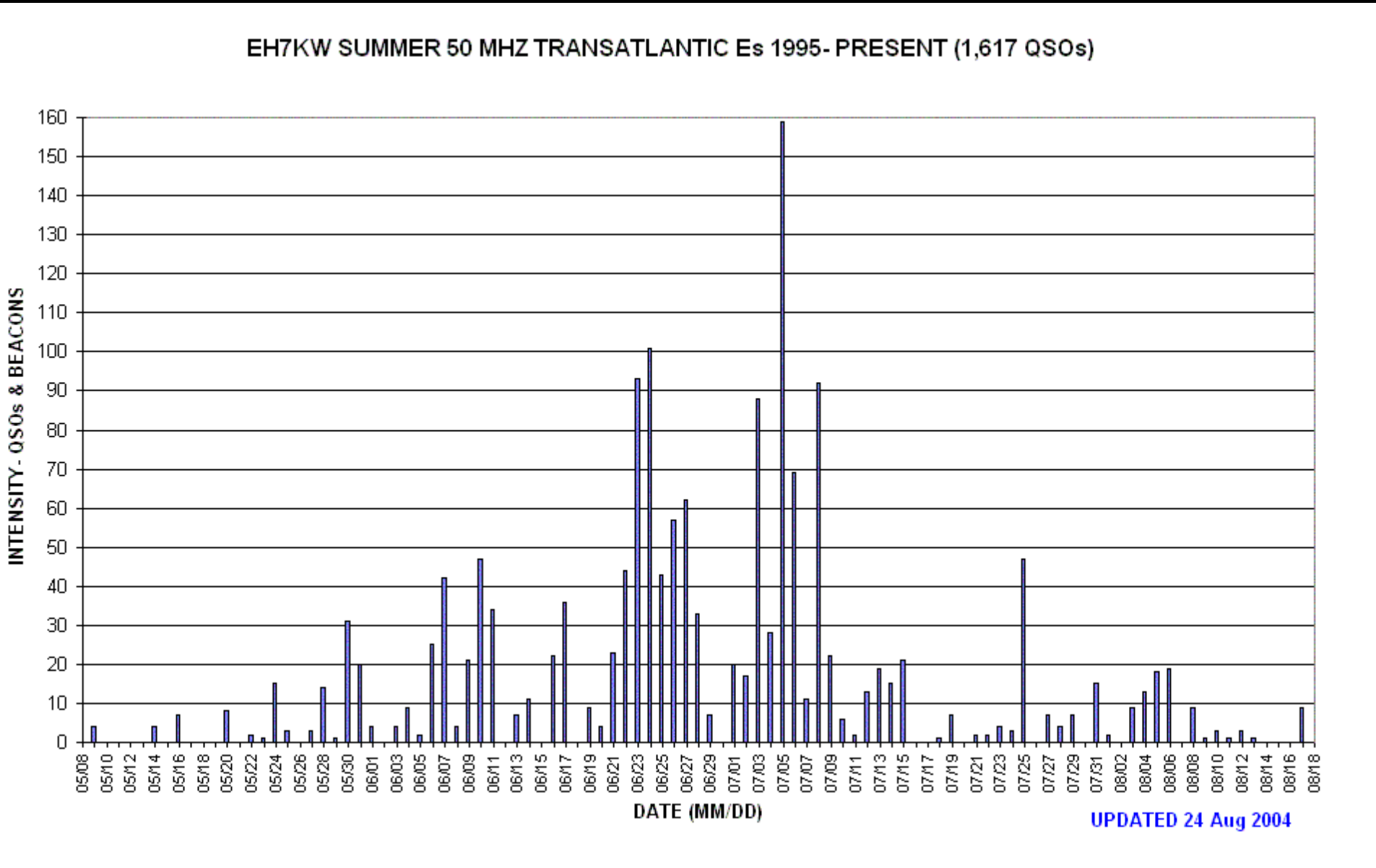

6m QRA density
QRA 6m, operators/grid
1
2
4
8
16
32
64
128
256
Azimuthal Equidistant Projection
From
Radial scale: 400km/cm
AZ_PROJ v1.1beta5, 25 Jan 98, (C) 1994-8 Joseph Mack NA3T, Michael Katzmann NV3Z

Esporádica E multi-salto

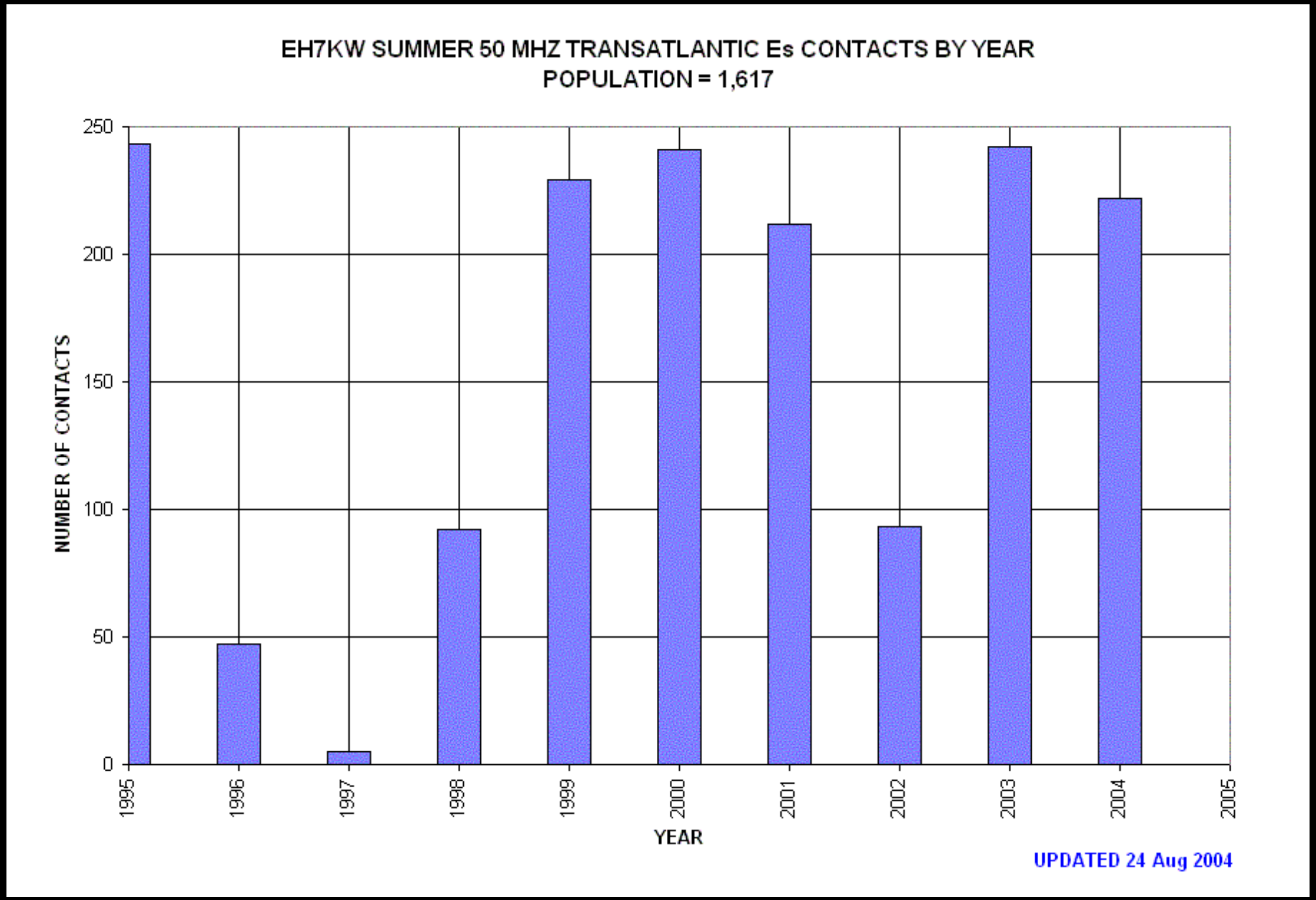




Bob Mobile, K1SIX



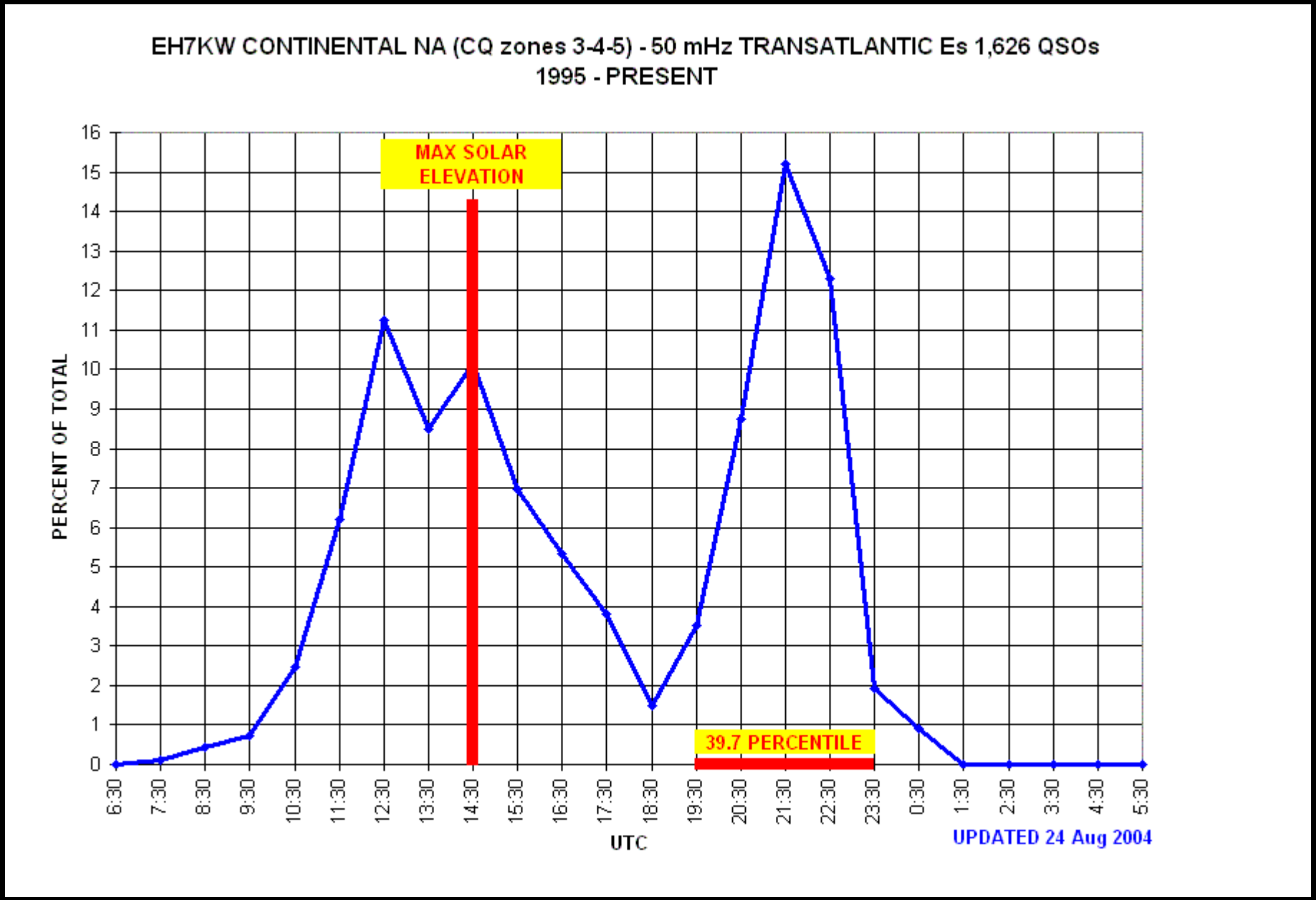
Bob Mobile, K1SIX



Bob Mobile, K1SIX

Esporádica Es Transatlántica

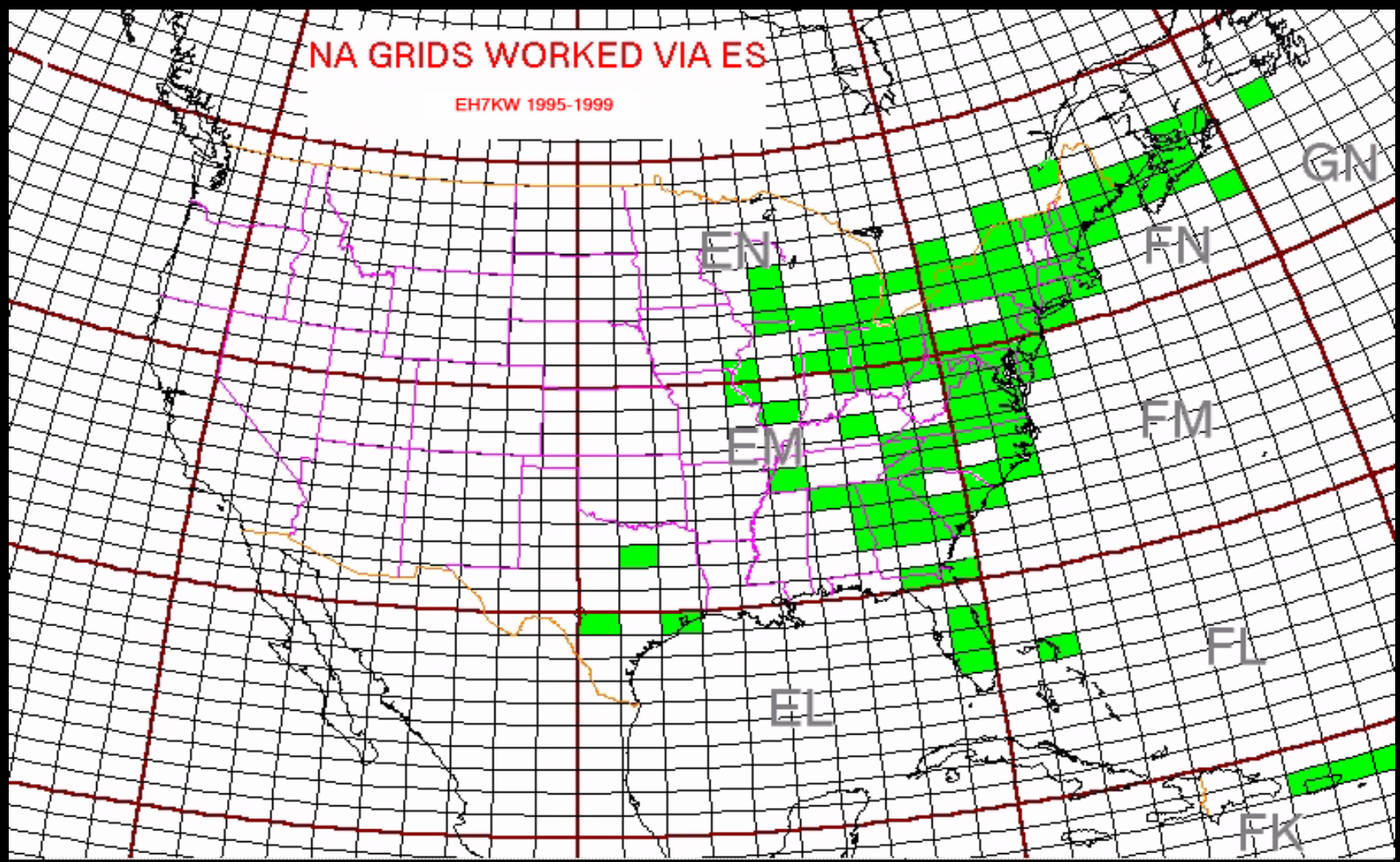
- **Doble pico:**
  - **1330-1430 Z**
  - **2100-2200 Z**
- **Teoría de K1SIX (ex-WA1OUB) "EL MALDITO AGUJERO NEGRO DE LAS 1730 UTC "**
- **Dos franjas de propagación:**
  - **Antes de las 17:30 Z**
  - **Después de las 17:30 Z**


EH7KW CONTINENTAL NA (CQ zones 3-4-5) - 50 mHz TRANSATLANTIC Es 1,626 QSOs
1995 - PRESENT
MAX SOLAR ELEVATION
39.7 PERCENTILE
PERCENT OF TOTAL
UTC
UPDATED 24 Aug 2004
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
6:30
7:30
8:30
9:30
10:30
11:30
12:30
13:30
14:30
15:30
16:30
17:30
18:30
19:30
20:30
21:30
22:30
23:30
0:30
1:30
2:30
3:30
4:30
5:30

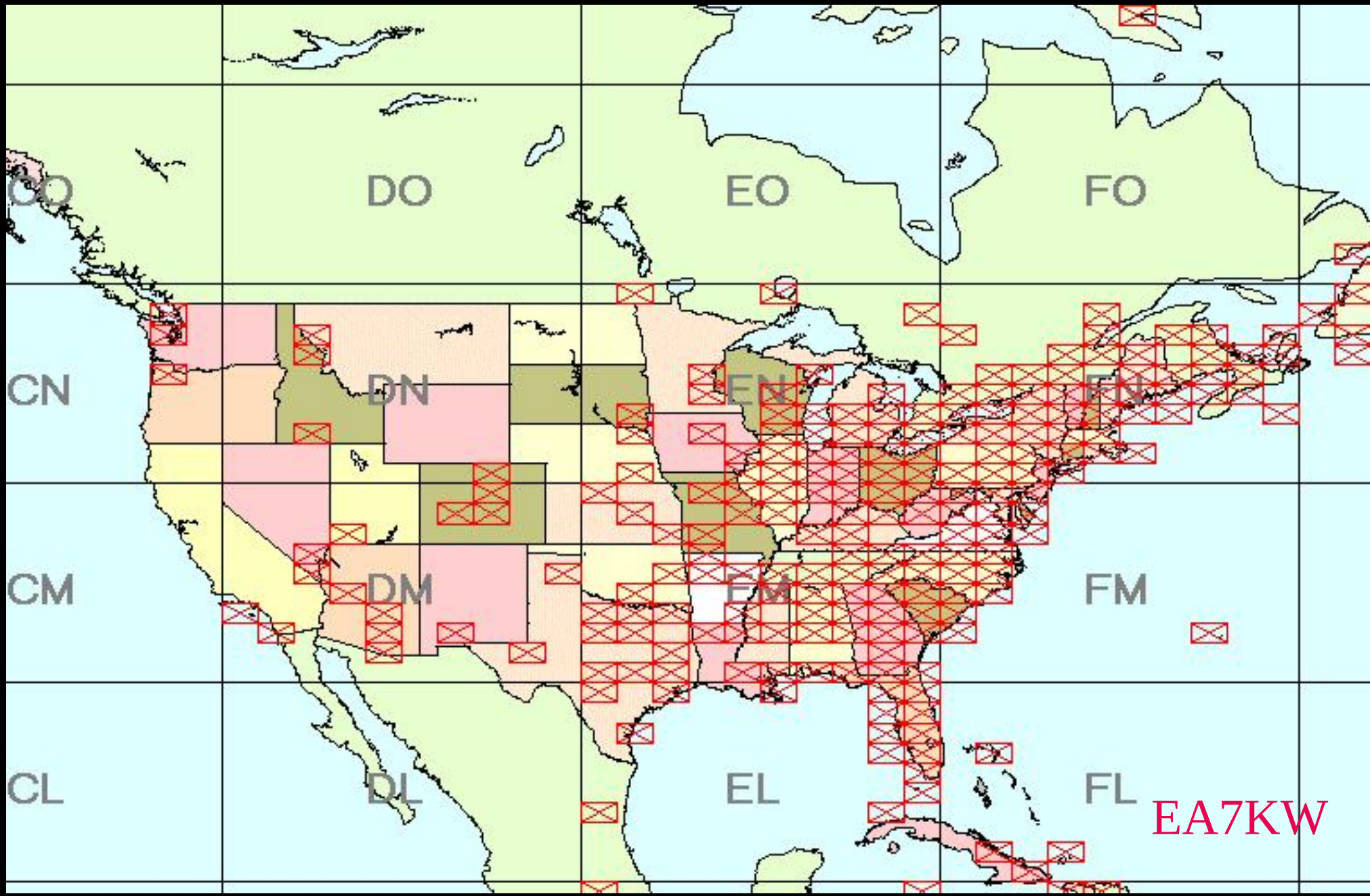
Grids en Es multi-salto

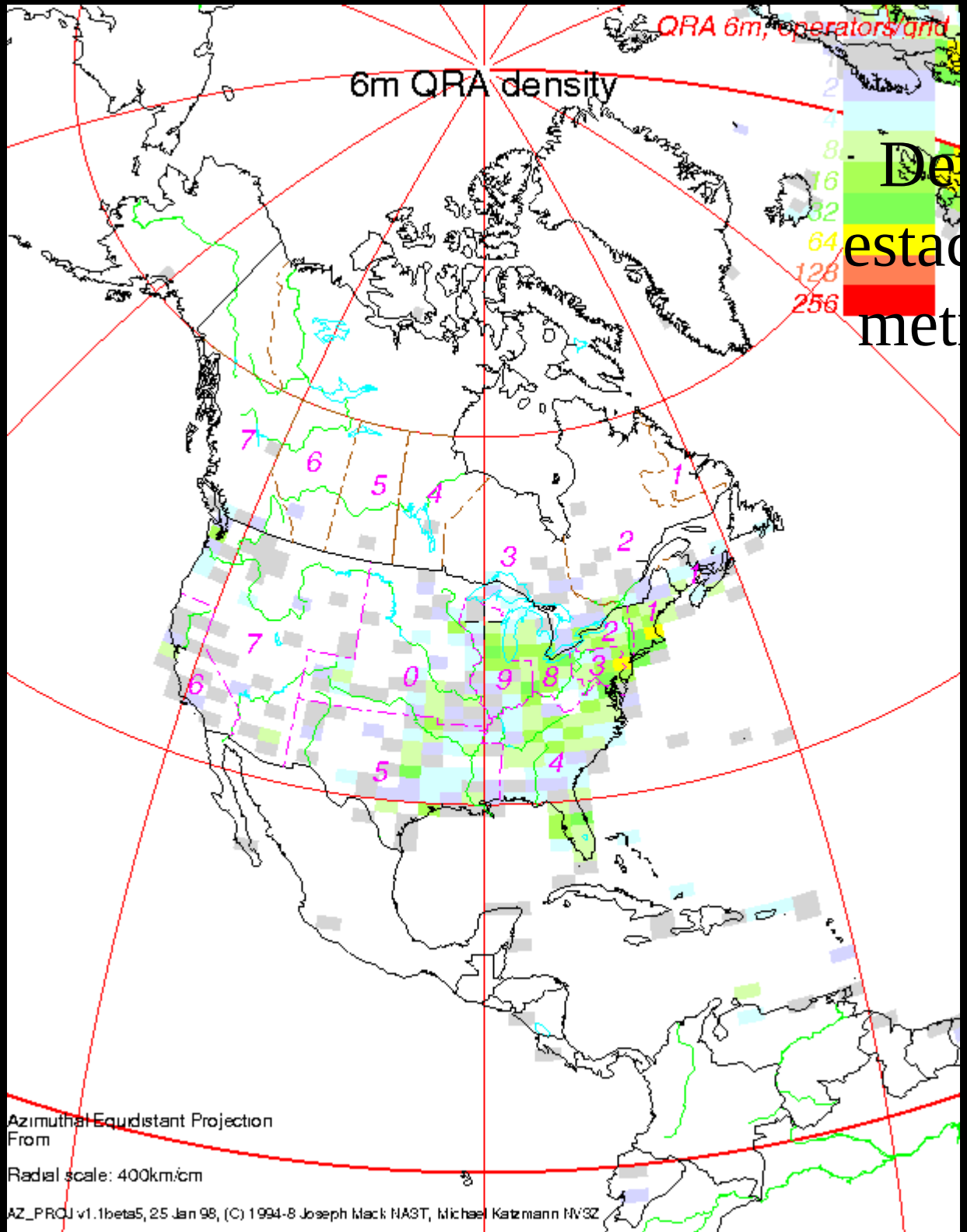
(1995-1999, 8 W + 5 ele. Tonna)

