Weak Signal Propagation Reporter

Was ist WSPR?

Was ist WSPR?

… und wofür wurde es entwickelt?

Entwickelt von Physiker und Nobelpreispräger Joe Taylor K1JT (FT8)

- Forschung und Dokumentation von Funkwellenausbreitung
- Automatisches, offenes und weltweites Sensornetz
- Vergleich von Antennen und Standorten
- Langzeitstudien

Wie ist ein WSPR-Signal aufgebaut?

Welche Informationen sind enthalten?

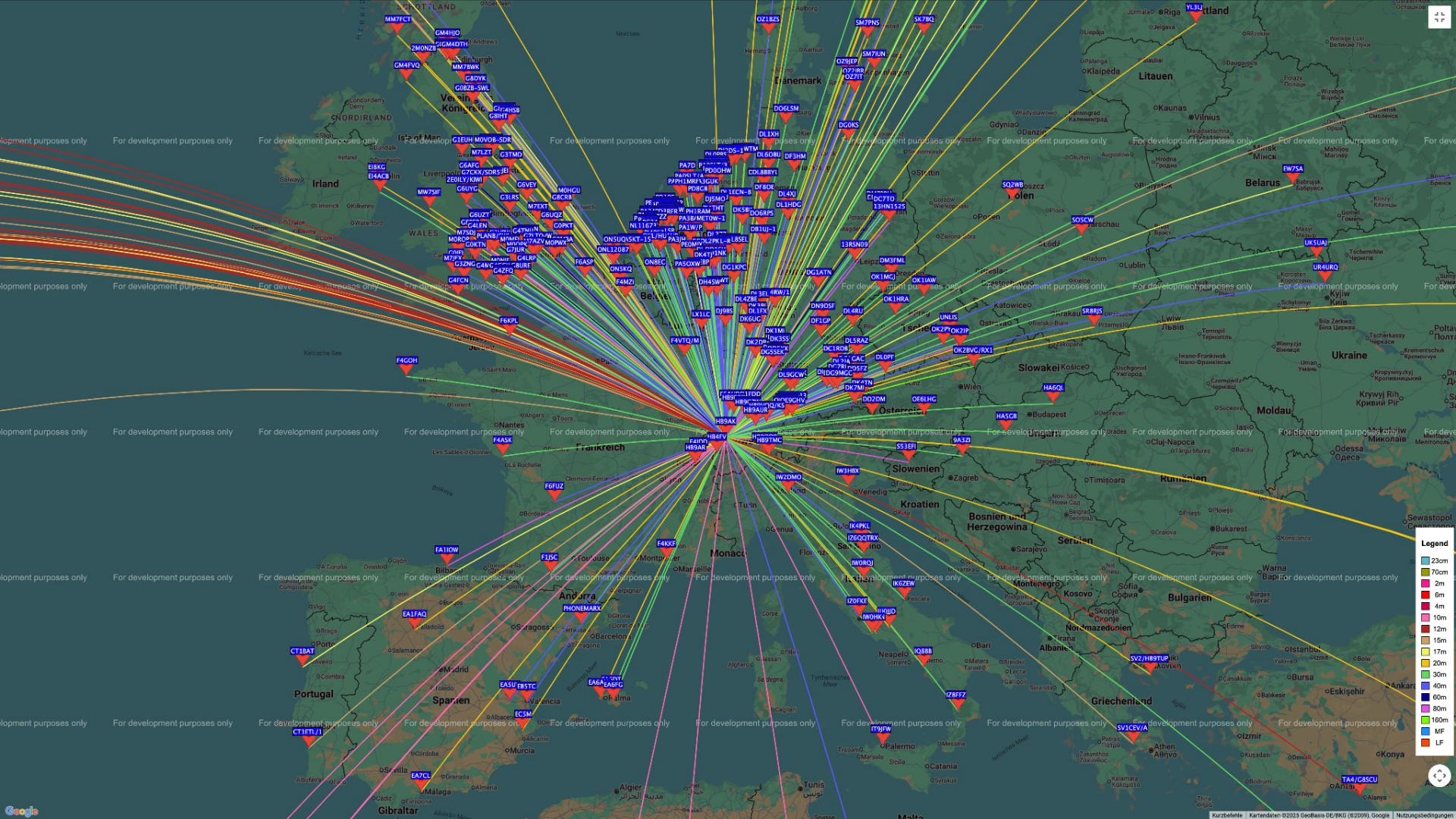
Ein WSPR-Frame überträgt 50 Bits in 110.6 Sekunden:

- **Rufzeichen** (28 Bit)
- **Locator** (15 Bit)
- **Sendeleistung** in dBm (7 Bit)

Ein WSPR-Frame kann noch bei einem SNR -28 dB decodiert werden. Das Rauschen ist ~630 Mal stärker als das WSPR-Signal.

FT8 decodiert noch bei SNR -21 dB.

Was macht man nun damit?


Legend
23cm
70cm
2m
6m
4m
10m
12m
15m
17m
20m
30m
40m
60m
80m
160m
MF
LF
For development purposes only
Kurzbefehle | Kartendaten ©2025 GeoBasis-DE/BKG (©2009), Google | Nutzungsbedingungen

Soweit die Basics.

Jetzt zum spannenden Teil.

Metadaten sind geil!

Einzelne Datenpunkte in Relation stellen

Stellt man Datenpunkte in Relation und ergänzt die Zeit als Dimension, lassen sich Metadaten generieren:

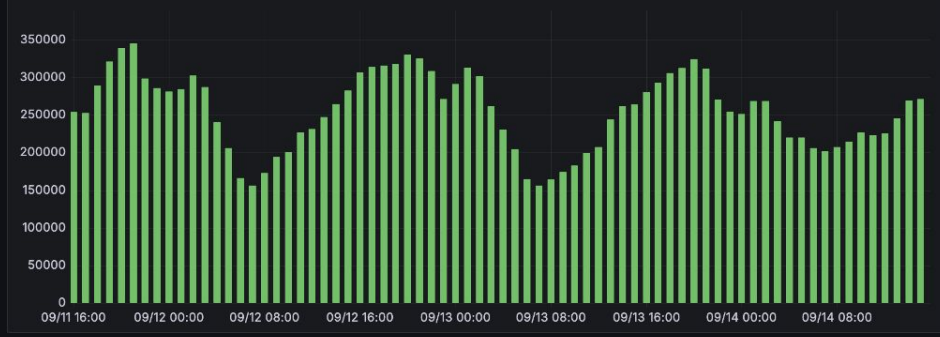
- Band
- Zeit
- Distanz & Richtung
- Signalstärke & SNR
- Ausbreitung & Band-Performance
- Jahreszeiten-Trends & Sonnenzyklen
- Aktivitäten auf den Bändern in Echtzeit
- Kilometer pro Watt
- *Spot Quality**

y-m-d local	txCall	txGrid	rxCall	rxGrid	MHz	W	SNR	drift	k	txAz°	mode	k/W	spotQ	version
2025-09-17 20:04	N4WIS	FM16uu	HB9AK	JN36pv	21.096038	0.2	-26	0	6679	52	WSPR2	33395	8587	2.6.1
2025-09-17 20:02	DL6OBU	JO43	HB9AK	JN36pv	3.570195	0.2	-19	0	742	190	WSPR2	3710	1696	2.6.1
2025-09-17 20:02	OK1IAW	JO70	HB9AK	JN36pv	3.570161	0.2	-29	-1	689	238	WSPR2	3445	591	2.6.1
2025-09-17 20:02	G8ORM	IO93cu	HB9AK	JN36pv	3.570064	5	-16	0	1005	137	WSPR2	201	109	2.6.1
2025-09-17 20:02	OE7AAI	JN57	HB9AK	JN36pv	3.570034	0.2	-18	0	285	258	WSPR2	1425	692	2.6.1
2025-09-17 19:54	K3WRG	FM28	HB9AK	JN36pv	21.096031	0.2	-28	1	6481	53	WSPR2	32405	6481	2.6.1
2025-09-17 19:52	N4WIS	FM16uu	HB9AK	JN36pv	18.106042	0.2	-27	0	6679	52	WSPR2	33395	7633	2.6.1
2025-09-17 19:52	N4SRN	FN42fx	HB9AK	JN36pv	18.10603	0.2	-27	0	5951	56	WSPR2	29755	6801	2.6.1
2025-09-17 19:50	GM3RQQ	IO75tv	HB9AK	JN36pv	14.097179	5	0	0	1284	136	WSPR2	257	257	2.6.1
2025-09-17 19:50	EI4GXB	IO52qq	HB9AK	JN36pv	14.097124	0.2	-13	0	1307	113	WSPR2	6535	4108	2.6.1
2025-09-17 19:50	HA6QL	JN97xs	HB9AK	JN36pv	14.097108	2	-12	0	958	269	WSPR2	479	315	2.6.1
2025-09-17 19:50	GI3VAF	IO74ep	HB9AK	JN36pv	14.097096	5	-1	0	1248	128	WSPR2	250	243	2.6.1
2025-09-17 19:50	EI7HZB	IO65fb	HB9AK	JN36pv	14.097067	0.2	-11	0	1374	125	WSPR2	6870	4711	2.6.1
2025-09-17 19:50	EK1RR	LN20	HB9AK	JN36pv	14.09705	0.5	-24	-1	3080	296	WSPR2	6160	1936	2.6.1
2025-09-17 19:50	SM5CJW	JO89	HB9AK	JN36pv	14.097027	0.2	-15	0	1537	209	WSPR2	7685	4391	2.6.1
2025-09-17 19:48	G0JEI	IO93ic	HB9AK	JN36pv	10.14029	5	-12	0	922	135	WSPR2	184	121	2.6.1
2025-09-17 19:48	PA3AKP	JO22fd	HB9AK	JN36pv	10.140246	0.05	-5	0	618	160	WSPR2	12360	10594	2.6.1
2025-09-17 19:48	DF3HM	JO43xk	HB9AK	JN36pv	10.140228	10	7	-1	752	196	WSPR2	75	90	2.6.1
2025-09-17 19:48	HA6QL	JN97xs	HB9AK	JN36pv	10.140206	2	-8	0	958	269	WSPR2	479	370	2.6.1
2025-09-17 19:48	SM5CJW	JO89	HB9AK	JN36pv	10.140201	0.2	-13	0	1537	209	WSPR2	7685	4831	2.6.1
2025-09-17 19:48	LA1ITS	JO59mx	HB9AK	JN36pv	10.140187	5	2	0	1475	191	WSPR2	295	312	2.6.1
2025-09-17 19:48	G8ORM	IO93cu	HB9AK	JN36pv	10.140164	5	1	0	1005	137	WSPR2	201	207	2.6.1
2025-09-17 19:48	4Z4TJ	KM71jf	HB9AK	JN36pv	10.140125	0.5	-18	0	2920	315	WSPR2	5840	2837	2.6.1
2025-09-17 19:46	PA7D	JO23vf	HB9AK	JN36pv	7.04019	0.2	-1	0	712	171	WSPR2	3560	3458	2.6.1
2025-09-17 19:46	PA3BDR	JO22fe	HB9AK	JN36pv	7.040177	0.01	-17	0	623	160	WSPR2	62300	32040	2.6.1
2025-09-17 19:46	OK1IAW	JO70	HB9AK	JN36pv	7.040169	0.2	-19	-1	689	238	WSPR2	3445	1575	2.6.1
2025-09-17 19:46	PA2PGU	JO32	HB9AK	JN36pv	7.040151	0.2	-10	0	621	178	WSPR2	3105	2218	2.6.1
2025-09-17 19:46	GM8FXD	IO77sh	HB9AK	JN36pv	7.040143	1	-9	0	1405	140	WSPR2	1405	1044	2.6.1
2025-09-17 19:46	DK3BI	JN49gu	HB9AK	JN36pv	7.040128	0.2	-10	0	342	196	WSPR2	1710	1221	2.6.1
2025-09-17 19:46	TA4/G8SCU	KM56vo	HB9AK	JN36pv	7.040108	5	0	0	2318	307	WSPR2	464	464	2.6.1
2025-09-17 19:46	M0ROP	IO81	HB9AK	JN36pv	7.040104	0.1	-10	0	906	120	WSPR2	9060	6471	2.6.1
2025-09-17 19:46	HB9T	JN36	HB9AK	JN36pv	7.040082	0.2	-22	-1	53	29	WSPR2	265	98	2.6.1
2025-09-17 19:46	G7LTQ	IO91wn	HB9AK	JN36pv	7.040073	1	-15	0	747	131	WSPR2	747	427	2.6.1
2025-09-17 19:46	OZ9JFP	JO65an	HB9AK	JN36pv	7.040069	5	-10	0	1018	201	WSPR2	204	146	2.6.1