EH7KW



Norte América en F2+Es




6m QRA density
QRA 6m, operators/grid
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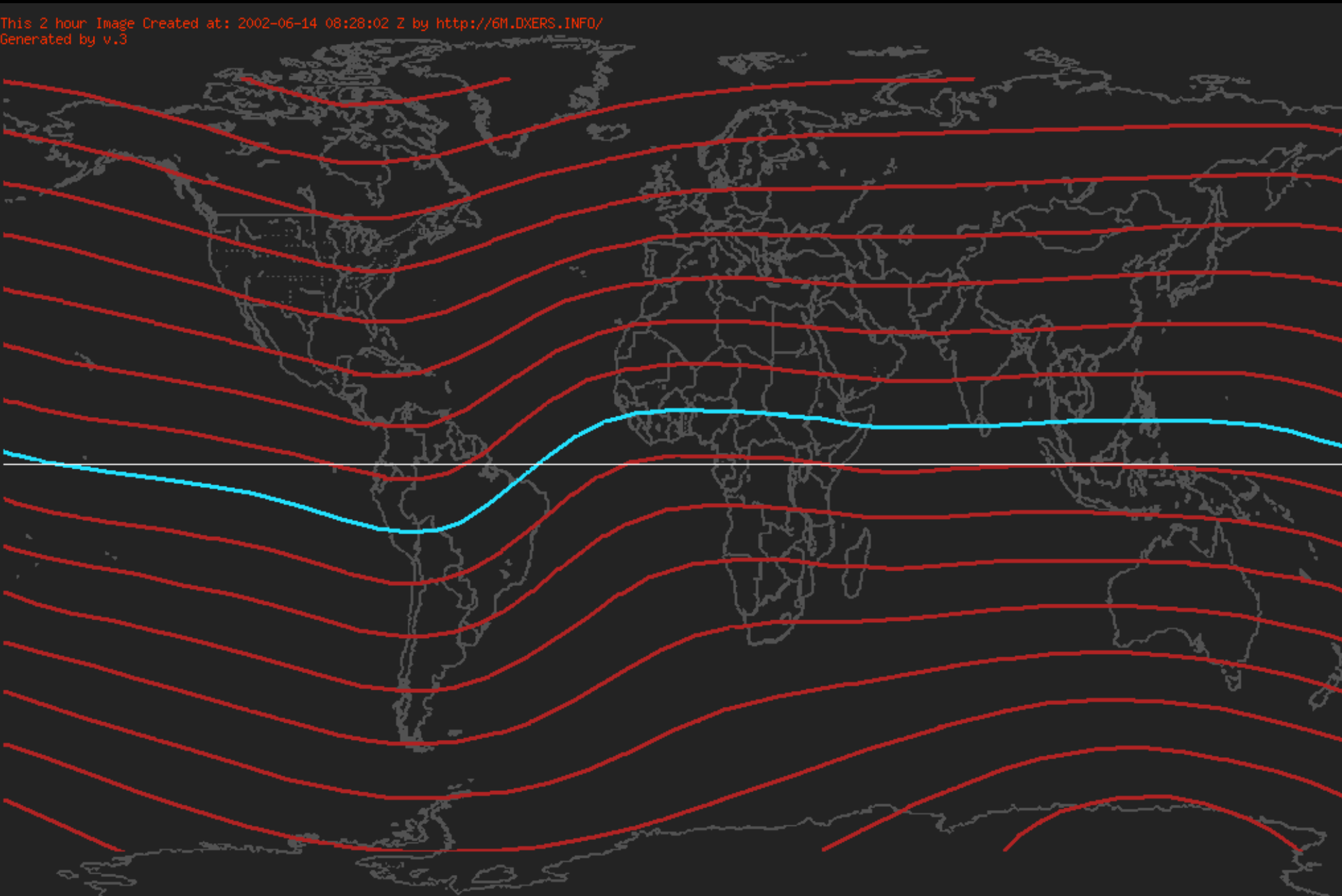
128
256
Azimuthal Equidistant Projection
From
Radial scale: 400km/cm
AZ_PROJ v1.1beta5, 25 Jan 98, (C) 1994-8 Joseph Mack NA3T, Michael Katzmann NV3Z

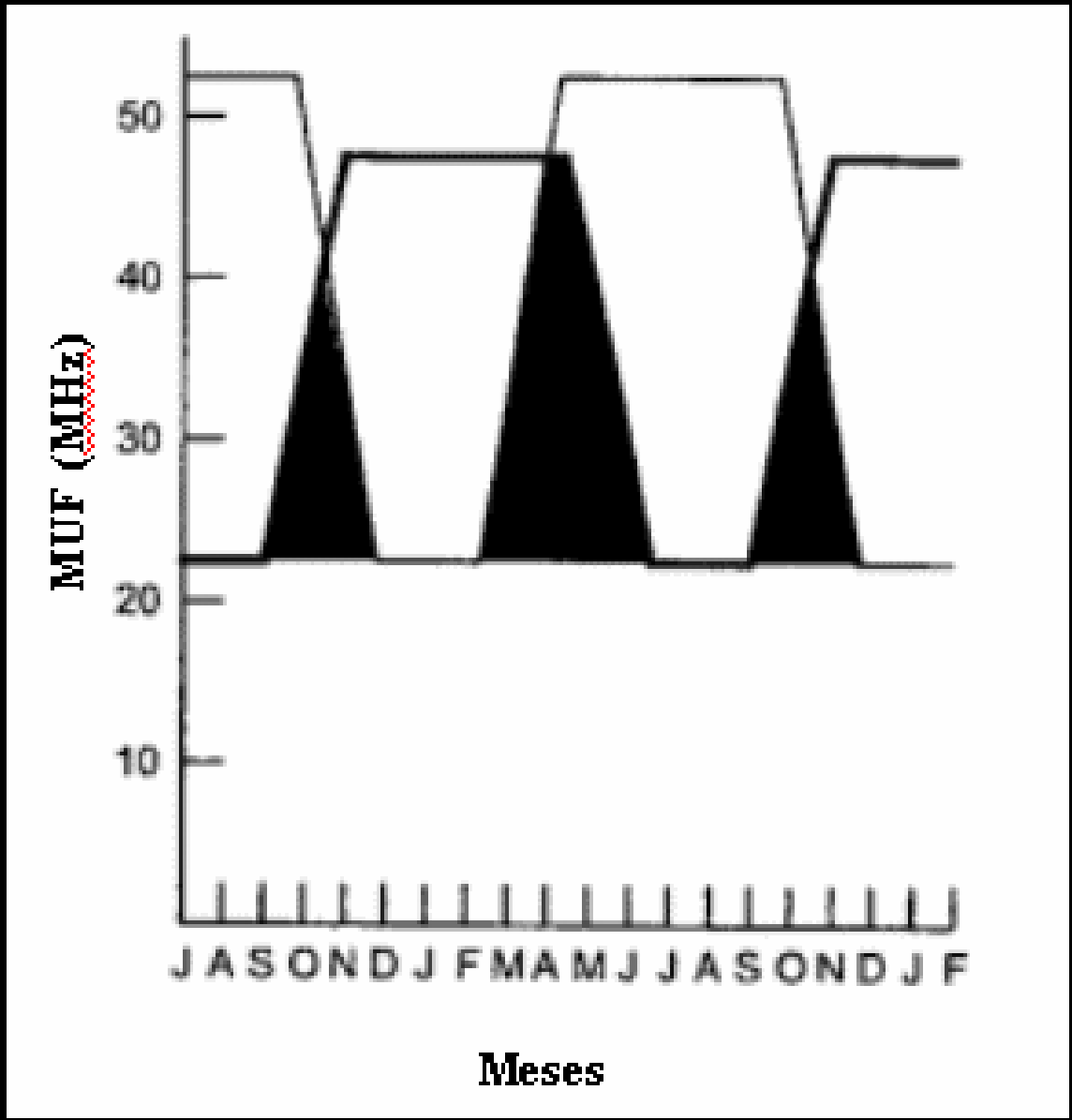
Transecuatorial (TEP)

- Relacionada con el ecuador magnético
- Señales limpias en las aperturas diurnas al sur de Africa
- AGUJERO NEGRO durante unos 30 minutos sobre el atardecer
- Las señales nocturnas vienen acompañadas de flutter y violento QSB
- Sucede aún en la parte baja del ciclo solar

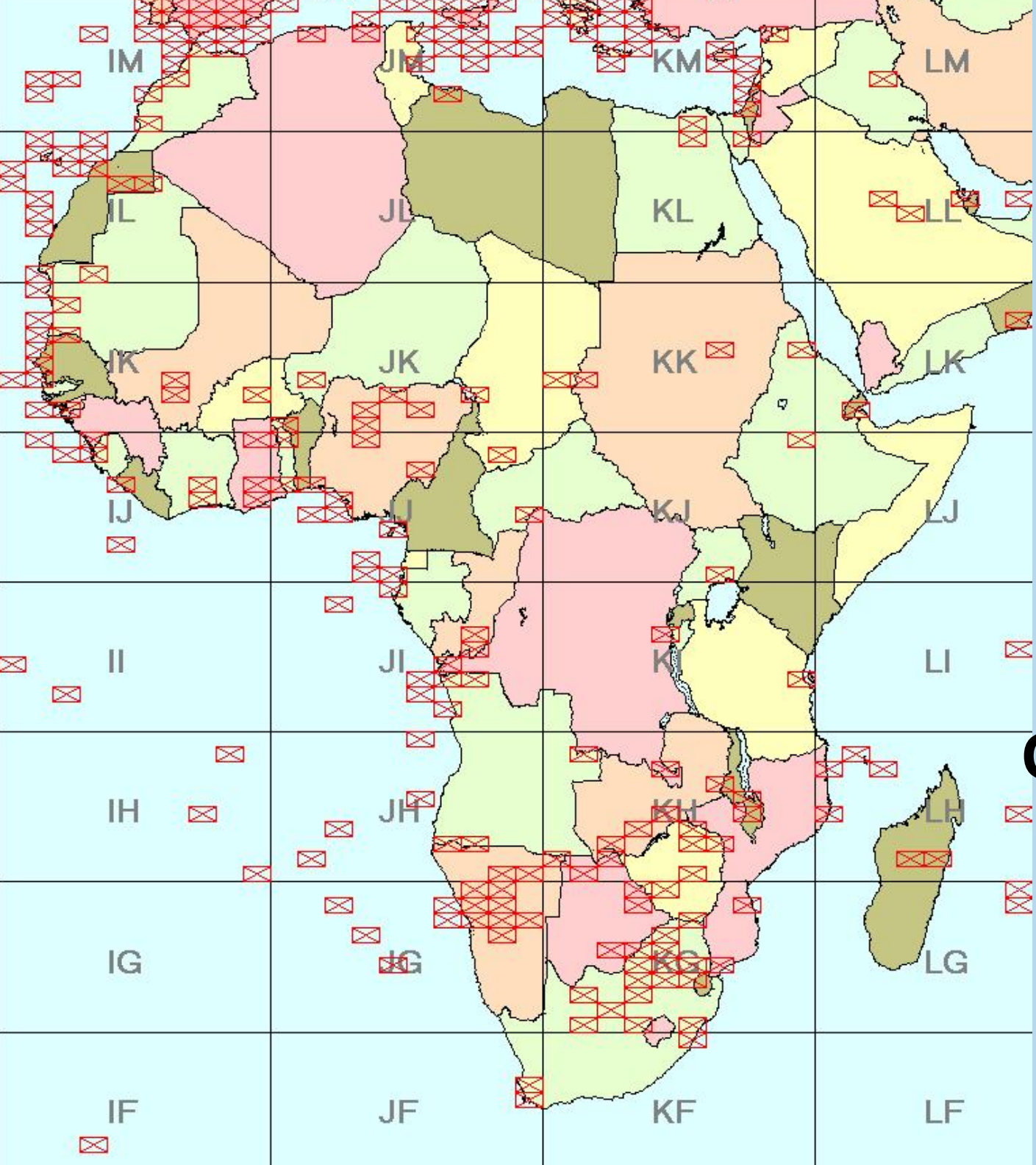
Latitud Magnética



Meses más favorables F2 norte-sur

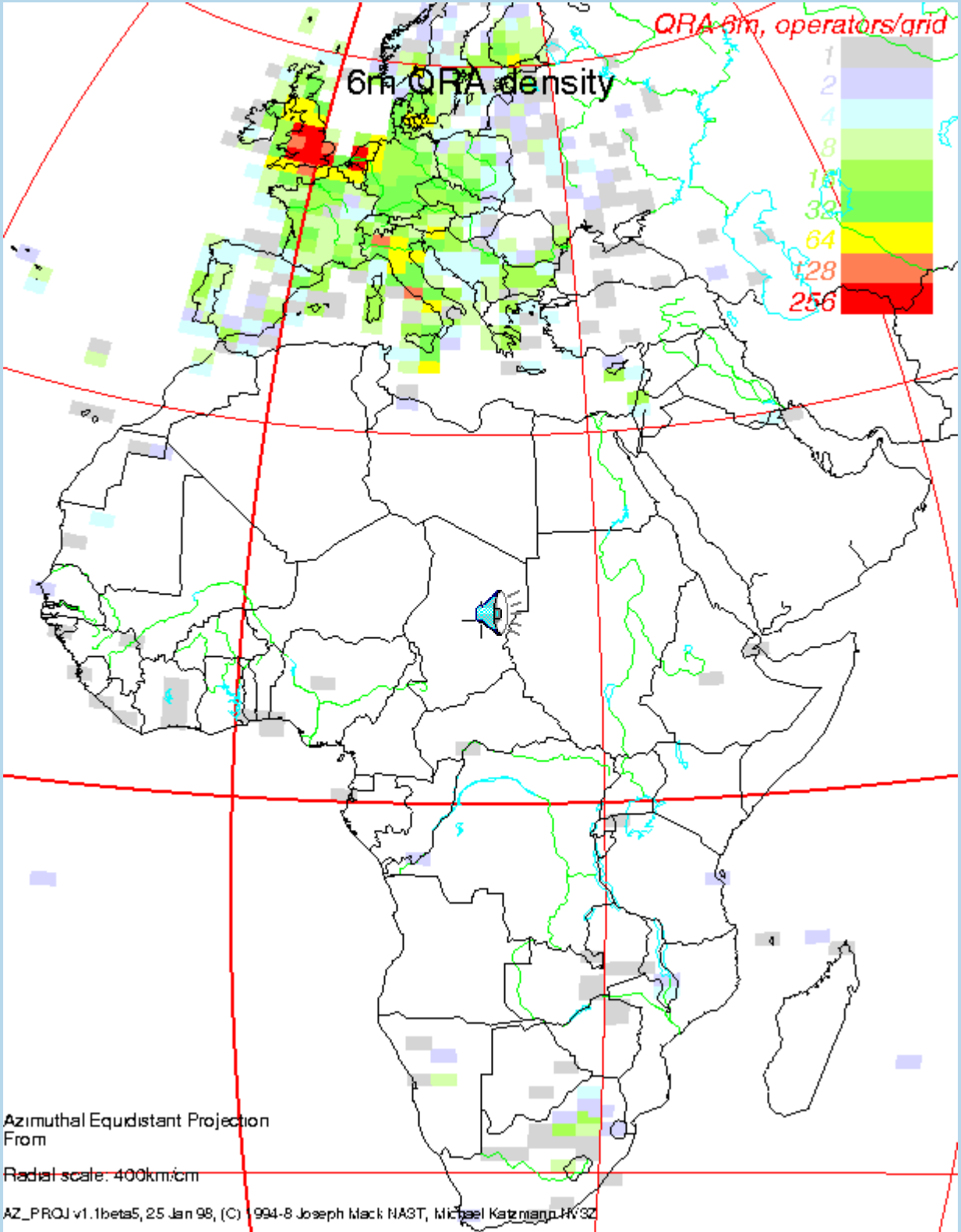


Dibujo: K6MIO/KH6



Grids trabajados en Africa

EA7KW


6m QRA density
QRA 6m, operators/grid
1
2
4
8
16
32
64
128
256
Azimuthal Equidistant Projection
From
Radial scale: 400km/cm
AZ_PROJ v1.1beta5, 25 Jan 98, (C) 1994-8 Joseph Mack NA3T, Michael Katzmann HV3Z