Grafana

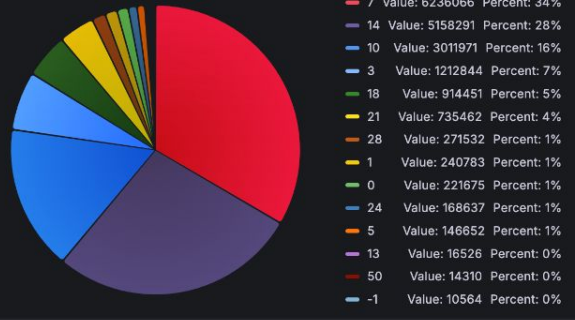
Spots stored in database	Spots reported last 24h	Spots reported last hour	Spots in selected time frame	Active transmitting stations	Active receiving stations
10123049531	6127967	277717	18377034	3354	1684

Total Spots / h

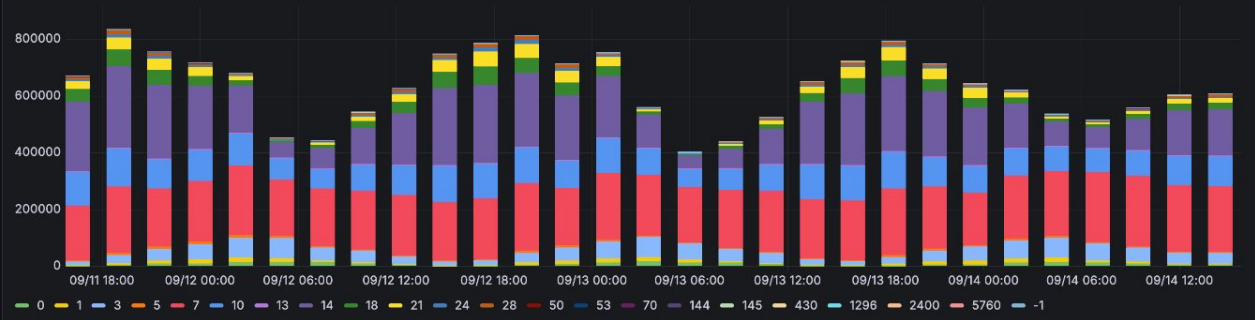


Participants

band activity



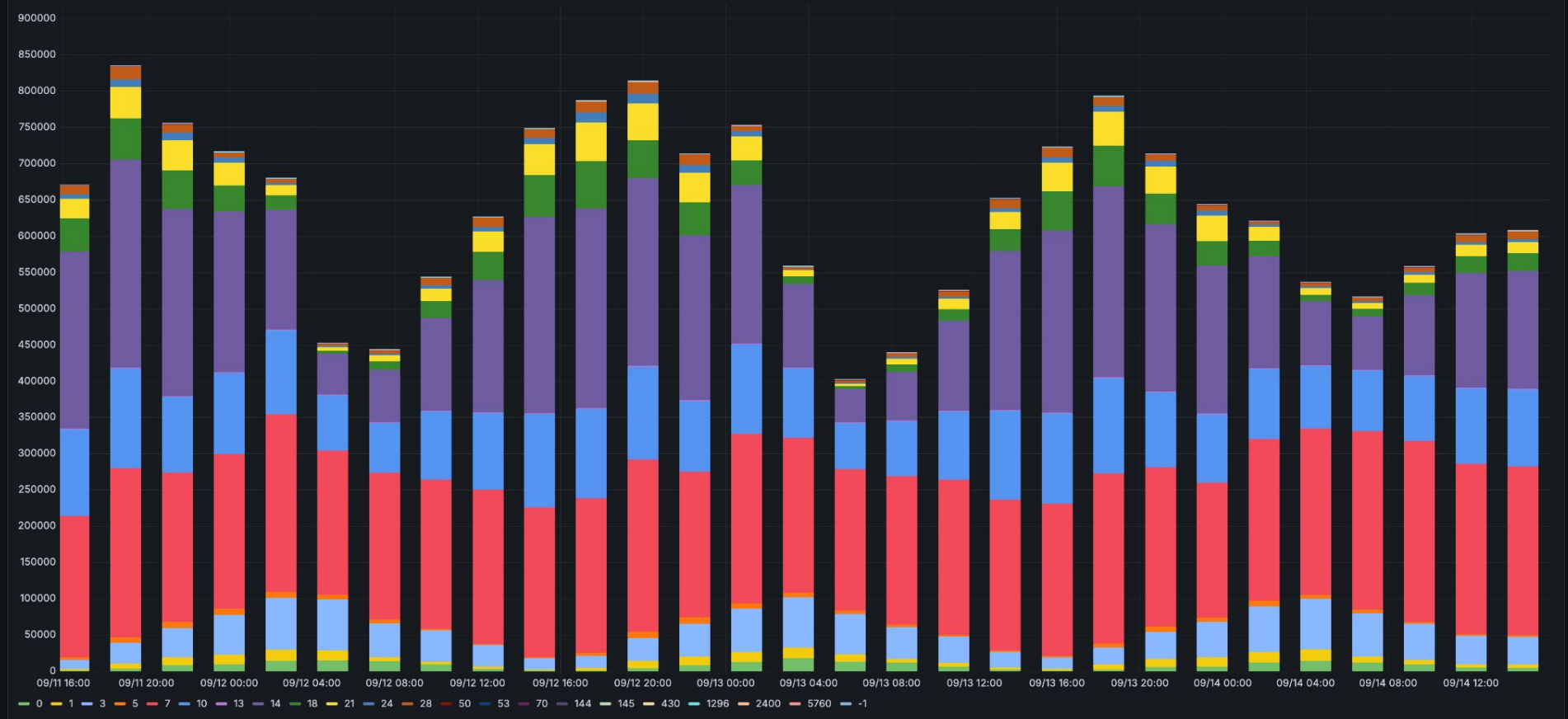
Total spots per band



Receiver Map

Transmitter Map

Total spots per band



Band 7 | Minimum Distance 0 | Auto Rotate No | Intensity (%) 30 | TX Locator Enter value | RX Locator Enter value