TN3B & TN3W

CONGO
2002
DXPEDITION



http://www.ea3bt.com/

DX-PEDICION
CONGO 2002

TN3W - TN3B

MAURITIUS
2002



GOVERNMENT OF MAURITIUS

TELECOMMUNICATION AUTHORITY

TEMPORARY EXPERIMENTER'S (AMATEUR) LICENCE

Date of issue: *23 MARCH 1998* Fee on issue: *Rs250/-*

Date of expiry: *30 MAY 1998*

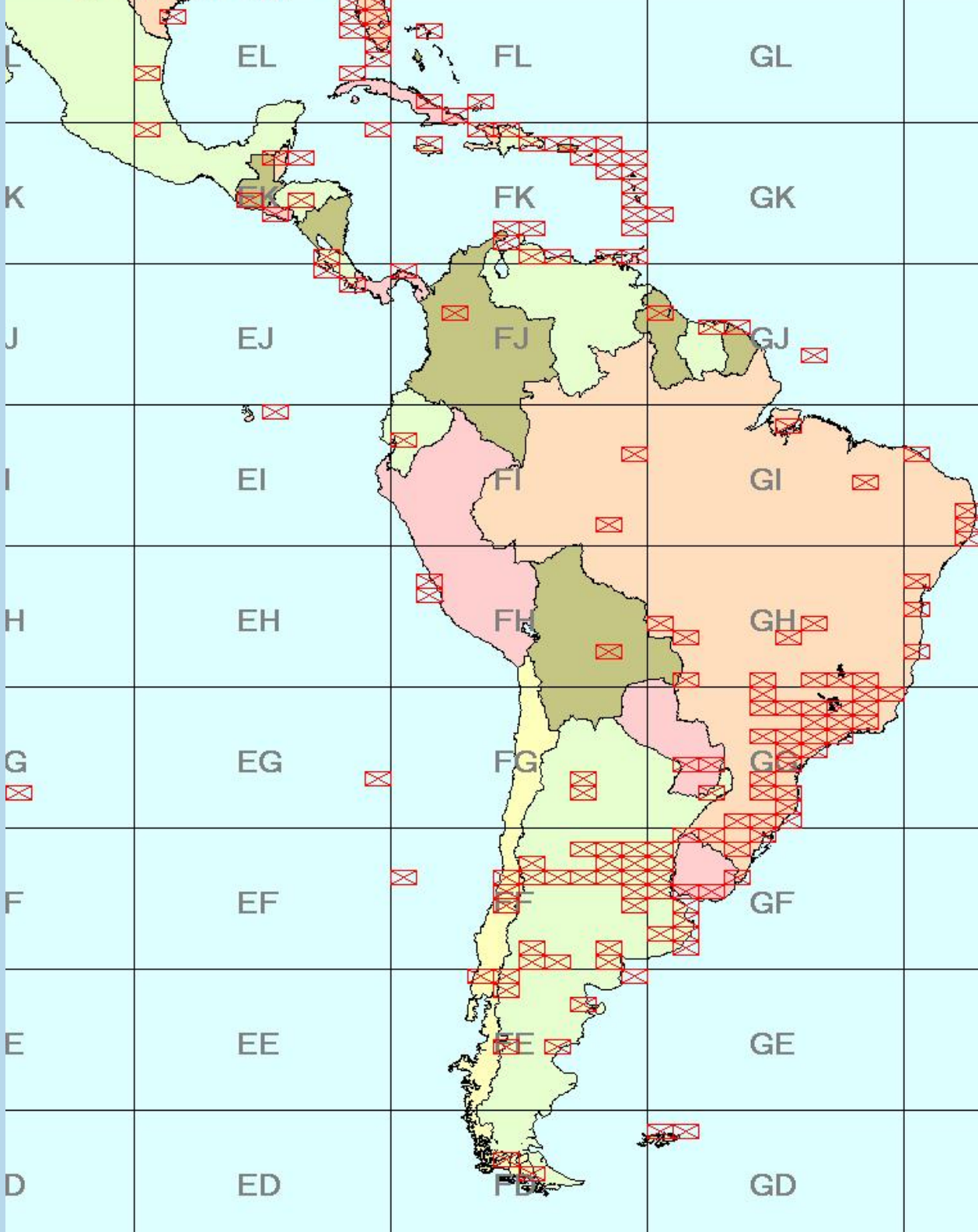
CALL SIGN *3B8/DL6UAA*

1. (1) *MR. MART MOBIUS* of *KIRCHPLATZ 10, D-04924 DOBRA, GERMANY-EUROPE*



3B8/DL6UAA

Grids trabajados en S. América



EH7KW

SAN FELIX ISLAND EXPEDITION

March, 2002

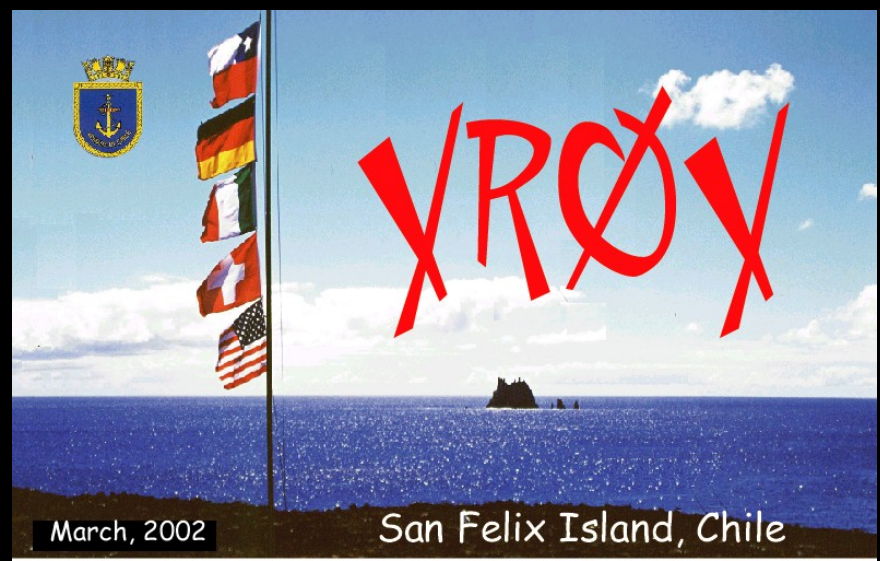
XRØX

XROX










3GØZ
Robinson Crusoe Island
Juan Fernandez Archipelago










CP6/N6XQ
BOLIVIA


DxPedition PWØT
Trindade Is.


PWØT
80
20/15/10
WARC
40
20/15/10
160
6
20/15/10


ICOM





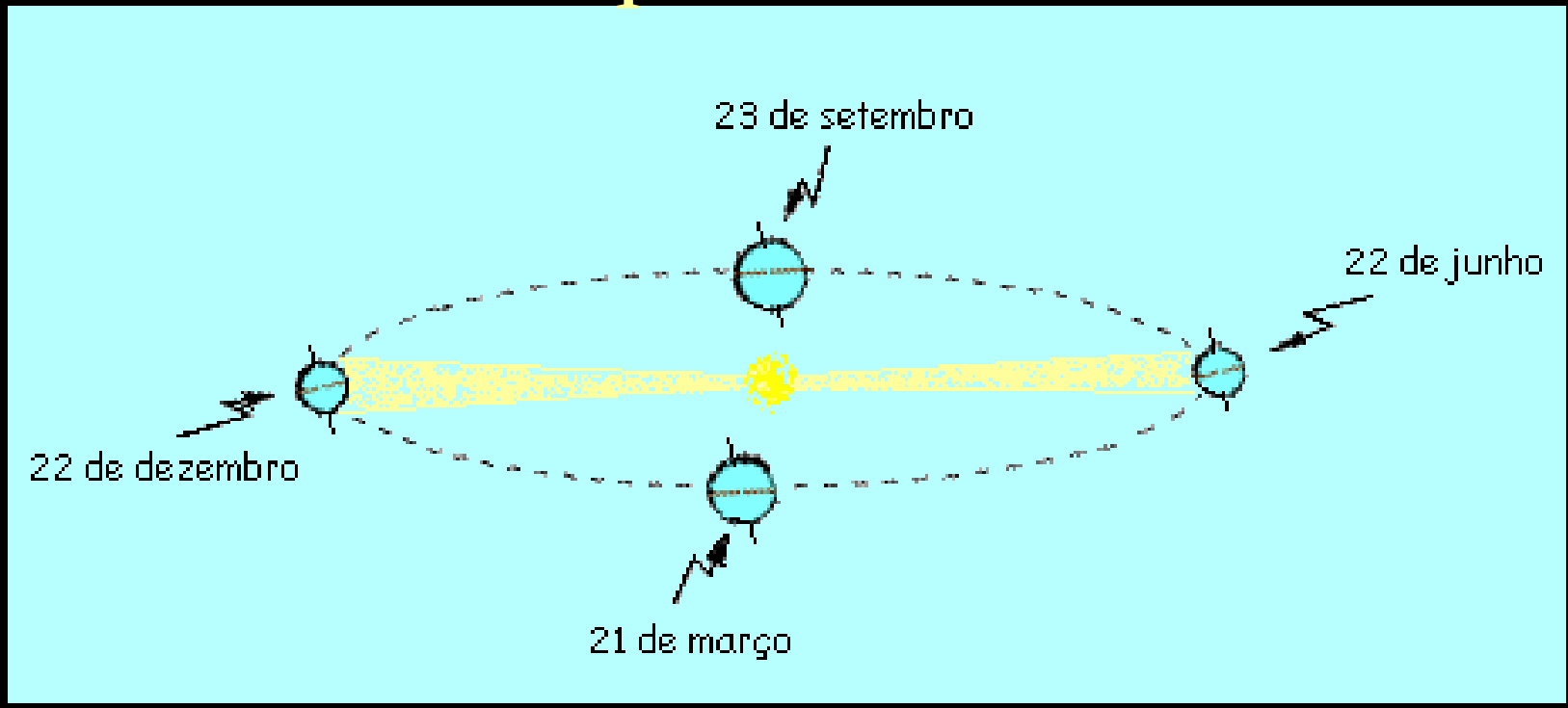


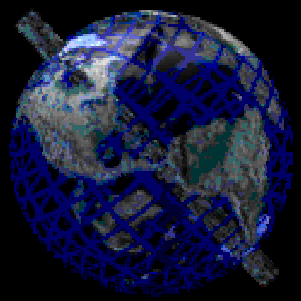
F2

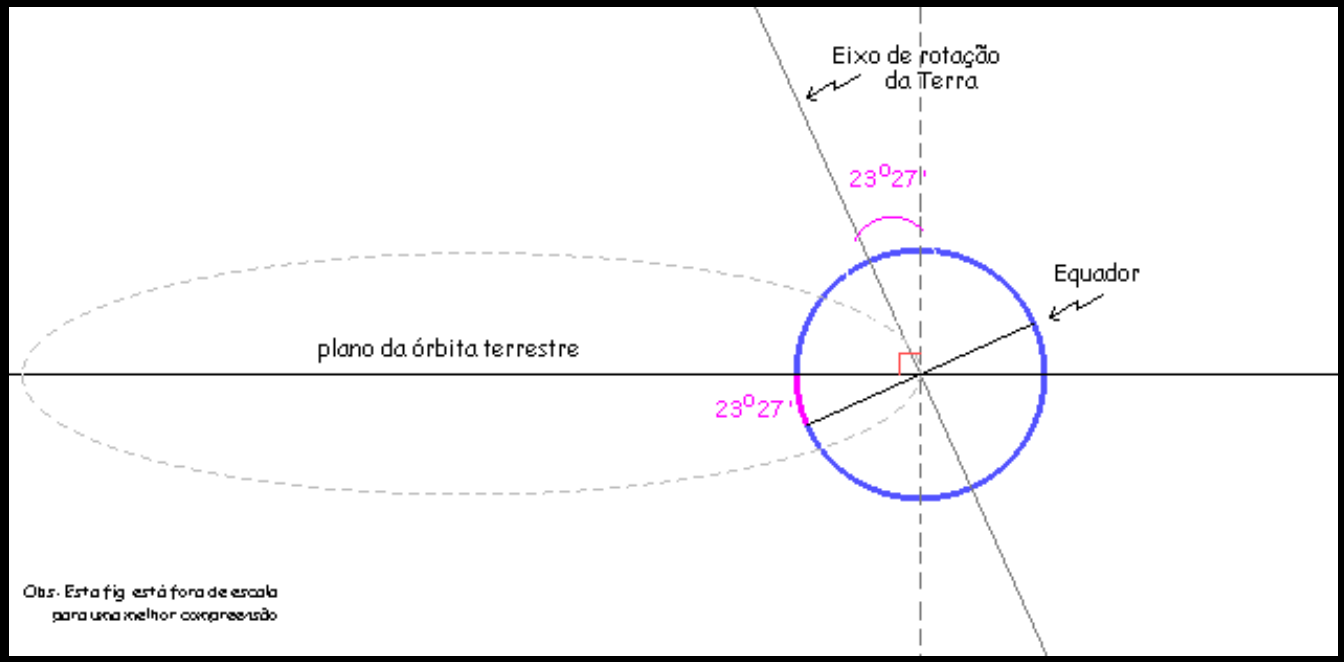


- Desarrollo alrededor del máximo del ciclo solar
- Equinoccial
- Se lleva mal con la lluvia de protones
- Principalmente diurna
- Puede enlazar con otros tipos de propagación
- La MUF suele ser muy crítica

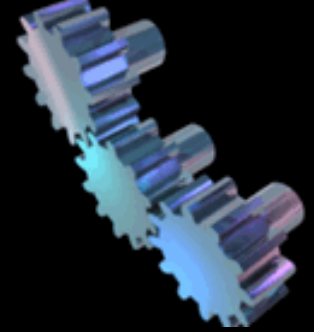
Equinocios

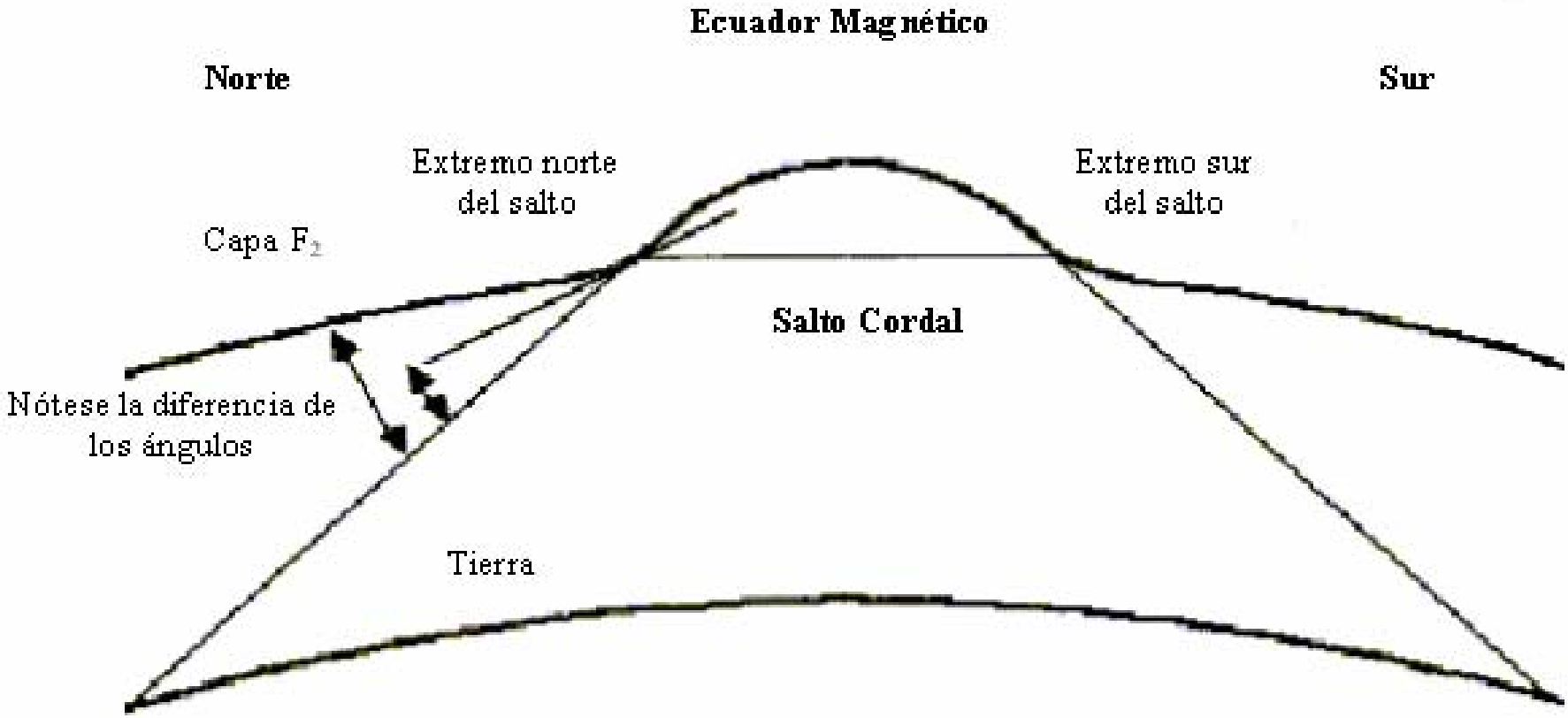

23 de setembro
22 de junho
22 de dezembro
21 de março




Eixo de rotação
da Terra
23°27'
Equador
plano da órbita terrestre
23°27'
Obs. Esta fig. está fora de escala
para uma melhor compreensão