Last 15 minutes | Refresh

Worldview

band 21 × 28 × 3 × 7 × 14 ×

location JO,JN,KO,KN

mode rx

Min distance 0

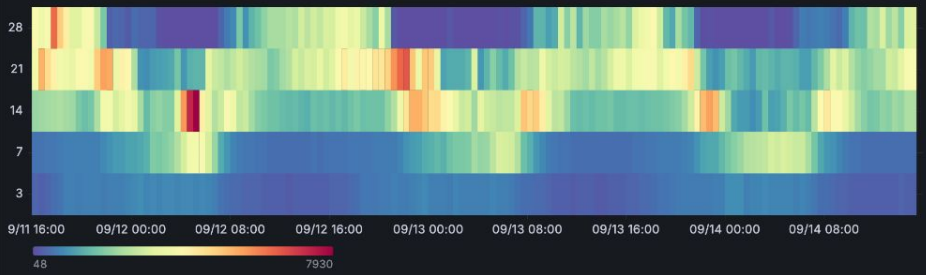
Last 3 days

Refresh

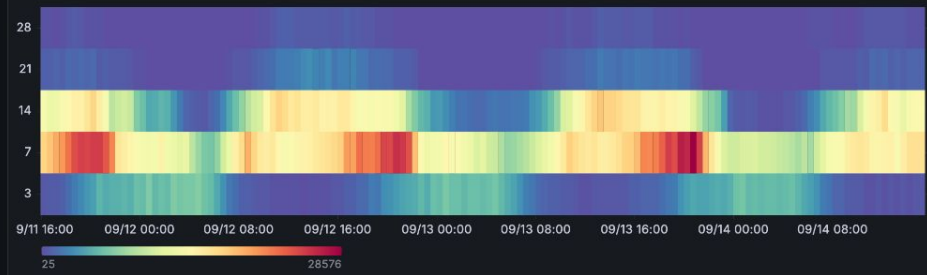
Overview *(2 panels)*

Comparision

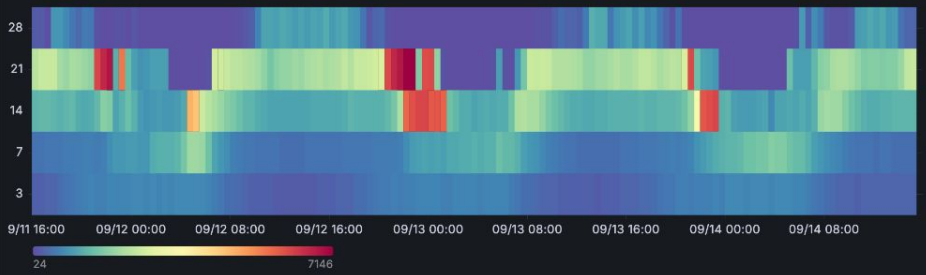
distance compare (avg)