Salto cordal y anomalía ecuatorial



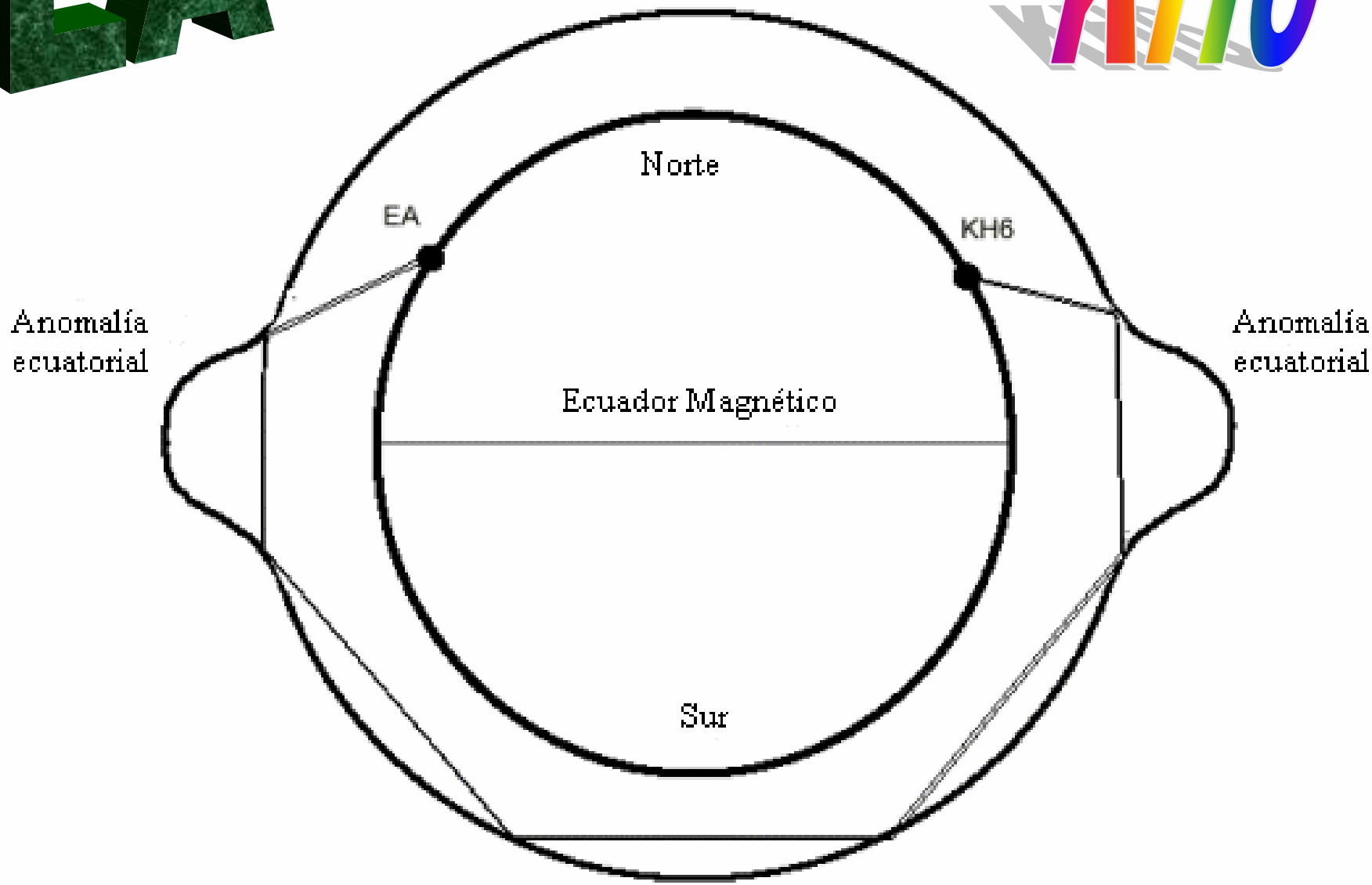


Dibujo: K6MIO/KH6

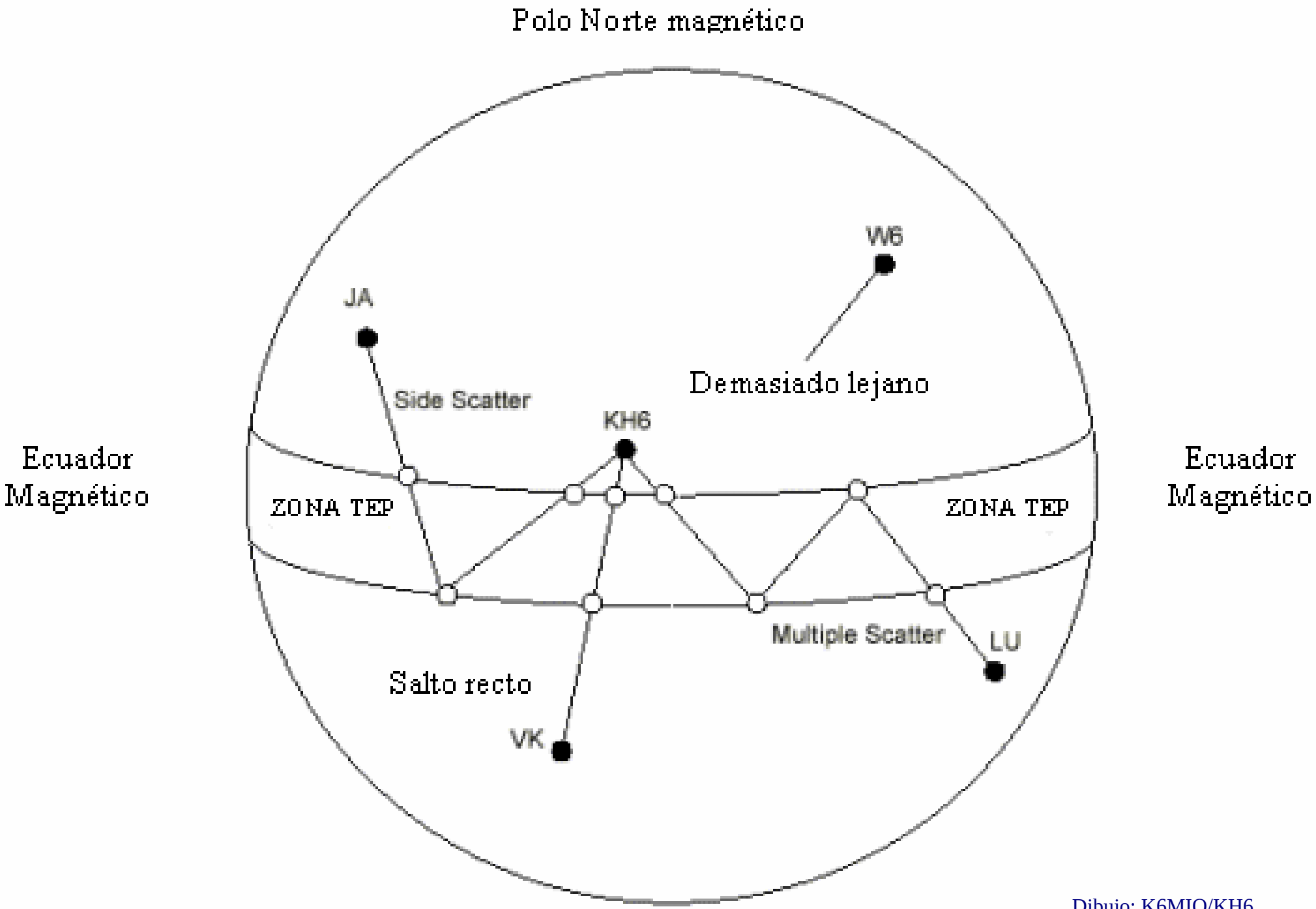
EA

PASO LARGO AYUDADO POR LA TEP

KH6

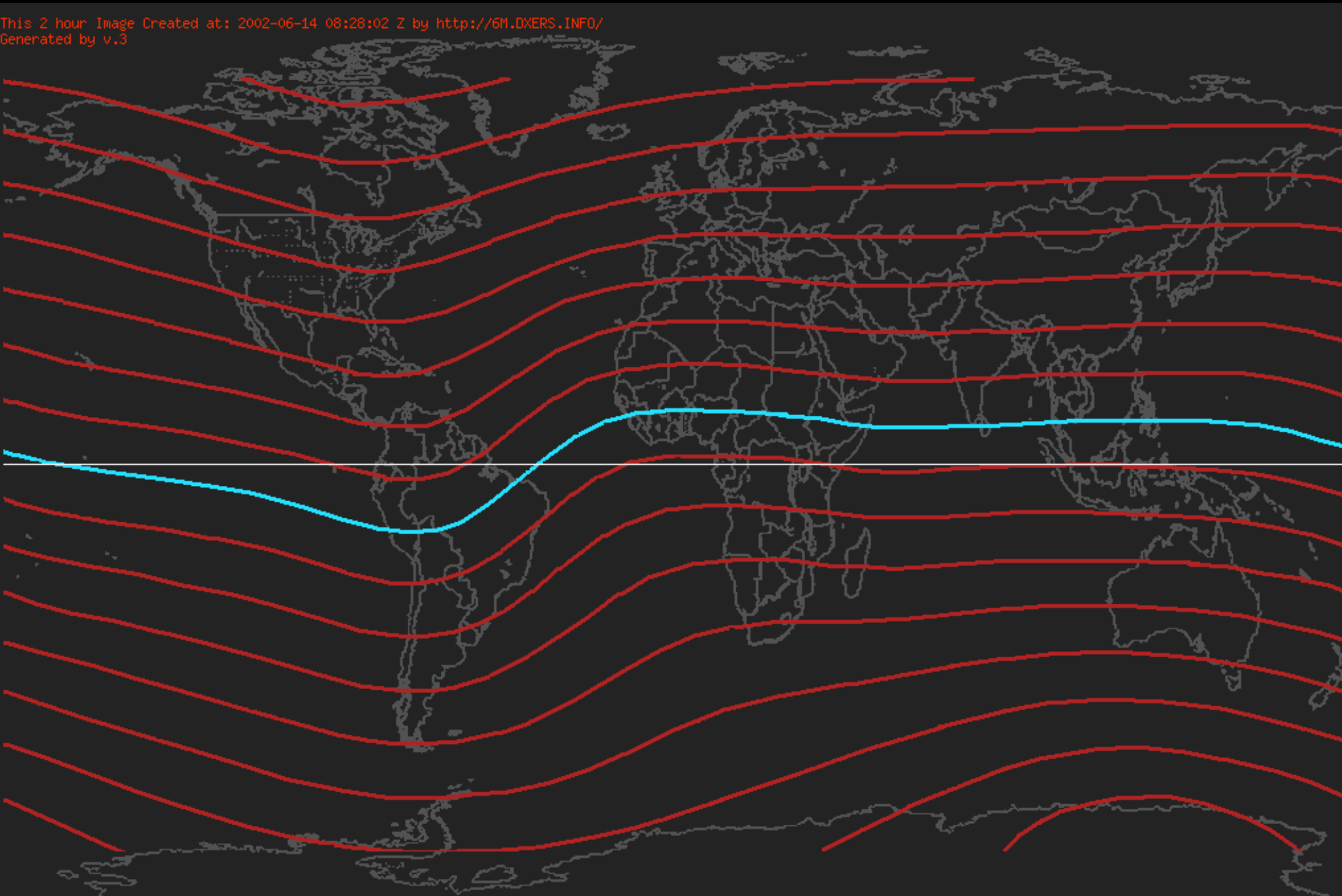


ALGUNAS TRAYECTORIAS TEP

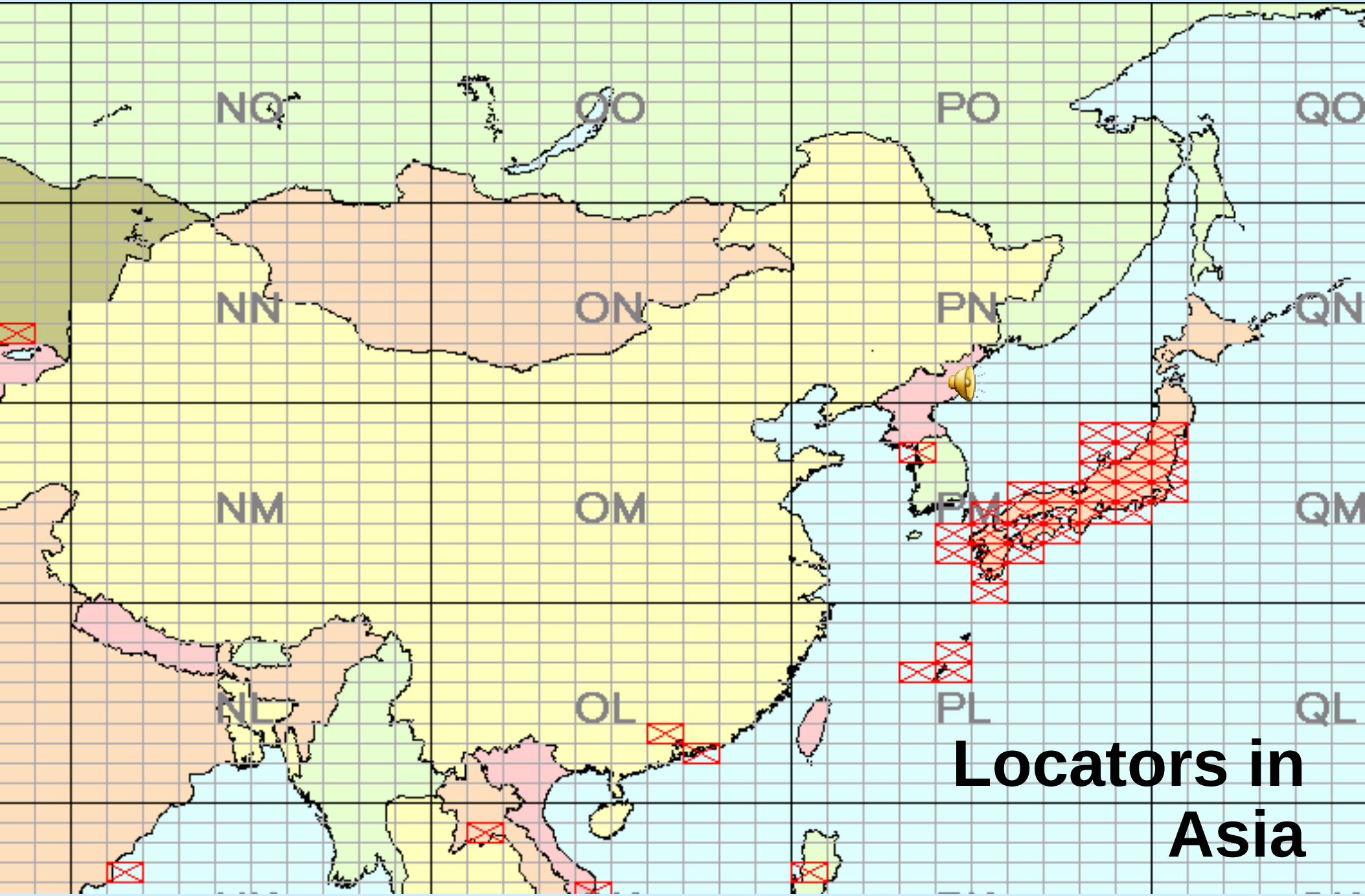


Dibujo: K6MIO/KH6

Magnetic Latitude

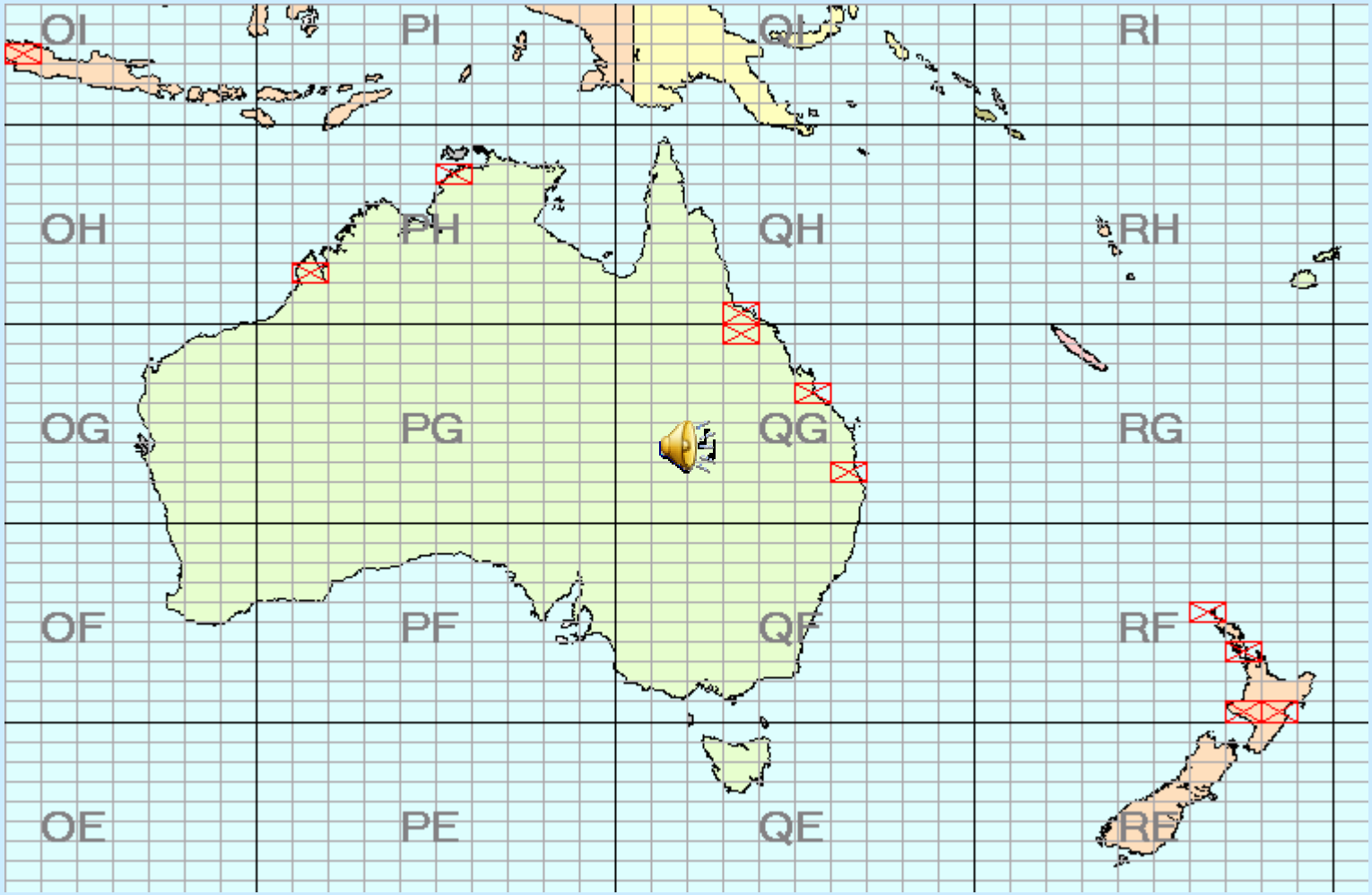


EA7KW

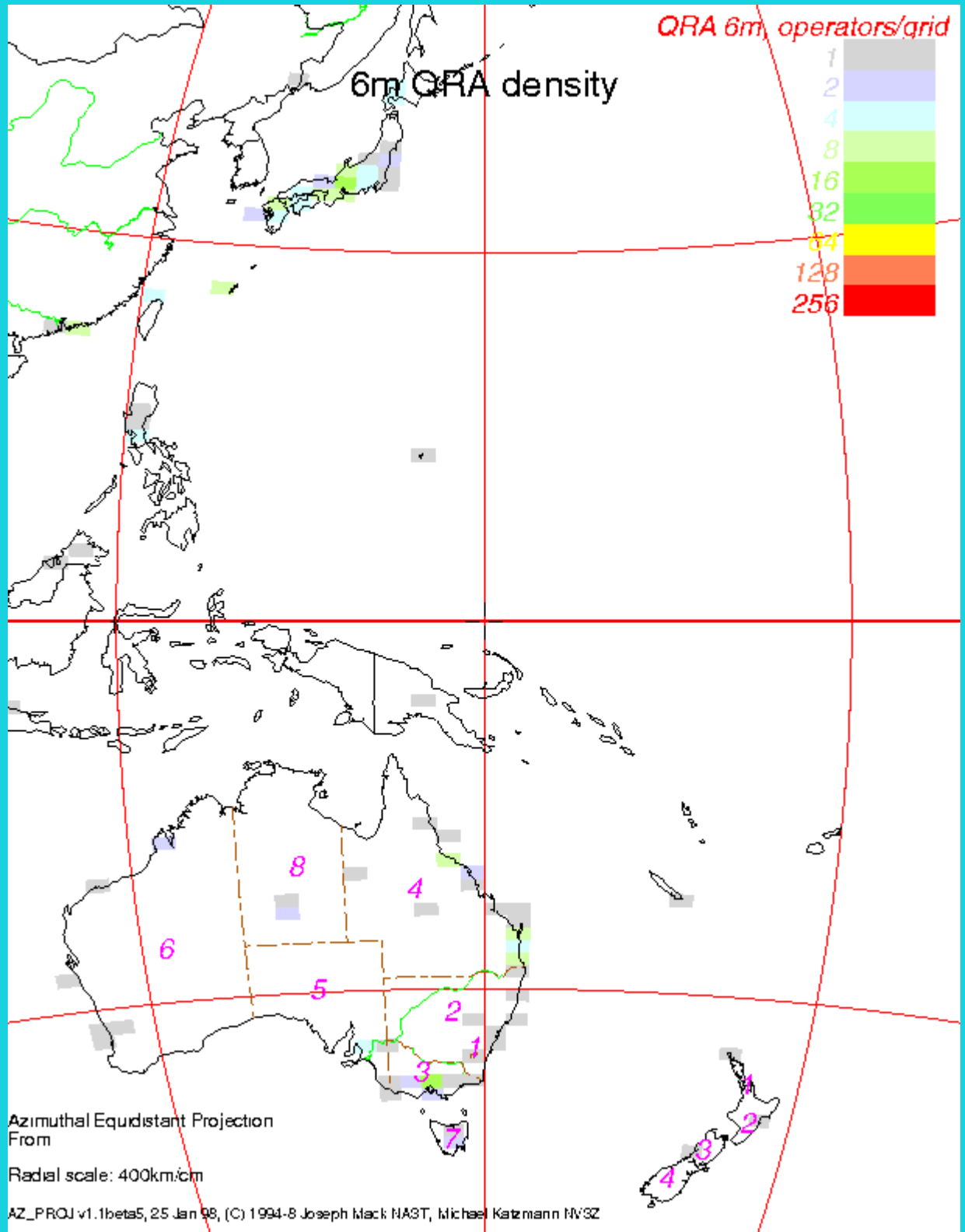


Locators in Asia

Locators in VK/ZL



EH7KW


6m QRA density
QRA 6m, operators/grid
1
2
4
8
16
32
64
128
256
8
4
6
5
2
1
3
7
1
2
3
4
Azimuthal Equidistant Projection
From
Radial scale: 400km/cm
AZ_PROJ v1.1beta5, 25 Jan 98, (C) 1994-8 Joseph Mack NA3T, Michael Katzmann NV3Z

Scatter

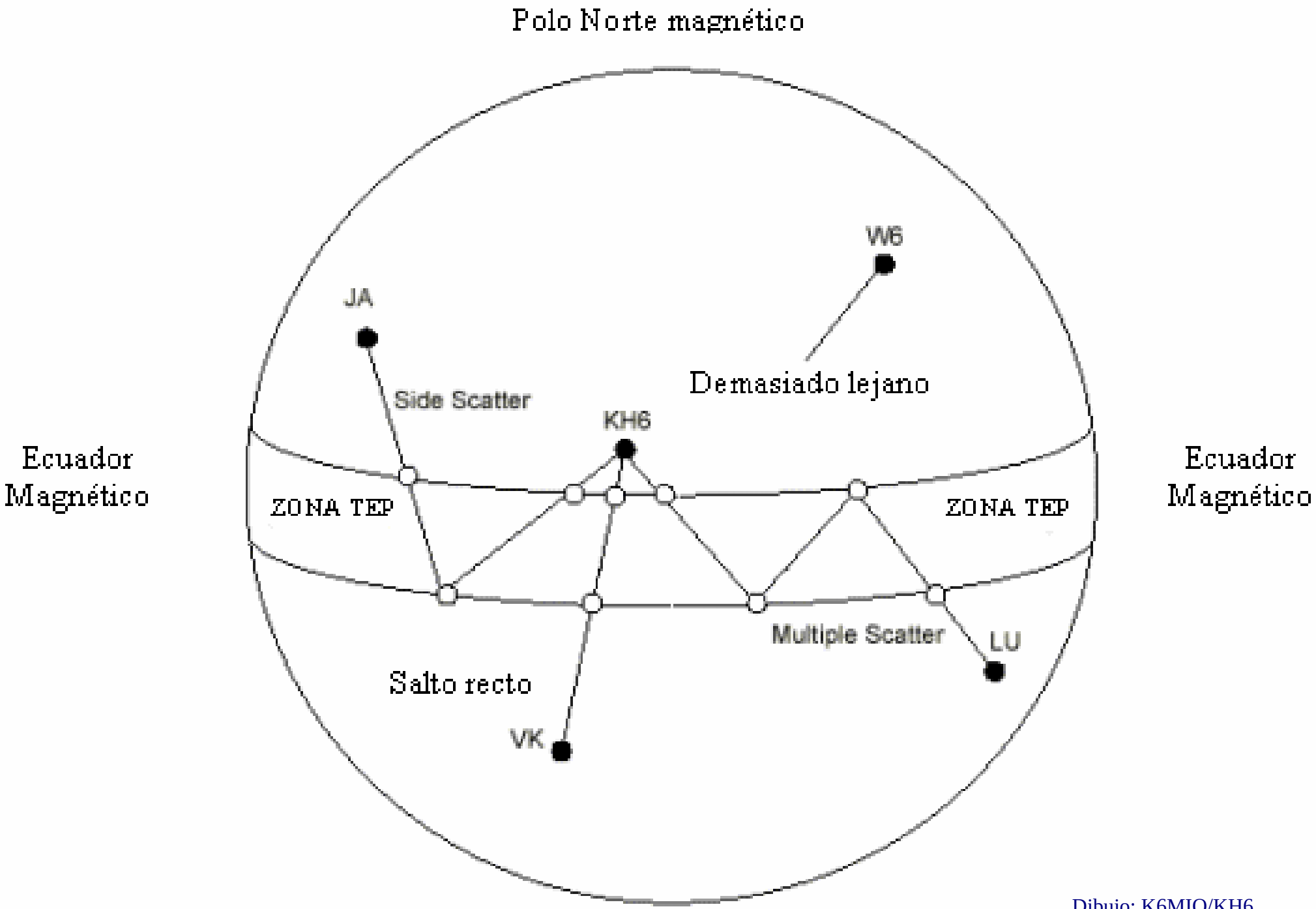
- ✓**Produce una desviación del camino normal de la señal**
- ✓**Principalmente en Es, TE y F2**
- ✓**Se pueden conseguir grandes distancias**
- ✓**Indicadores como el eco propio y las señales de TV**
- ✓**Ocurre a diario en las latitudes TE**
- ✓**Distorsión de la señal en ocasiones por el multi-paso**

K4RX – semiduplex – tono monitor y no eco

K4RX – tono + eco

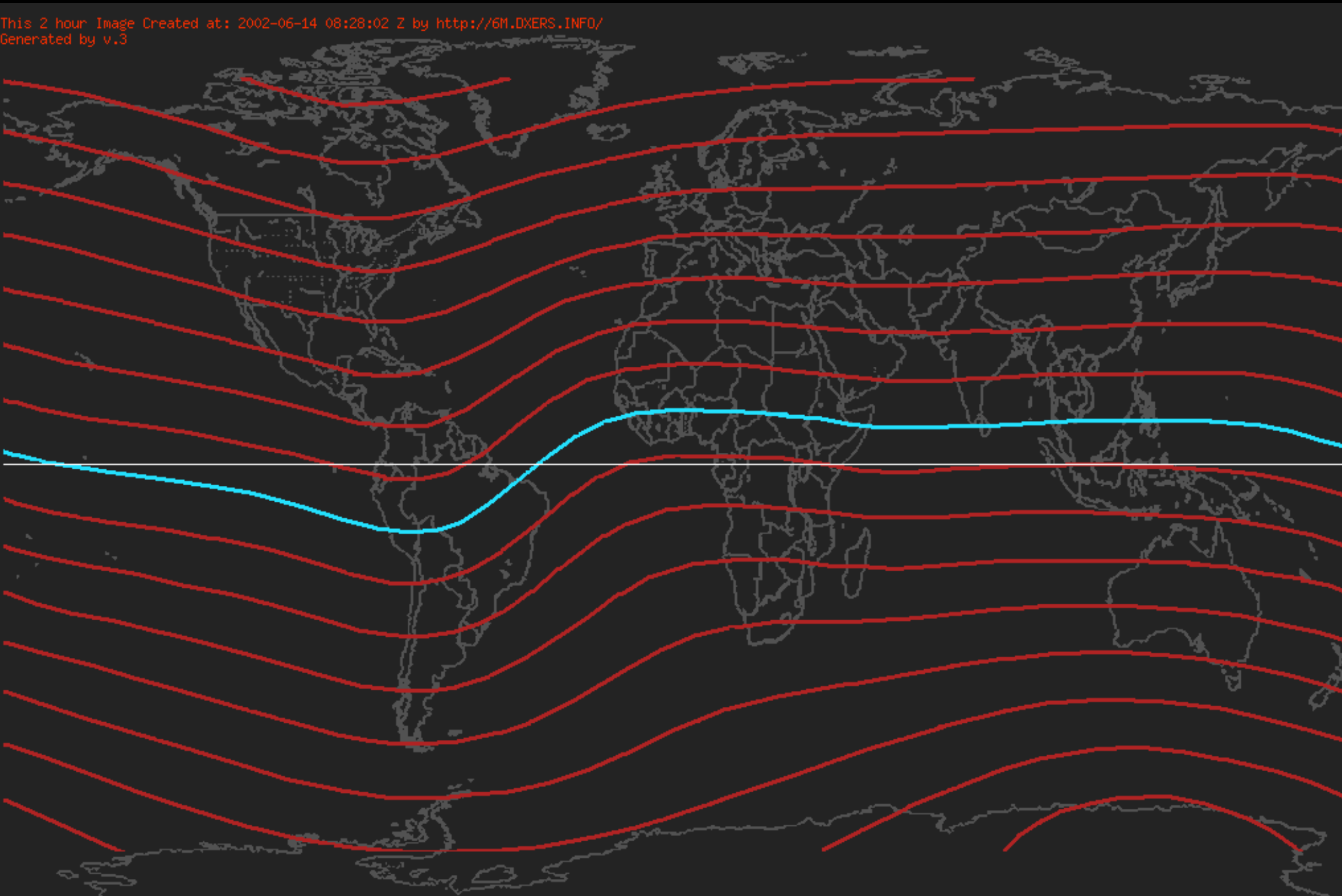
K4RX – ecos qth 160 grados (sin tono)

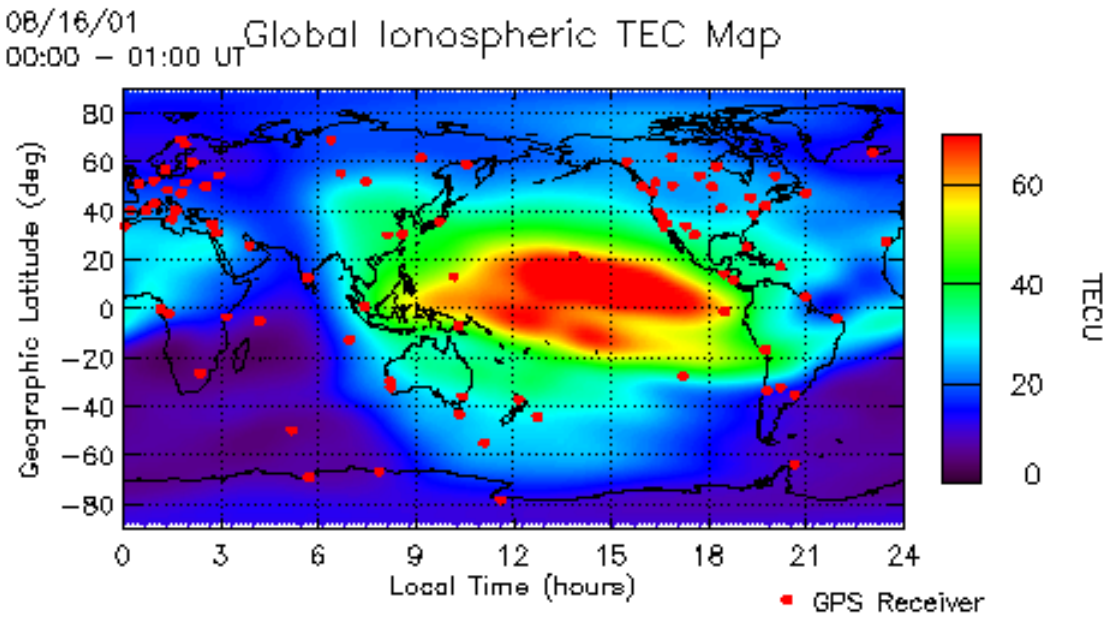
ALGUNAS TRAYECTORIAS TEP

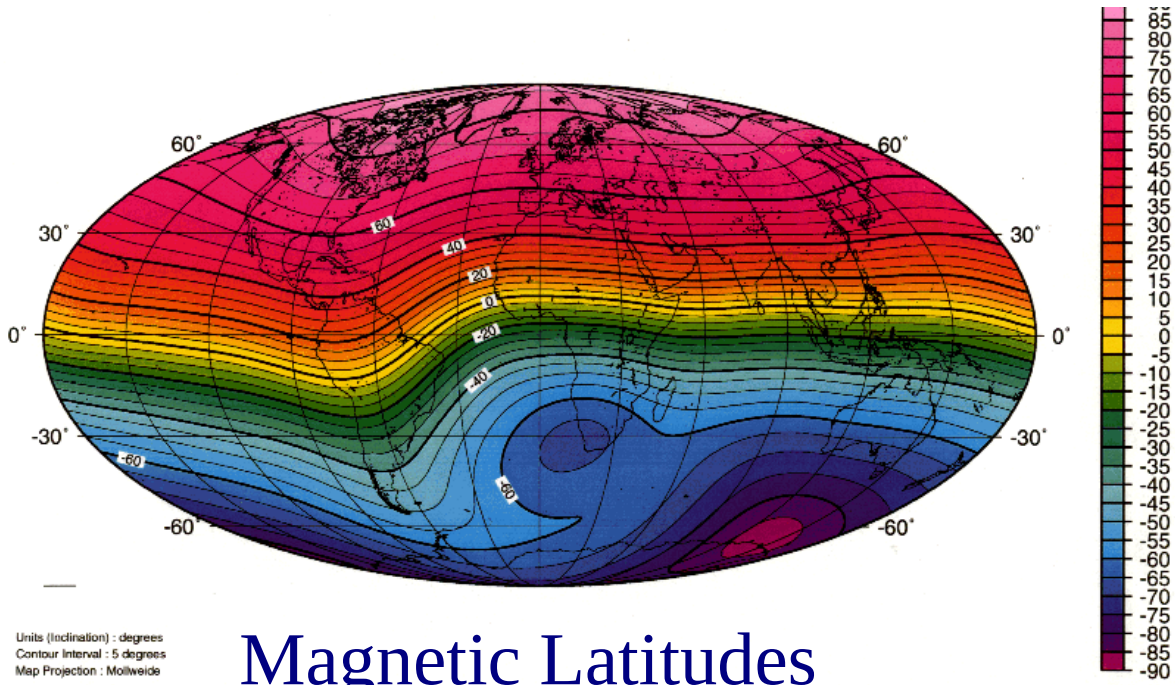


Dibujo: K6MIO/KH6

Latitud Magnética

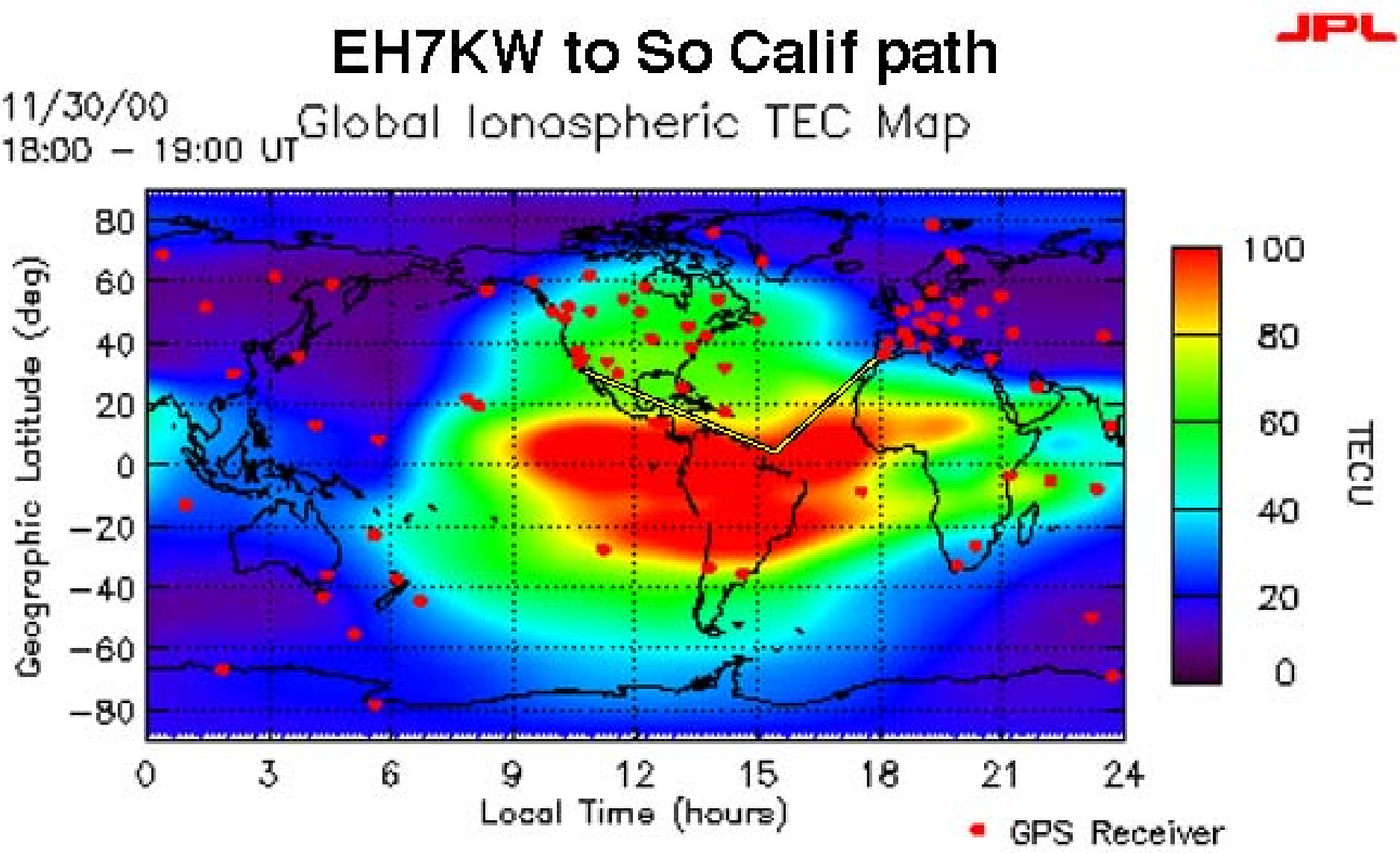






Magnetic Latitudes

California – EA7



N6CA



W7GJ 3.5 lambda



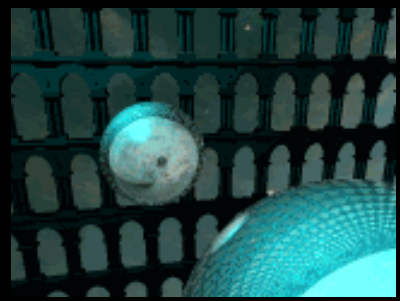
EME

EME

- **4 x Yagi de 3 lambda hechas a medida por m² K6MYC**

- 13 elementos en boom de 20 metros, a 11.2 m. distancia horizontal x 10.66 m. en vertical.