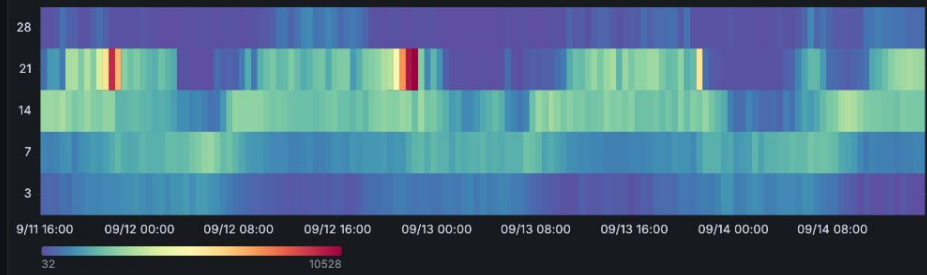
spots total



distance compare median



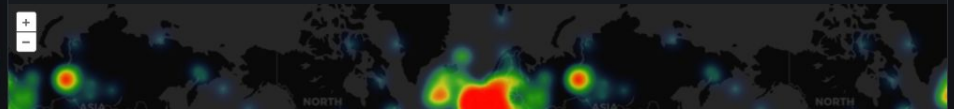
median spotQ



Maps

21 MHz spot count map

28 MHz spot count map



band 21 × 28 × 3 × 7 × 14 ×

location JO,JN,KO,KN

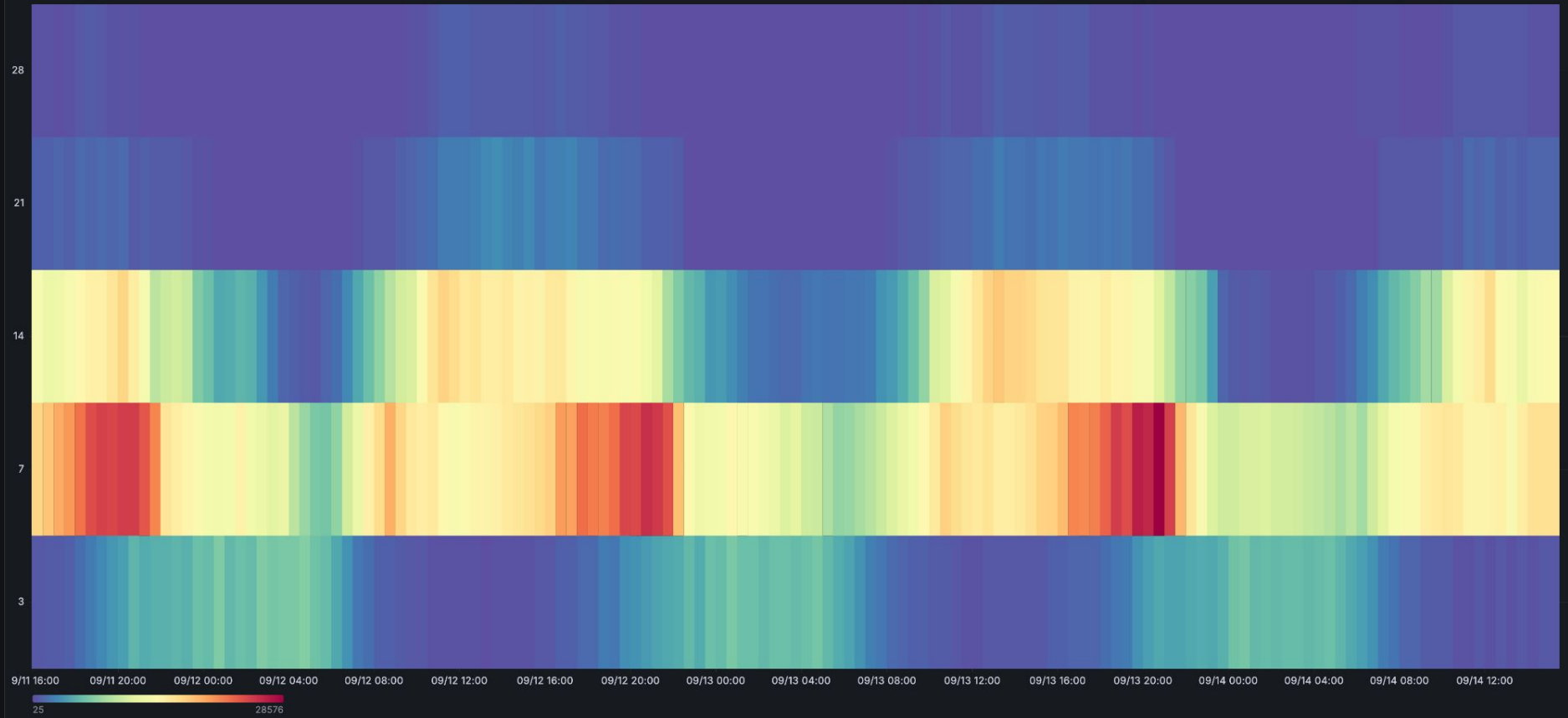
mode rx

Min distance 0

Last 3 days

Refresh

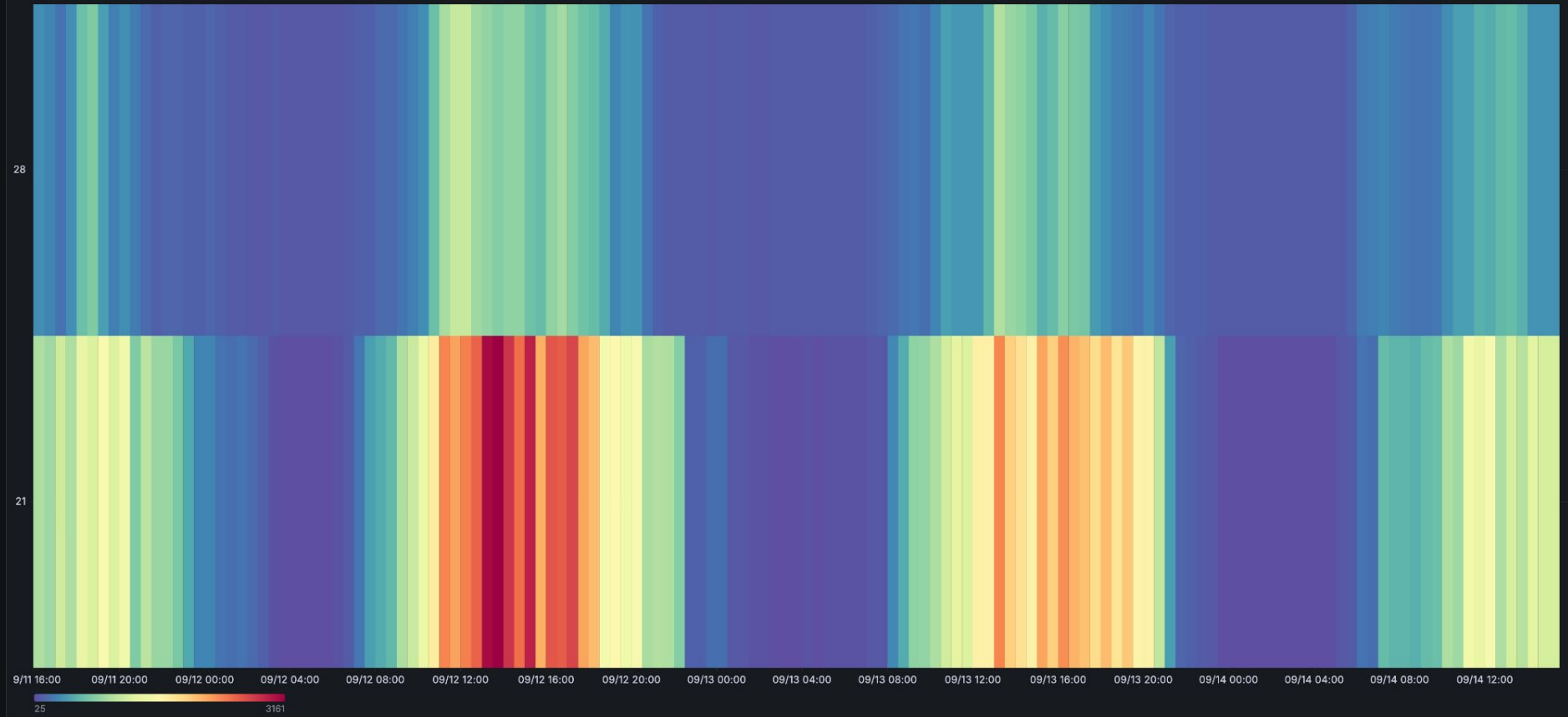
spots total



band 21 × 28 × | location JO,JN,KO,KN | mode rx | Min distance 0

Last 3 days | Refresh

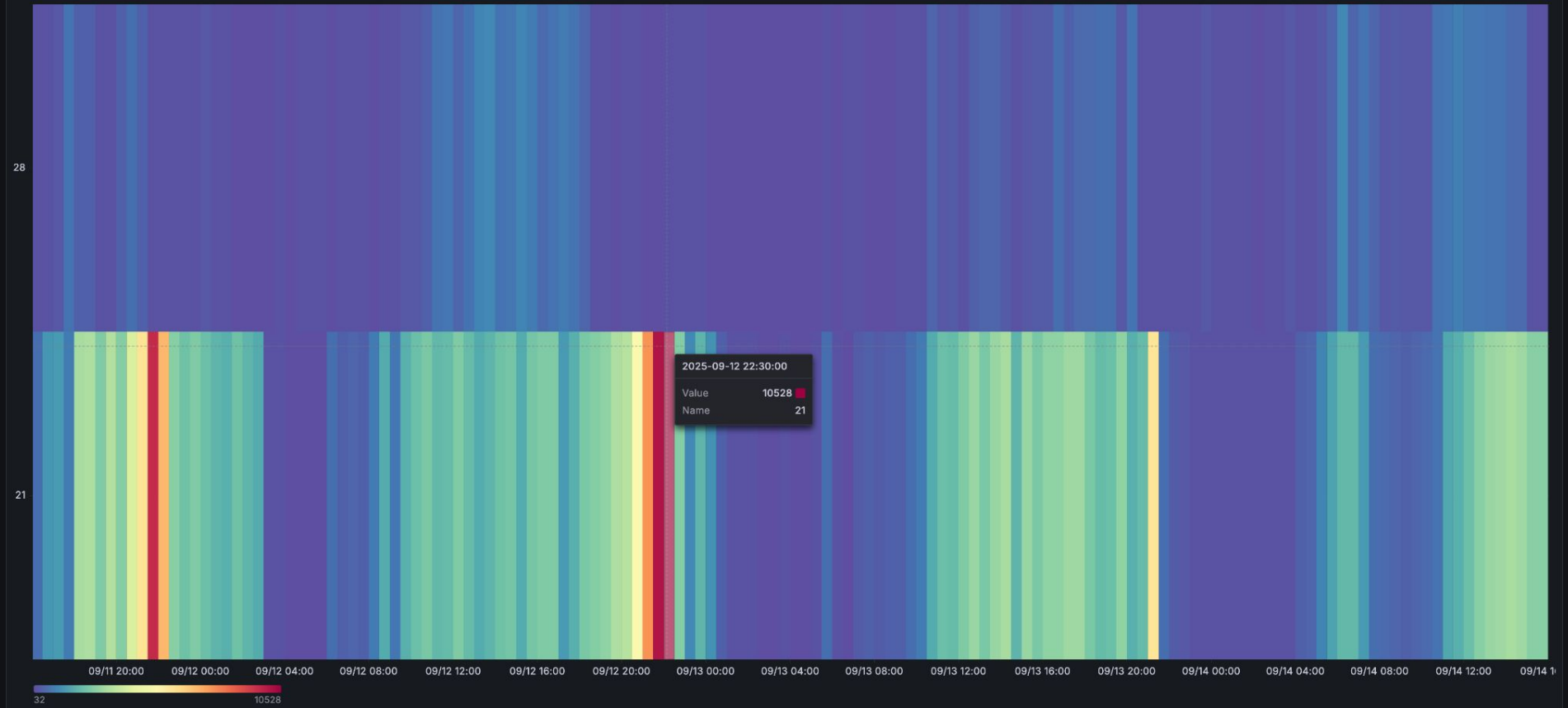
spots total



band 21 × 28 × | location JO,JN,KO,KN | mode rx | Min distance 0

Last 3 days | Refresh

median spotQ

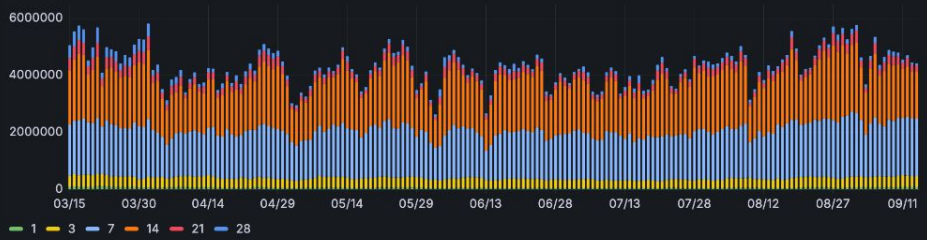


Experimentelle Metadaten

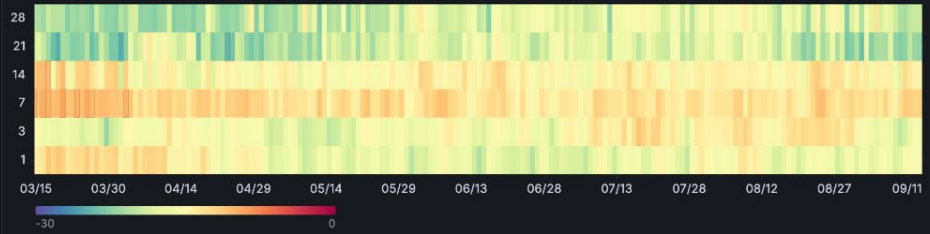
Bands 21 × 28 × 14 × 3 × 7 × (+1) Grid JN