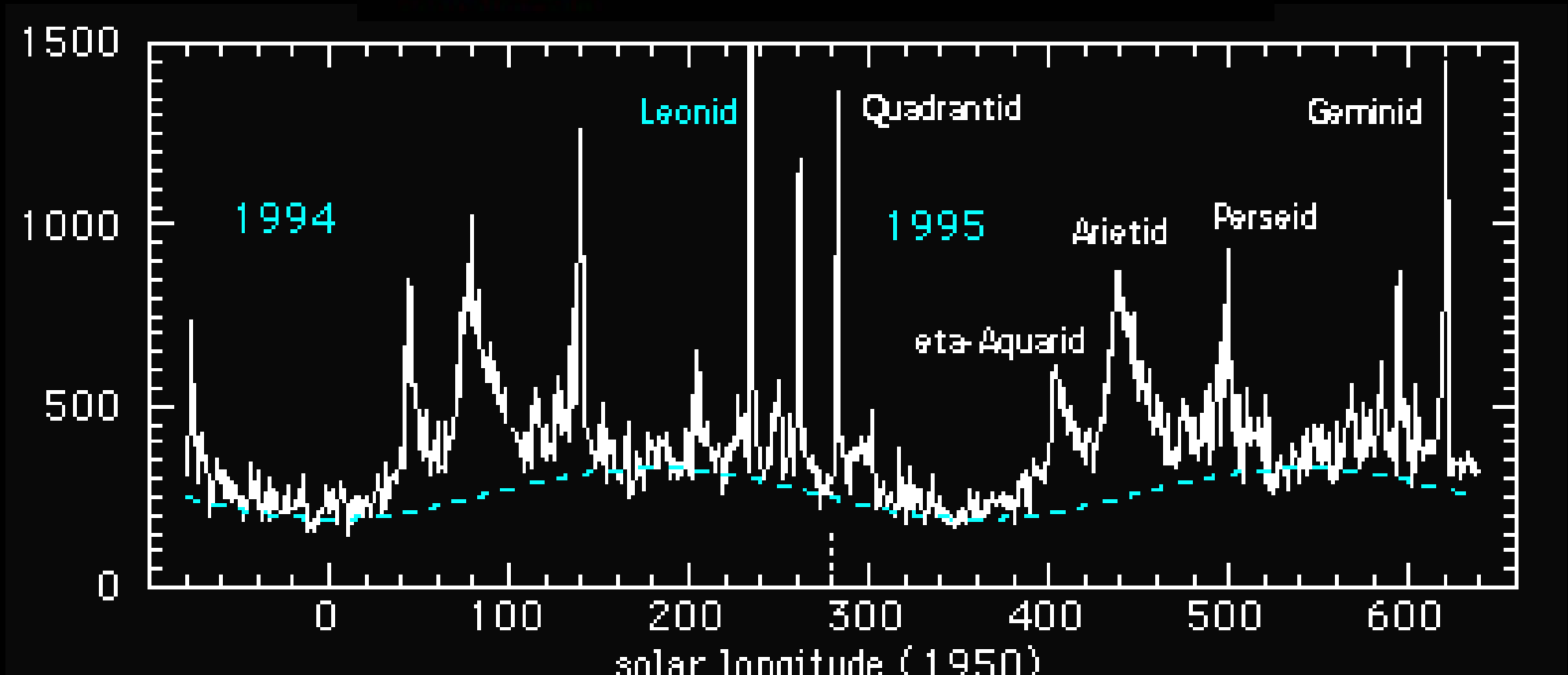
- Ganancia =19.7dbd





Red Mundial Meteor-Scatter

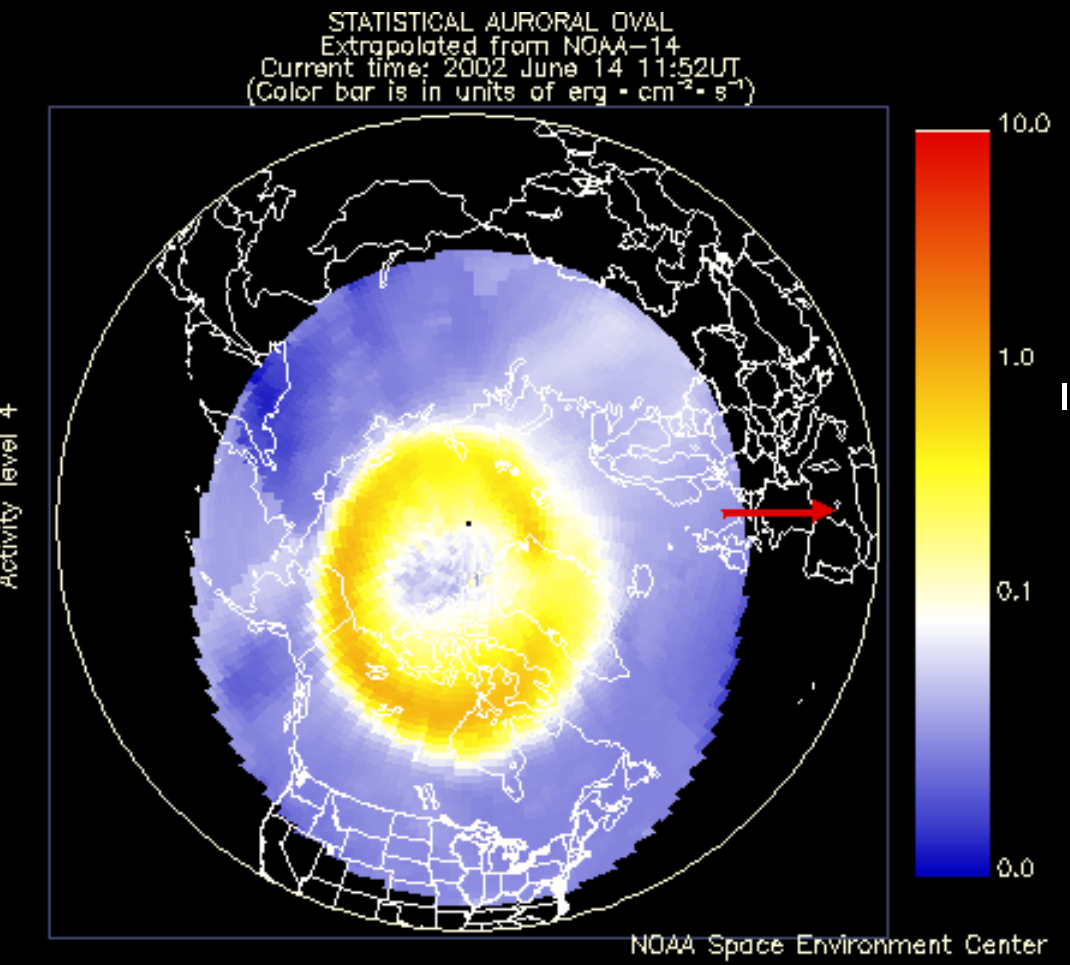


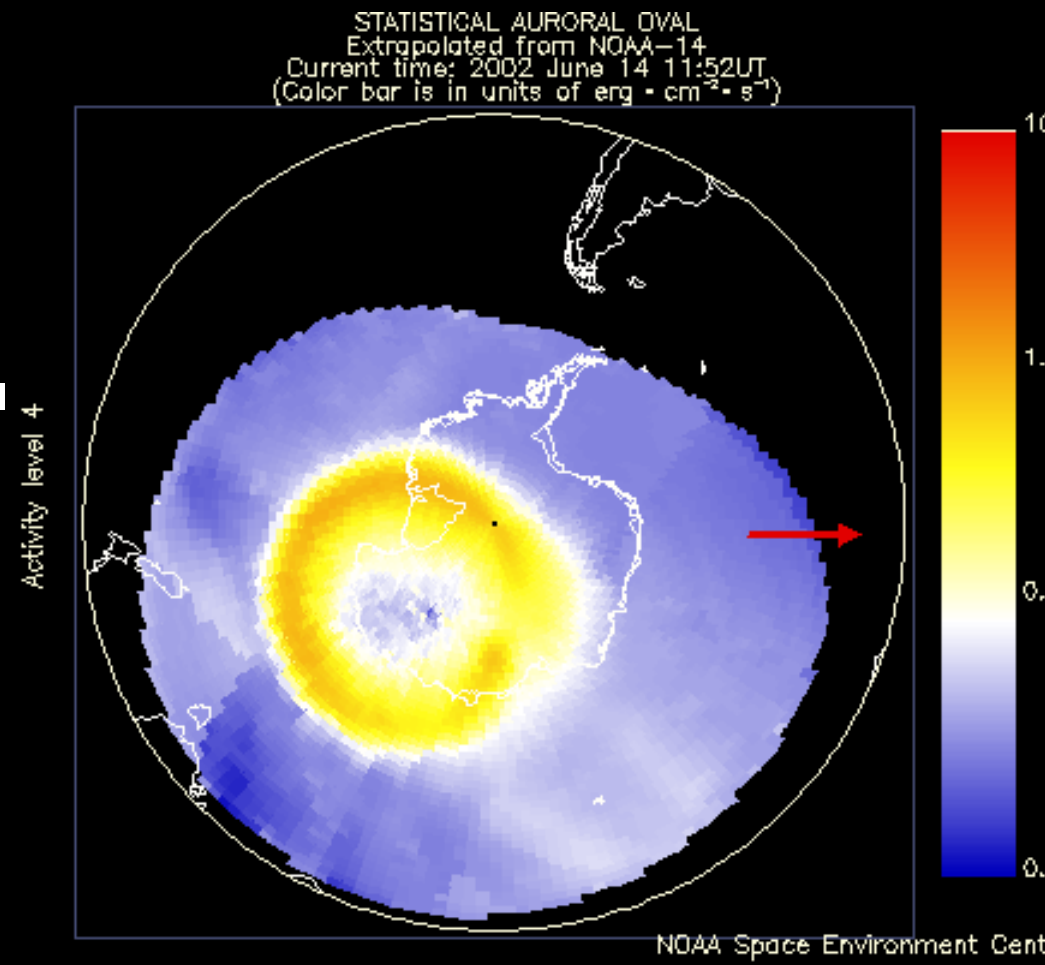


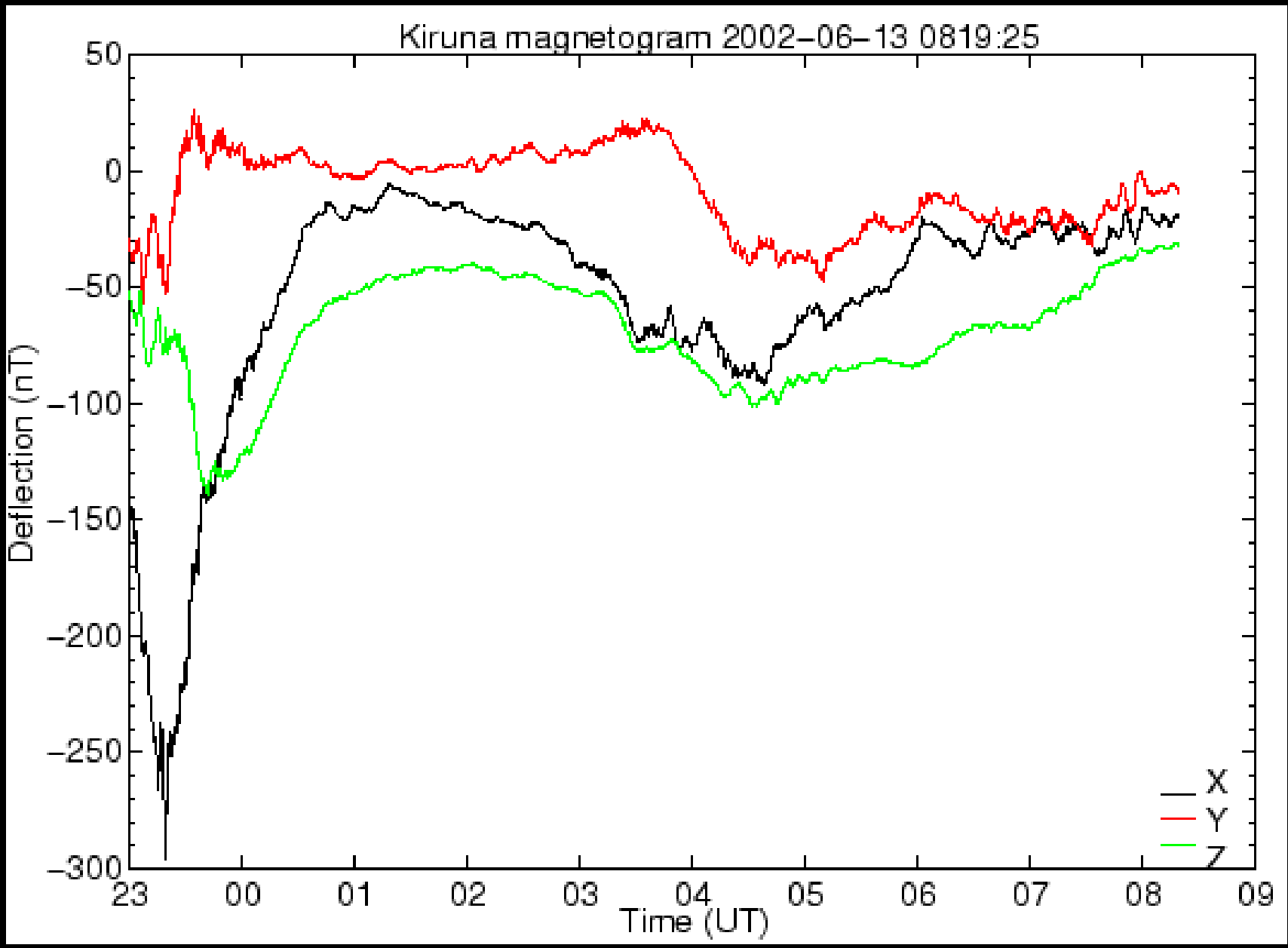
Las luces del Norte

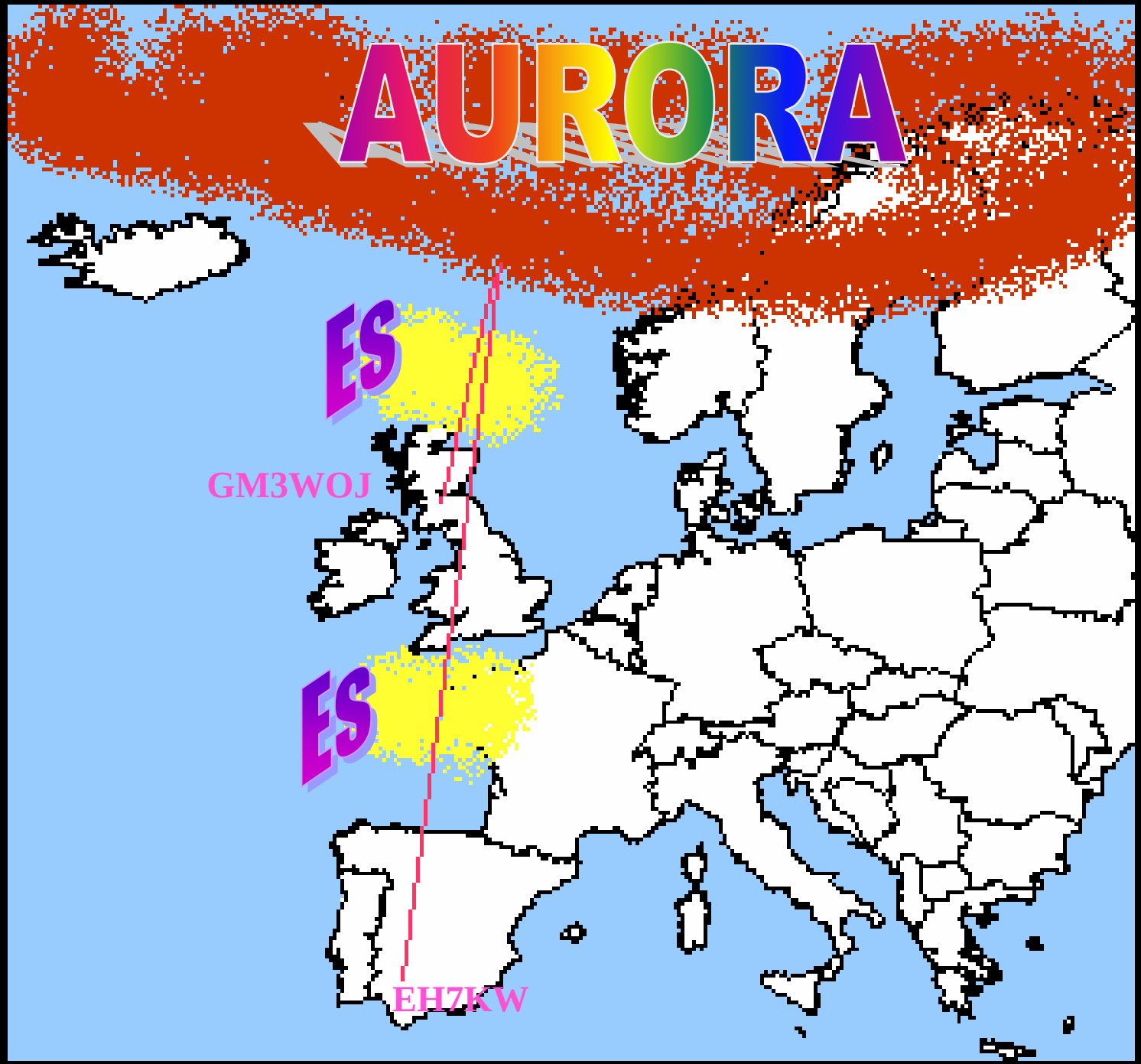


AURORA


STATISTICAL AURORAL OVAL
Extrapolated from NOAA-14
Current time: 2002 June 14 11:52UT
(Color bar is in units of erg • cm⁻² • s⁻¹)
10.0
1.0
0.1
0.0
Activity level 4
NOAA Space Environment Center


STATISTICAL AURORAL OVAL
Extrapolated from NOAA-14
Current time: 2002 June 14 11:52UT
(Color bar is in units of erg • cm⁻² • s⁻¹)
Activity level 4
NOAA Space Environment Cent


Kiruna magnetogram 2002–06–13 0819:25
50
0
−50
−100
−150
−200
−250
−300
Deflection (nT)
23
00
01
02
03
04
05
06
07
08
09
Time (UT)
X
Y
Z


AURORA
ES
GM3WOJ
ES
EH7KW

¿ Se puede predecir la propagación ?

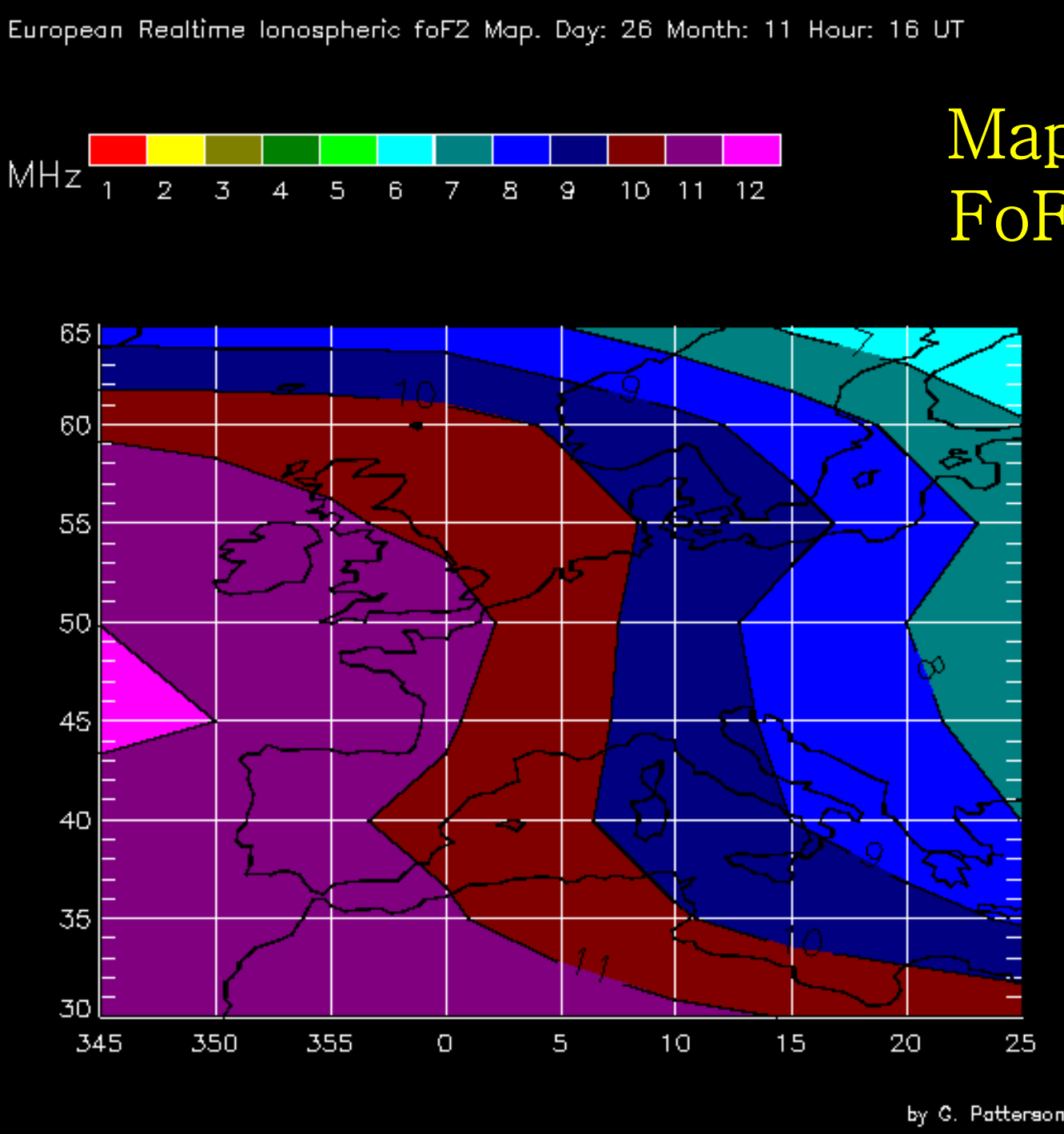
- Indicadores de la MUF
  - Emisoras TV (E2 E3 E4 R1 R2 R3)
  - Emisoras radioMusica ambiental chilena FM
  - Teléfonos, radios comerciales y militares, enlaces
  - Señales en scatter
- DX-Cluster
- 28.885
- Internet
  - Mapas FoF2, MUF, TEC
  - WWV
  - CME
  - Chats: DXWORLD, DXINFO, Wwconvers
  - Balizas
  - Más recursos en internet

QRG	QTH	DXCC	QRA	ERP(KW)	POL	PROG
48.2396	Orebro	SM	JO79	60	h	SVT1
48.2396	Gottelb. Hohe	DL	JN39	100	h	ARD
48.2422	Muro	CT	IN51	40	h	RTP1
48.2461	Gulen	LA	JP20	30	h	NRK1
48.2474	Biedenkopf	DL	JO40	100	h	ARD
48.2487	Varanger	LA	KP59	30	h	NRK1
48.2500	Vannas	SM	JP93	60	h	SVT1
48.2500	Bantiger	HB9	JN36	48	h	DRS1
48.2502	Navacerrada	EA	IN70	250	h	TVE1
48.2528*	Greipstad	LA	JO38	60	h	NRK1
48.2564*	Melhus	LA	JP53	100	h	NRK1
48.2604	Grunten	DL	JN57	100	h	ARD
48.2604*	Steigen	LA	JP77	60	h	NRK1
49.7396	Budapest	HA	JN97	120	h	MTV1
49.7396	Praha	OK	JN79	150	h	NOVA
49.7448	Nagykanizsa	HA	JN86	50	v	MTV1
49.7476	Moskva	UA	KO85	240	h	----
49.750	Poltssamaa	ES	KO28	-R-	h	ETV
49.750	Kunda	ES	KO39	-R-	h	OPT

Música desde Chile

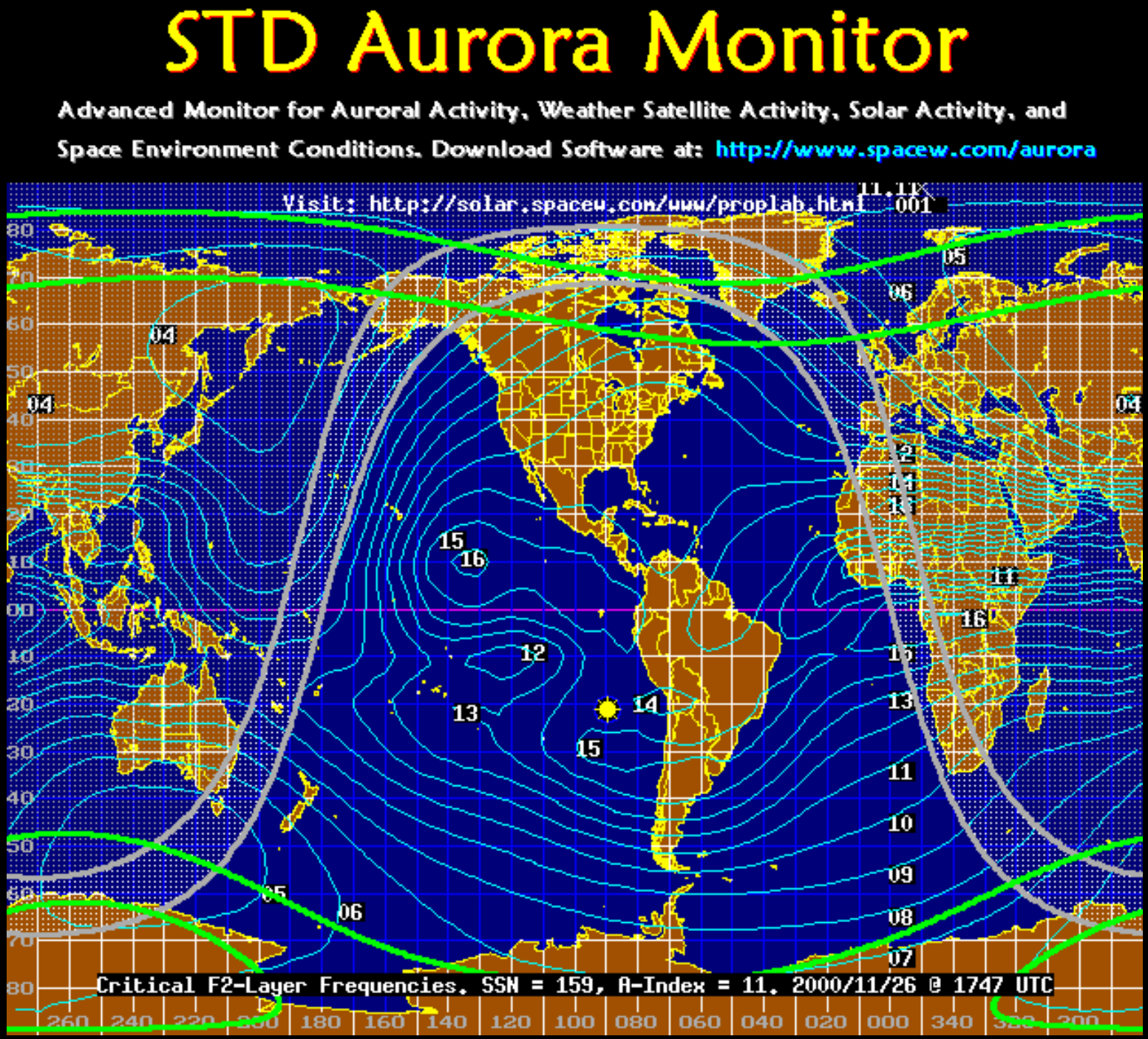
Frecuencia	Señal	Potencia Watts	Localizador	Ciudad
47,4	XQA-230	500	FG57	Calama
47,9	XQA-156	250	FG40	La Serena
47,9	XQB-10	5000	FF46	Santiago
47,9	XQB-72	1000	FF47	Viña del Mar
47,9	XQC-68	1000	FF33	Concepción
47,9	XQC-166	500	FF46	Rancagua
48,3	XQB-155	1000	FF46	Santiago
49,3	XQB-153	1000	FF46	Santiago
72,6	XQA-157A	800	FG42	Copiapó
72,6	XQA-158	100	FG57	Calama
72,6	XQA-229	1000	FH50	Iquique
72,6	XQB-146	3000	FF46	Santiago

http://www.ips.gov.au/asfc/euro_hf/euromap.html



Mapa FoF2

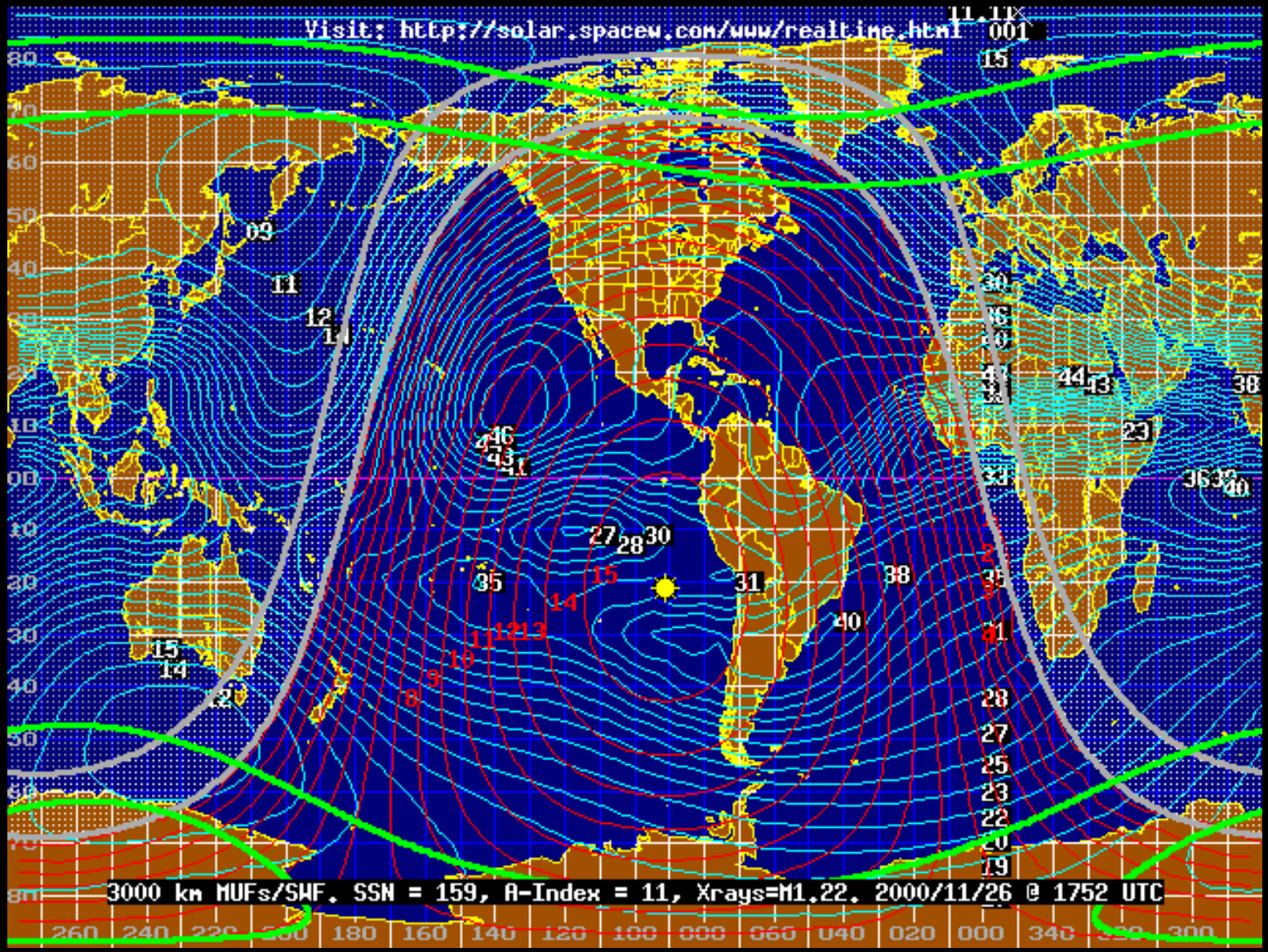
Mapa de FoF2 en tiempo real



Tiempo Real de la MUF mundial

STD Aurora Monitor

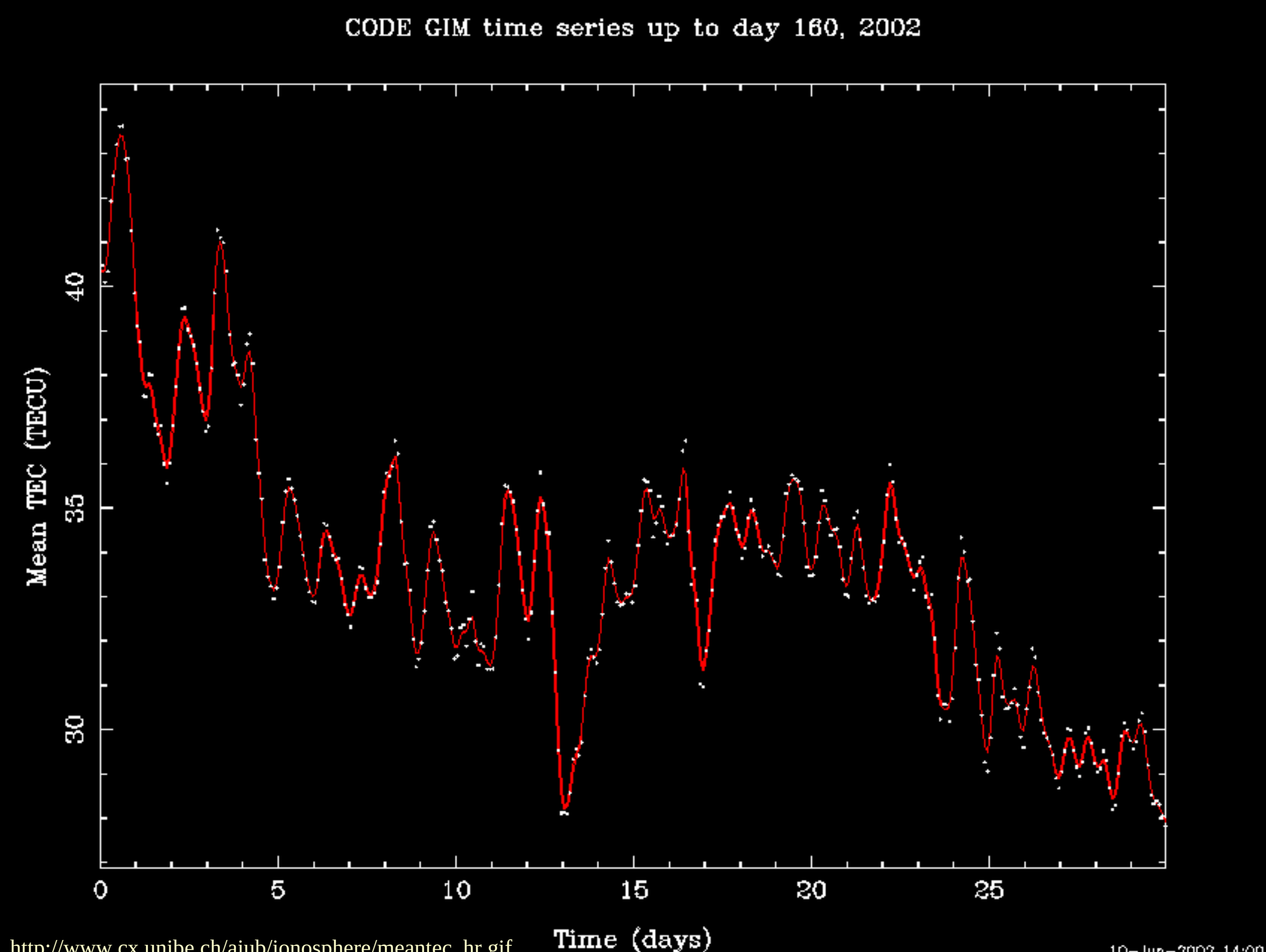
Advanced Monitor for Auroral Activity, Weather Satellite Activity, Solar Activity, and Space Environment Conditions. Download Software at: http://www.spacew.com/aurora



WWV

Fecha	Hora	SFI	A	K	Predicc.	
4-Dec-2000	9	164	14	3	R=186 SA:lo=>lo GF:qu-ac=>qu-un	<JA3QGI>
4-Dec-2000	6	164	14	3	R=186 SA:lo=>lo GF:qu-ac=>qu-un	<JA3QGI>
4-Dec-2000	0	164	14	1	Low,Qt-Act / Low,Qt-Unset	<N4TY-9>
3-Dec-2000	21	164	15	3	R=141 SA:lo=>lo GF:qu-ac=>qu-un	<JA3QGI>
3-Dec-2000	18	167	3	4	R=141 SA:lo=>lo GF:qu-ac=>qu-un	<JA3QGI>
3-Dec-2000	15	167	3	3	R=141 SA:lo=>lo GF:qu-ac=>qu-un	<JA3QGI>
3-Dec-2000	12	167	3	3	R=141 SA:lo=>lo GF:qu-ac=>qu-ac	<JA3QGI>
3-Dec-2000	9	167	3	4	R=141 SA:lo=>lo GF:qu-ac=>qu-ac	<JA3QGI>
3-Dec-2000	3	167	3	1	R=141 SA:lo=>lo GF:qu=>qu	<JA3QGI>
2-Dec-2000	21	167	3	1	R=157 SA:lo=>lo GF:qu=>qu	<JA3QGI>
2-Dec-2000	18	185	4	2	R=157 SA:lo=>lo GF:qu=>qu	<JA3QGI>
2-Dec-2000	15	185	4	2	R=157 SA:lo=>lo GF:qu=>qu	<JA3QGI>
2-Dec-2000	12	185	4	2	R=157 SA:lo=>lo-mo GF:qu=>qu-un	<JA3QGI>
2-Dec-2000	9	185	4	0	low-moderate, quiet-unsettled	<VK2ISA>
2-Dec-2000	0	185	4	0	R=191 SA:lo=>lo-mo GF:qu=>qu-un	<JA3QGI>
1-Dec-2000	21	192	5	2	low-moderate, quiet	<VK2ISA>
1-Dec-2000	18	192	5	2	MODERATE/QUIET;LOW-MODERATE/QUIET	<K3SKE
1-Dec-2000	15	192	5	2	R=191 SA:mo=>lo-mo GF:qu=>qu	<JA3QGI>
1-Dec-2000	12	192	5	2	R=191 SA:mo=>mo GF:qu=>qu-un	<JA3QGI>
1-Dec-2000	9	192	5	0	R=191 SA:mo=>mo GF:qu=>qu-un	<JA3QGI>

EA7KW de EA7URS-5 4-Dec 1136Z >


CODE GIM time series up to day 160, 2002
Mean TEC (TECU)
30
35
40
0
5
10
15
20
25
Time (days)
http://www.cx.unibe.ch/aiub/ionosphere/meantec_hr.gif
10-Jun-2002 14:00

50 Mhz PROPAGATION LOGGER! - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda | Dirección http://dxworld.com/50prop.html | Ir

Atrás Adelante Detener Actualizar Inicio Búsqueda Favoritos Historial Correo Imprimir | Vínculos 3-da

50 Mhz Propagation Logger ©

Page List: - An interactive Webpage for 50 Mhz reports! - Look Back!

Date	utc	Message	Server
Dec04	07:49	**V73AT: 0750 I make short CQ in you direction de SP6GWB JO80**	(pa249.walbrzyc
Dec04	07:43	**Rgr, I will keep sending and hope from propagation DE V73AT**	(ns3.kwajalein.
Dec04	07:32	**V73AT: grg not bad, but nothing heard de SP6GWB**	(pa249.walbrzych.cvx.ppp.tp
Dec04	07:05	**I am CQ CW 50.090, Let me know if this is good freq DE V73AT**	(ns3.kwajalein
Dec04	06:24	**V73AT: what is your cq grg yet ? de sp6gwb**	(pa207.walbrzych.cvx.ppp.tpnet.p
Dec04	06:02	**Worked 15 States and 3 VE Prov DE V73AT**	(ns3.kwajalein.com)
Dec04	05:53	**A copy of my Log for todays NA American Opening at http://www.sixmeters.com/six001203.htm DE V73A**	
Dec04	05:52	**A copy of my Log for todays NA American Opening at http://www.sixmeters.com/six001203.htm**	
Dec04	02:02	**Mike: quick, send your wishlist. Santa is QRV**	(nanldl2.dial.uniserve.ca)
Dec04	01:59	**now cw, aimed at North Pole...de ve9aa...who?**	(wc2-int2.nbnet.nb.ca)
Dec04	01:47	**Just hrd SSB on 110 beaming over the north pole! (perhaps py5cc off the back?) gone now, de ve9aa**	
Dec04	01:41	**DE KC6WFS DM04 ON 50.290 PSK31**	(adsl-64-165-225-125.dsl.lsan03.pacbell.net)
Dec04	01:33	**Send some of it south! de K7JA DM03**	(pool003l.cvx3-bradley.dialup.earthlink
Dec04	01:27	**DU1/GM4COK now CQ and QSX 50.130 beaming USA**	(cisco8-s2.pacific.net.sg)
Dec04	01:11	**JE1RXJ .120 up es dwn -WX7R CN85**	(pm3-02-18.sle.du.teleport.com)
Dec04	01:10	**VE7VDX/CN89 is calling JR2HCB on 50.082. no copy here. DE VE7DXG/CN88**	(nanl
Dec04	01:09	**50 MHz info STOP PRESS page just updated at; http://www.qsl.net/oz6om/**	(fe0
Dec04	01:03	**KB7WW qsy .082**	(ptlddslgw5poolb86.ptld.uswest.net)
Dec04	01:00	**KB7WW 50.1106 de JR2HCB**	(nat40.aitai.ne.jp)
Dec04	00:59	**JA1PJU thank you for your Asia DX spots de N0YY/2 CN84**	(mmpoe0003.leh.cen

IARU 50 MHz Beacons (November 2001)

http://www.amateurbeacon.co.uk/IARU%2050%20MHz%20beacons.htm

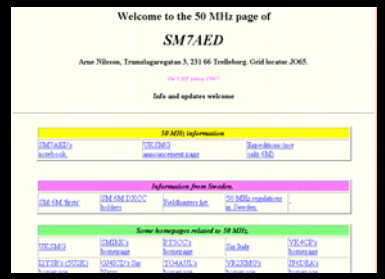
Freq	Call	Location	Locator	ASL	Antenna	Beam	Power	Keeper	Status	Date	Reporter
50.000	GB3BUX	Buxton, Derbyshire	IO93BF	457	Turnstile	Omni	20	G4IHO		08/01	ON4ANT
50.000	9A1CAL		JN86							08/01	GM0BQM
50.003	7Q7SIX		KH75MG							06/01	GI6ATZ
50.004	IOJX		JN61HV							06/01	GI6ATZ
50.005	9M2TO									11/01	JE2XBY
50.006	PY0FF									11/01	PP1CZ
50.006	EH7AH		IM67OG								
50.008	VE8SIX	Inuvik NWT	CP38		Double Bay	0°/180°	80			06/99	VE2PIJ
50.008	*HI0VHF*		FK58								
50.008	*XE2HWB/B*	La Paz Baja	DL44		6 el Yagi	0°	5				
50.0095	PY2SFY		GG77GA		5/8 Vert	Omni	5			05/01	PY2LED
50.010	SV9SIX	Iraklio	KM25NH		Vertical dipole	Omni	30			05/01	DL3LFA
50.010	*JA2IGY*	Mie	PM84JK		5/8 G/Plane	Omni	10				
50.012	OX3SIX		HP15		Dipole		100			11/01	EA7GTF