Last 6 months Refresh

Spots per band

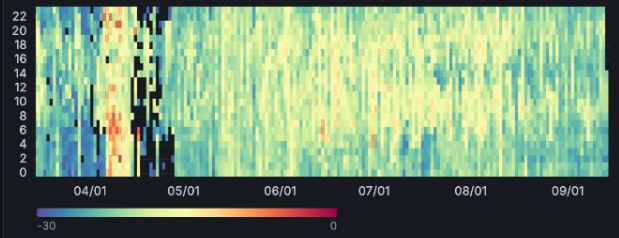


Average SNR per band

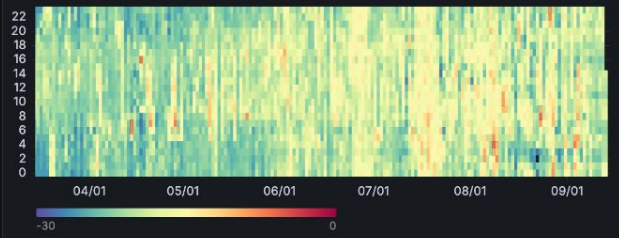


Row title

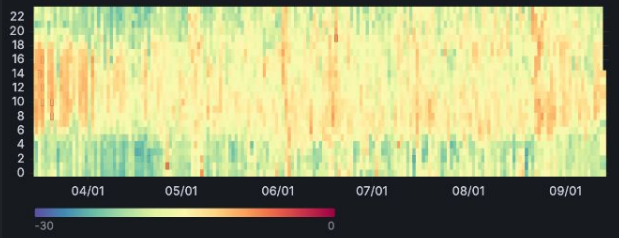
Average SNR per time of day at 21MHz



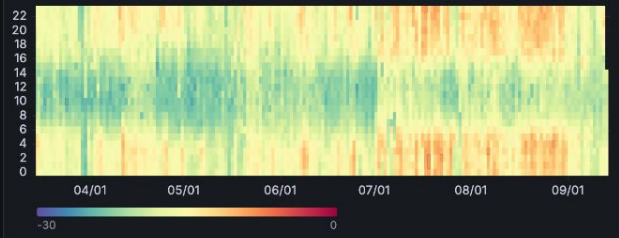
Average SNR per time of day at 28MHz



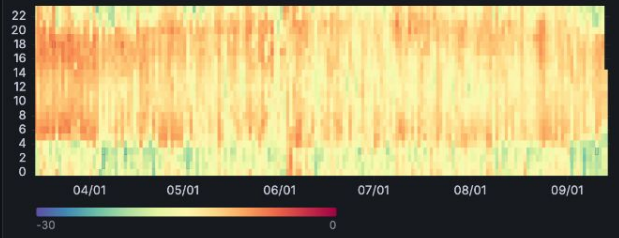
Average SNR per time of day at 14MHz



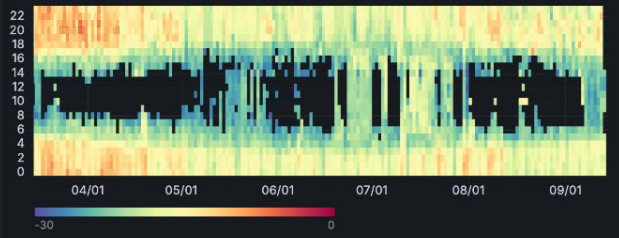
Average SNR per time of day at 3MHz



Average SNR per time of day at 7MHz



Average SNR per time of day at 1MHz



Grid JN | Bands 3 × 7 × 10 × 13 × 14 × | Year(s) 2025 × | Month(s) 2025-07 × 2025-08 ×

Last 90 days | Refresh

disphour\	>16km	>26km	>41km	>66km	>105km	>166km	>264km	>418km	>663km	>1051km
0:00	80m	80m	40m	80m	80m	80m	80m	40m	40m	30m
1:00	80m	80m	80m	80m	80m	80m	80m	80m	40m	30m
2:00	80m	80m	80m	80m	80m	80m	80m	20m	40m	30m
3:00	80m	80m	40m	80m	80m	80m	80m	80m	40m	30m
4:00	80m	20m	40m	80m	80m	80m	40m	40m	40m	30m
5:00	40m	20m	40m	40m	80m	40m	40m	40m	30m	30m
6:00	40m	20m	20m	40m	40m	40m	30m	20m	30m	20m
7:00	80m	20m	20m	40m	40m	20m	20m	20m	20m	20m
8:00	40m	20m	20m	40m	40m	30m	20m	20m	20m	20m
9:00	40m	40m	20m	40m	40m	30m	20m	20m	20m	20m
10:00	40m	40m	20m	40m	40m	40m	20m	20m	20m	20m
11:00	40m	40m	20m	40m	40m	40m	20m	20m	20m	20m
12:00	40m	20m	20m	40m	40m	40m	20m	20m	30m	20m
13:00	40m	40m	20m	40m	40m	40m	20m	20m	30m	20m
14:00	40m	20m	20m	40m	40m	40m	30m	20m	30m	20m
15:00	40m	40m	20m	40m	40m	40m	20m	20m	30m	20m
16:00	40m	20m	20m	40m	40m	40m	20m	20m	30m	30m
17:00	40m	20m	20m	40m	40m	40m	20m	20m	30m	30m
18:00	40m	80m	20m	40m	40m	40m	20m	20m	30m	20m
19:00	40m	80m	40m	40m	40m	40m	20m	40m	30m	20m
20:00	40m	80m	20m	40m	40m	40m	40m	40m	30m	30m
21:00	40m	80m	40m	40m	80m	40m	80m	40m	30m	30m
22:00	40m	80m	40m	40m	80m	40m	80m	40m	40m	30m
23:00	80m	80m	40m	40m	80m	80m	80m	40m	40m	80m