http://www.ngdc.noaa.gov/stp/IONO/ionohome.html



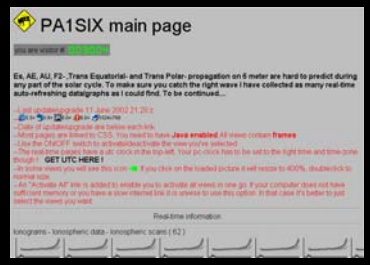
http://www.conknet.com/~b_mobile/



http://www.algonet.se/~sm7aed/



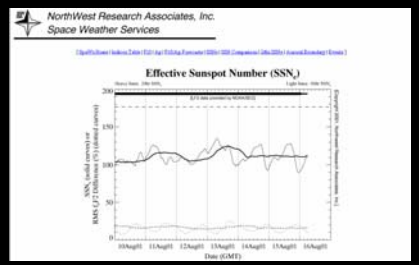
http://www.qsl.net/dk5ya/



http://home.planet.nl/~pa1six/pa1six.htm



http://smsdx.net/



http://www.nwra-az.com/spawx/ssne24.html



http://www.uksmg.org/



http://www.50mhz.com/



http://www.qsl.net/wa5iyx/



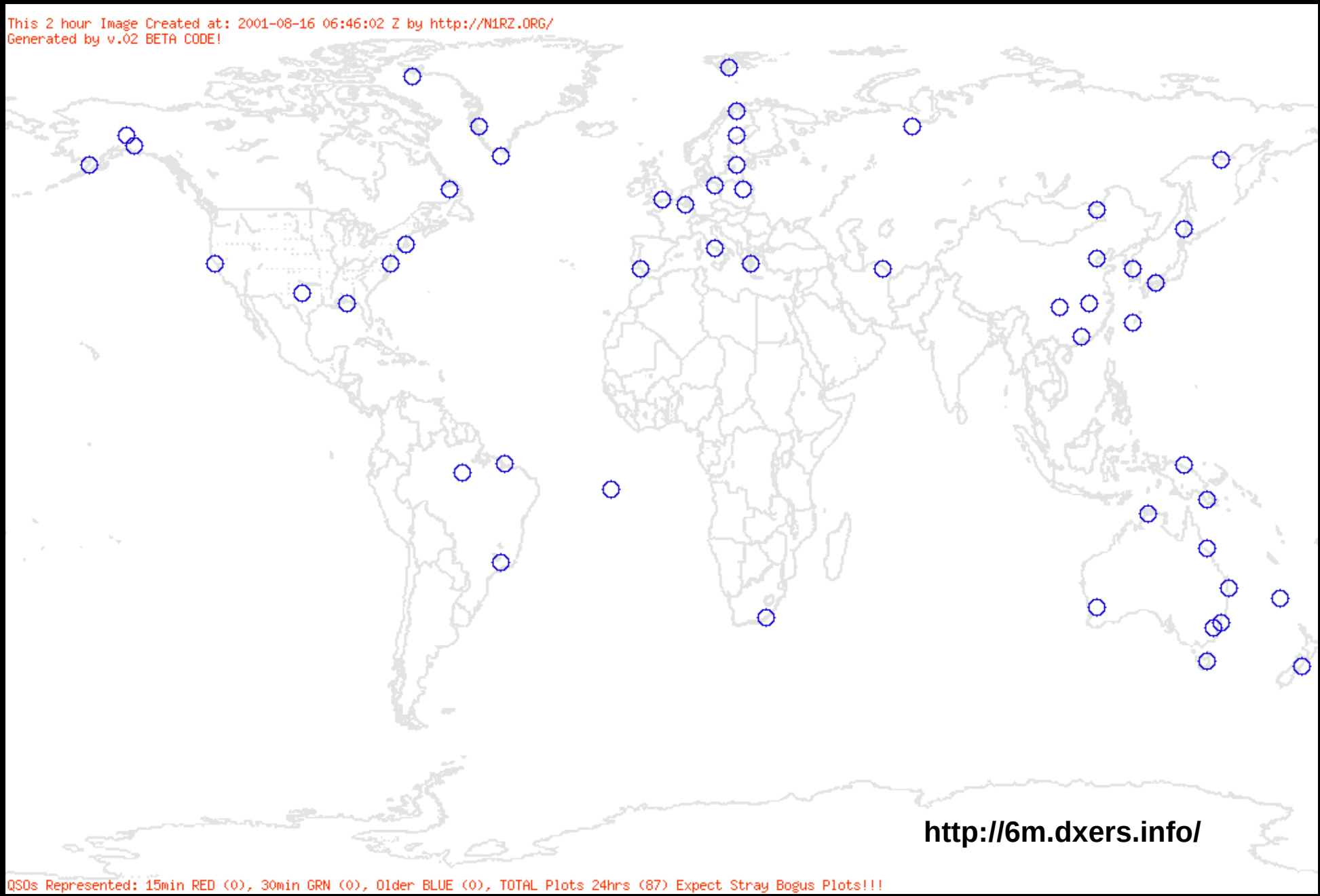
http://www.smirk.org/



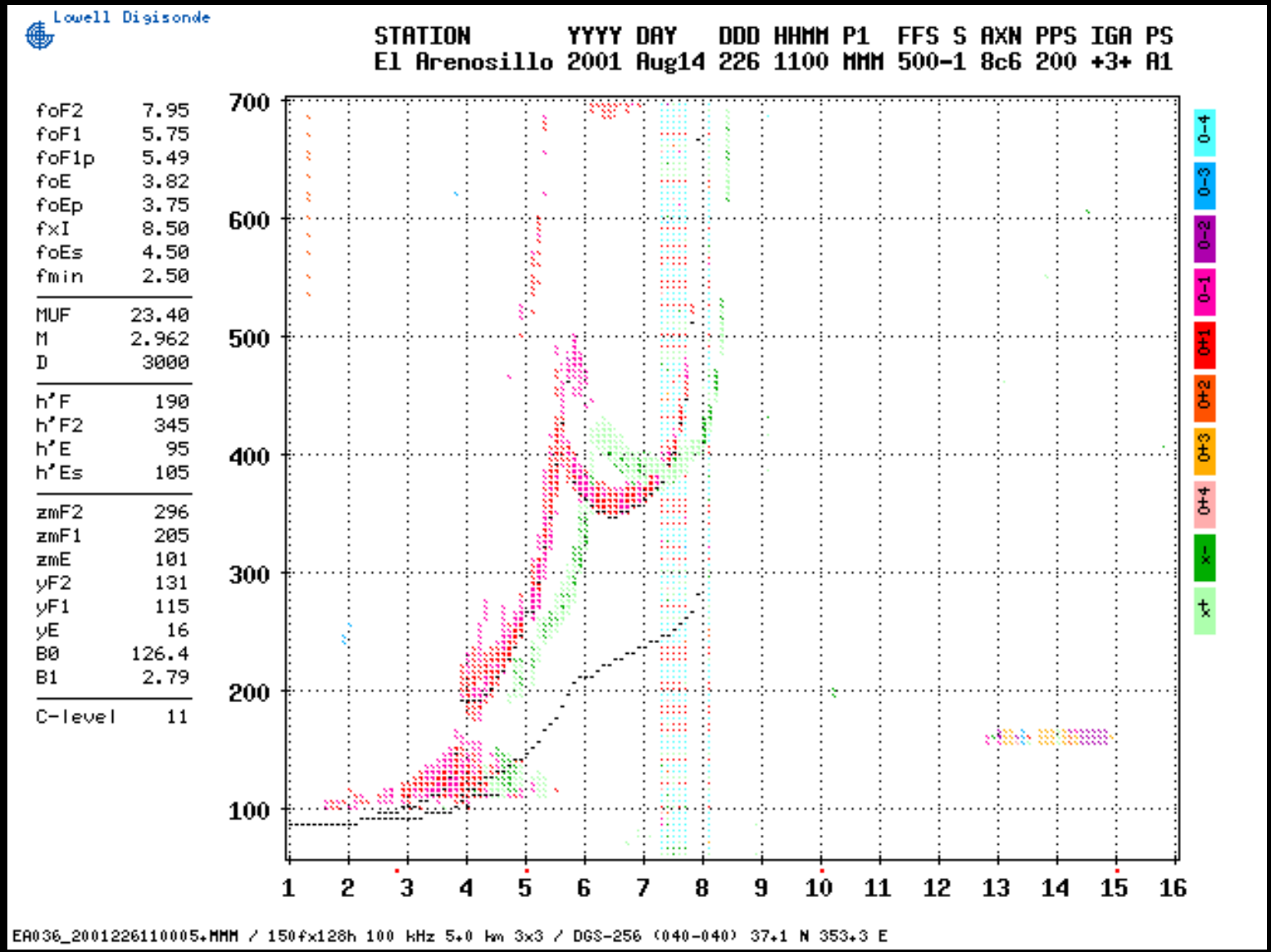
http://www.qsl.net/ea6vq

Recursos en la Red

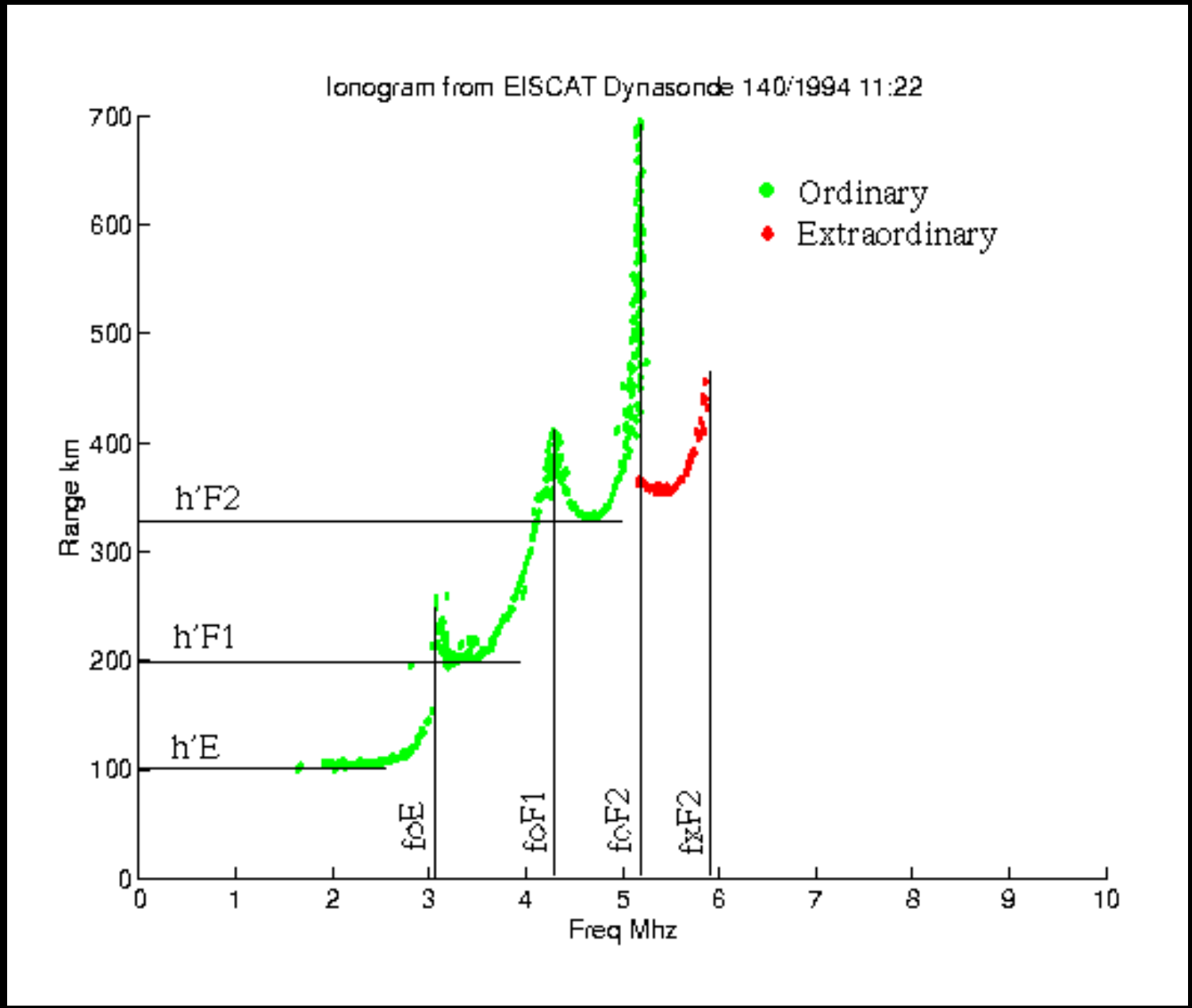
Ionosondas


This 2 hour Image Created at: 2001-08-16 06:46:02 Z by http://N1RZ.ORG/
Generated by v.02 BETA CODE!
http://6m.dxers.info/
QSOs Represented: 15min RED (0), 30min GRN (0), Older BLUE (0), TOTAL Plots 24hrs (87) Expect Stray Bogus Plots!!!

Ionosonda del INTA El Arenosillo, Huelva (IM67)



Ionogramas

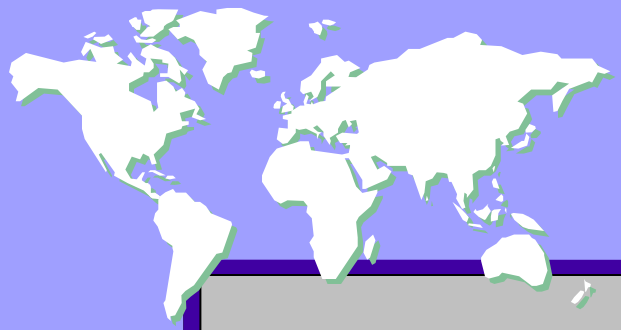

Ionogram from EISCAT Dynasonde 140/1994 11:22
Ordinary
Extraordinary
Range km
Freq Mhz
h'F2
h'F1
h'E
foE
foF1
foF2
fxF2
0
100
200
300
400
500
600
700
0
1
2
3
4
5
6
7
8
9
10

RECOMENDACIONES y PRACTICA INTERNACIONAL



- **Respeta al plan de banda**
- **Evita QSOs continentales en la ventana de DX 50.100-50130**
- **Aprende a escuchar**
- **50110: como frecuencia internacional de llamada**
- **No llames si no oyes al DX**
- **No repitas el DX. Da una oportunidad a otros**

Un poco de estadísticas

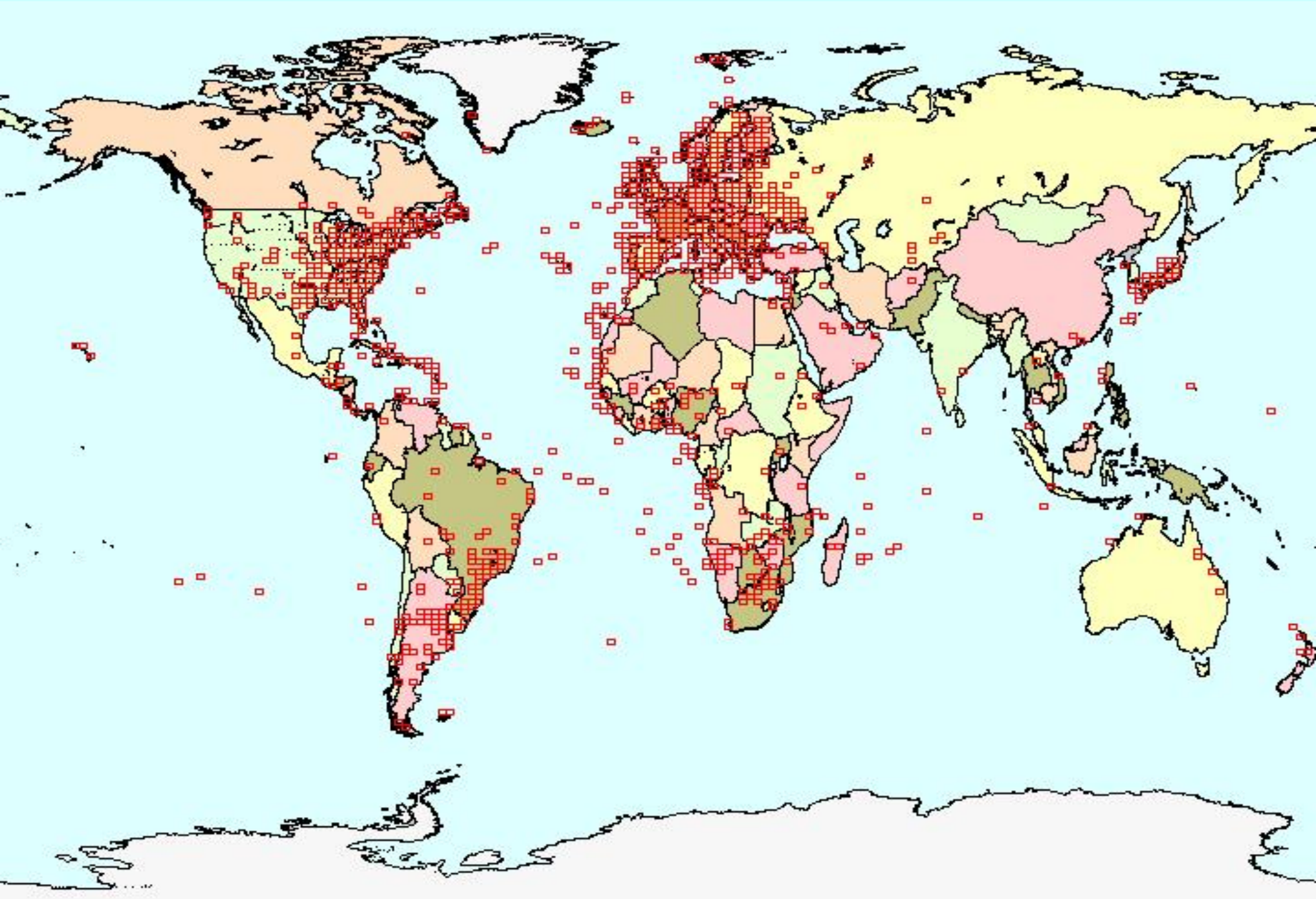


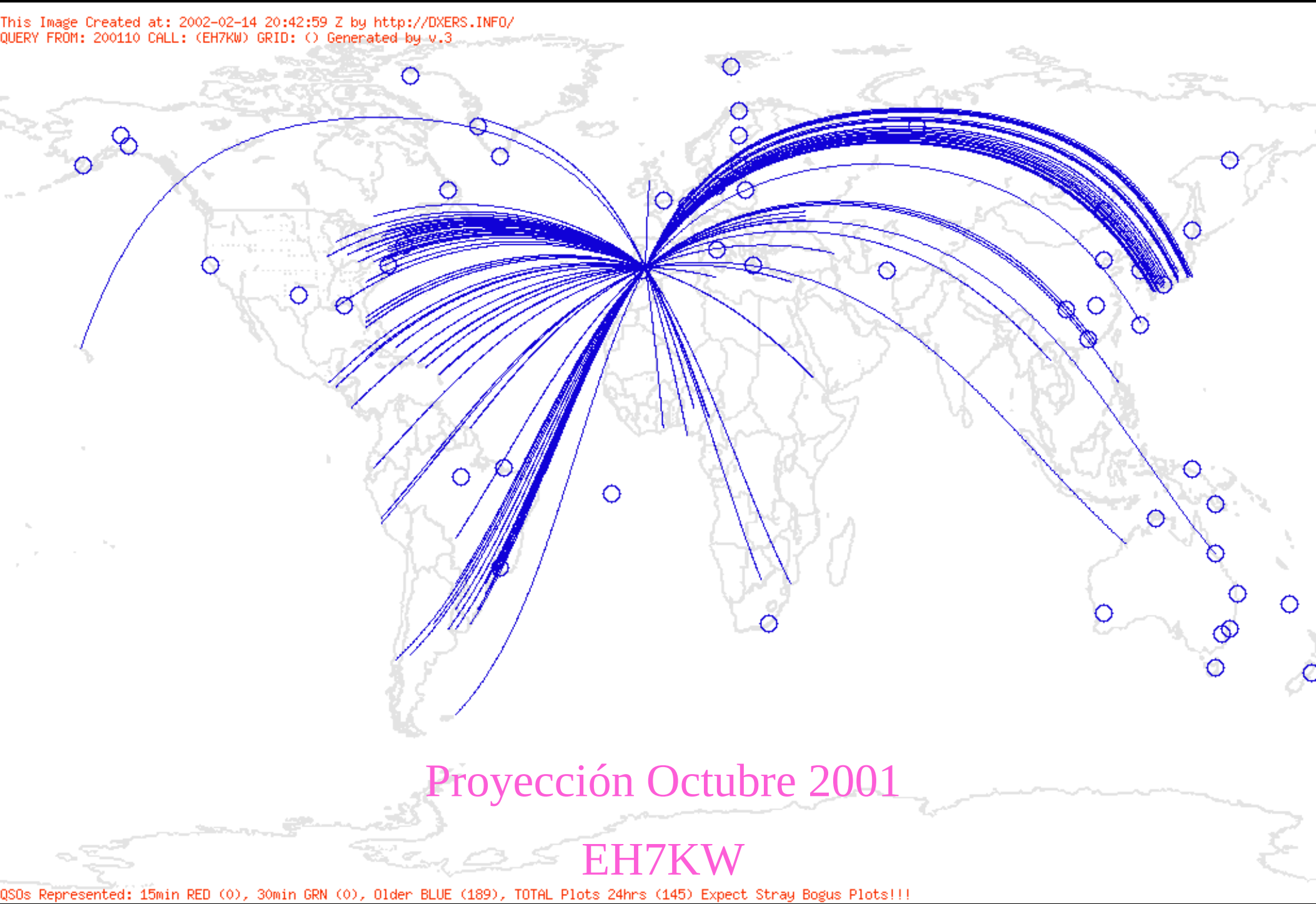
EA7KW

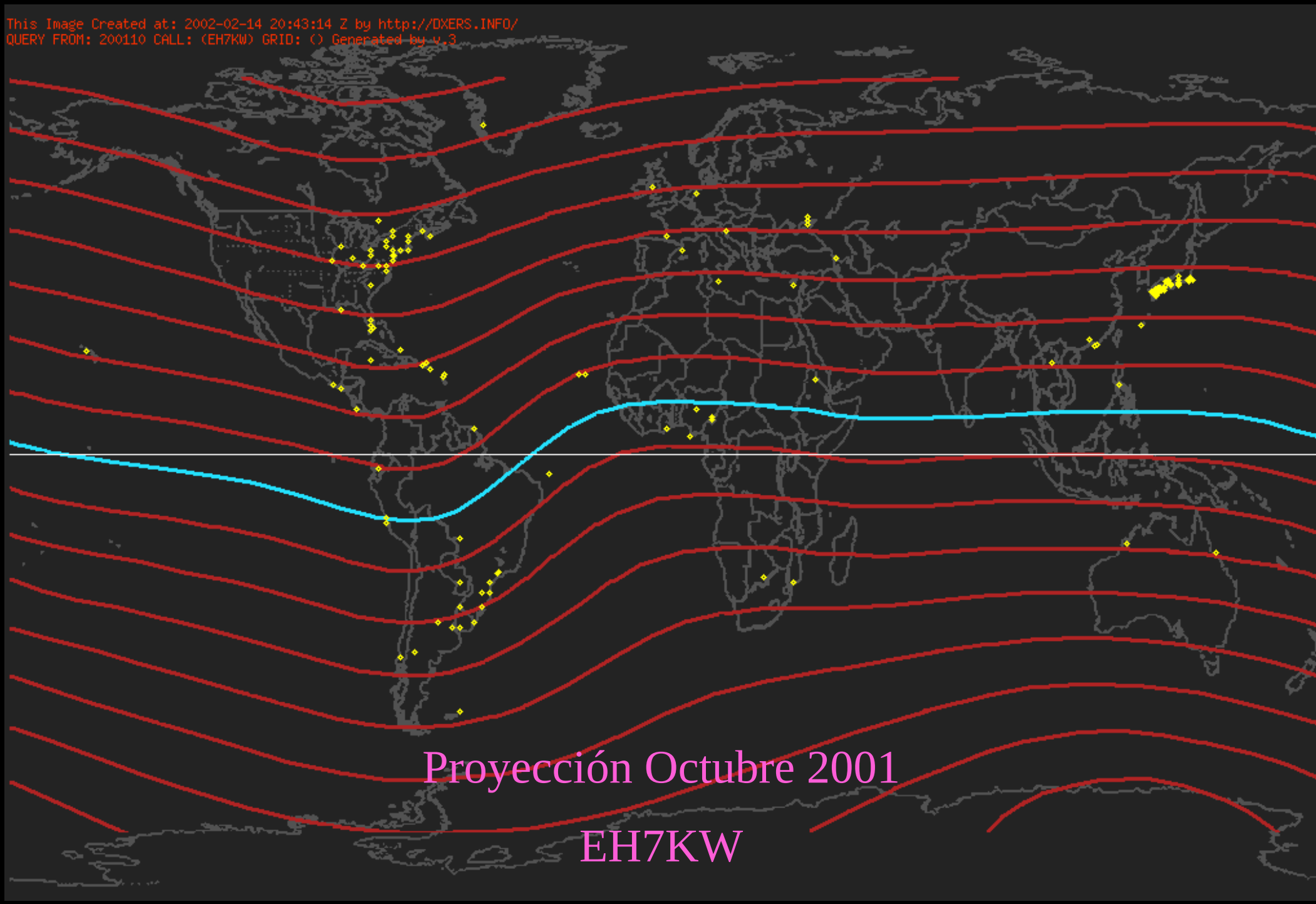
Since 27/04/95:

- 17378 QSOs
- 8690 estaciones
- 9602 SSB
- 7774 CW
- 230 entidades DXCC
  - 206 en CW
  - 212 en SSB

- 110 Mainhead Fields
- 46 Estados EEUU
- 1151 locators
- 36 Zonas WAZ
- Record absoluto en distancia de 19910 Km con ZL3VTV/1 (RF73kd), casi el máximo posible




This Image Created at: 2002-02-14 20:42:59 Z by http://DXERS.INFO/
QUERY FROM: 200110 CALL: (EH7KW) GRID: () Generated by v.3
Proyección Octubre 2001
EH7KW
QSOs Represented: 15min RED (0), 30min GRN (0), Older BLUE (189), TOTAL Plots 24hrs (145) Expect Stray Bogus Plots!!!


This Image Created at: 2002-02-14 20:43:14 Z by http://DXERS.INFO/
QUERY FROM: 200110 CALL: (EH7KW) GRID: () Generated by v.3
Proyección Octubre 2001
EH7KW

Samba Brasileira

PY0FF, PY5CC y PY5EG





PY2DP, PP1CZ y PY0FF



PY5CC, PP1CZ y PY2DP
at Fernando de Noronha



Brazil

PY5CC

ALSO PYØFM, PT9ZZ, PP5XX, PY5XX

PETER ZOCH SPRENGEL
P.O. Box 007
Matinhos, PR 83260-000
BRAZIL
GRID GG54re

Antenas y shack de Matinhos, estado de Paraná



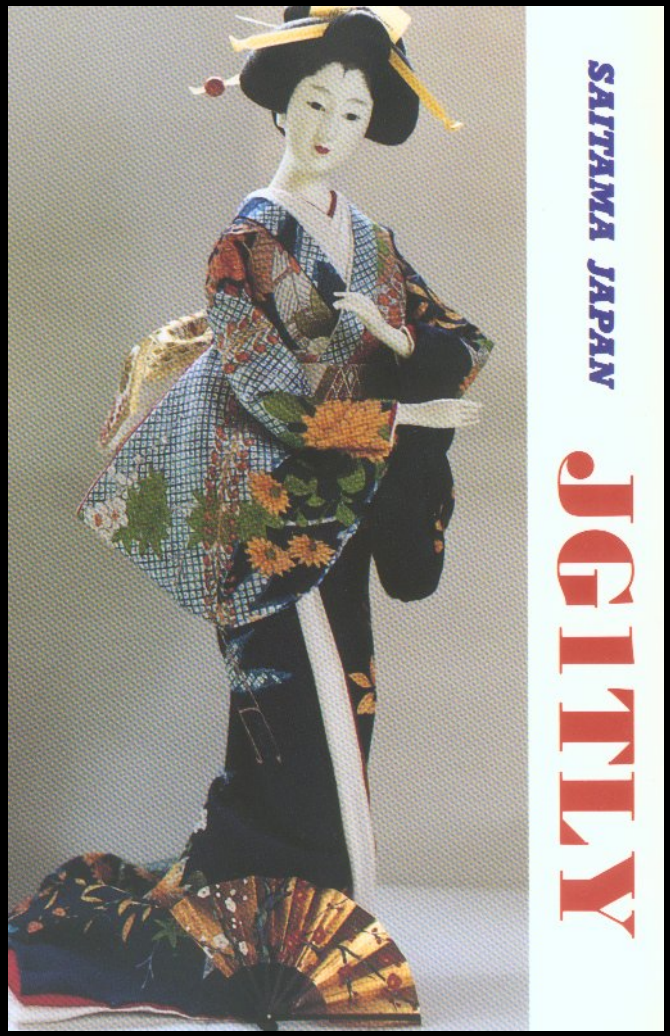


Peter en la plantación de antenas Fernando de Noronha



Peter y EA7KW en Eslovenia WRTC 2000

Japón - Paso largo



- ✓Febrero - marzo
- ✓Octubre - noviembre
- ✓22 a 02Z y posible alrededor 12Z
- ✓Requiere buen SFI/SSN y bajo Kpp

- 1389 QSOs de + 28500 Kms de camino
- 1º JA-EA JH7VEP/6 03/03/2000
- 30 cuadrículas
- 43 prefecturas confirmadas de las 47