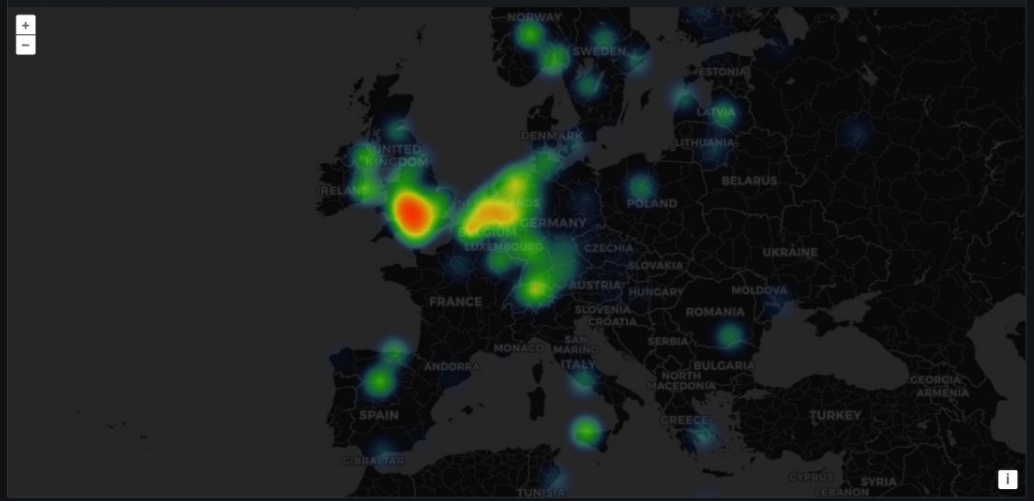
disphour\	>16km	>26km	>41km	>66km	>105km	>166km	>264km	>418km	>663km	>1051km
0:00	80m	80m	20m	80m	80m	80m	80m	40m	20m	30m
1:00	80m	80m	20m	80m	80m	80m	80m	80m	40m	30m
2:00	80m	80m	20m	80m	80m	80m	80m	80m	40m	30m
3:00	80m	80m	20m	80m	80m	80m	80m	80m	40m	30m
4:00	80m	20m	20m	80m	80m	80m	80m	40m	40m	30m
5:00	80m	20m	20m	80m	40m	40m	40m	30m	30m	30m
6:00	40m	20m	20m	40m	40m	40m	40m	20m	20m	20m
7:00	40m	20m	20m	40m	40m	40m	20m	20m	20m	20m
8:00	40m	20m	20m	40m	40m	40m	20m	20m	20m	20m
9:00	40m	20m	20m	40m	20m	20m	20m	20m	20m	20m
10:00	40m	20m	20m	40m	20m	20m	20m	20m	20m	20m
11:00	40m	40m	20m	40m	20m	20m	20m	20m	20m	20m
12:00	40m	20m	20m	40m	20m	20m	20m	20m	20m	20m
13:00	40m	40m	20m	40m	20m	20m	20m	40m	20m	20m
14:00	40m	20m	20m	40m	40m	40m	40m	20m	30m	20m
15:00	40m	40m	20m	40m	40m	40m	40m	20m	20m	20m
16:00	40m	40m	20m	40m	40m	40m	40m	20m	20m	20m
17:00	40m	40m	20m	40m	40m	40m	20m	20m	30m	20m
18:00	80m	80m	80m	80m	40m	40m	20m	20m	20m	20m
19:00	80m	80m	80m	80m	40m	40m	20m	20m	20m	20m
20:00	80m	80m	80m	80m	40m	40m	40m	40m	20m	30m
21:00	80m	80m	80m	80m	80m	40m	20m	40m	20m	30m
22:00	80m	80m	80m	80m	80m	40m	80m	20m	20m	30m
23:00	80m	80m	20m	80m	80m	40m	80m	40m	20m	30m

Bands 7 × 14 × 21 × 28 × 24 × (+3) | QTH Locator JN | Mode tx | Last 24 hours | Refresh

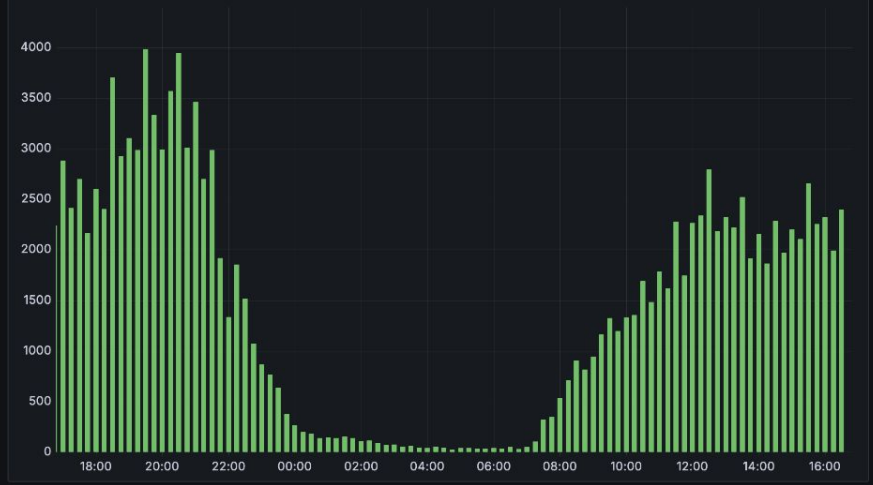
› 7 MHz *(2 panels)*

⌄ 14 MHz

Panel Title — Last 30 minutes



Spot Counts



› 21 MHz *(2 panels)*

› 28 MHz *(2 panels)*

› 24 MHz *(2 panels)*

› 18 MHz *(2 panels)*

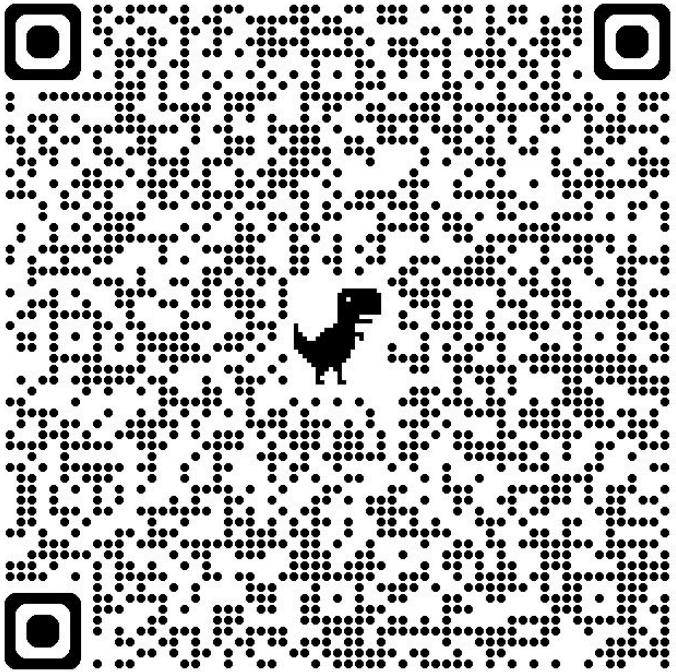
› 10 MHz *(2 panels)*

› 5 MHz *(2 panels)*

Hands on

Online bereitgestellt

Für alle frei zugänglich



www.wspr.live

Nutzen ist gut,
mitmachen ist besser

Was brauche ich um mitzumachen?

Um selbst Messdaten ins WSPR-Sensornetz einspeisen zu können, braucht es:

- HE-, HB3- oder HB9-Rufzeichen
- Einen Windows-PC / Mac / Linux
- Ein Funkgerät/Empfänger mit CAT-Schnittstelle
- Open Source Software: WSJT-X
- Eine Internet-Verbindung

Und jetzt: Bier!

Danke!