

A Short Course on HF Antennas for Contesting

NCCC Contest Academy 2013

Visalia, CA on Friday, Apr. 19, 2013

By Dean Straw, N6BV



Putting up the two 4L40 Yagis at N6RO

Antennas for Contesting

- My task is to talk all about contest antennas, in about 20 minutes... So put on your seatbelts, folks. Here we go.

Antennas for Contesting

- In past presentations and in various Webinars on contest antennas, I've talked about antennas at multi-multi *superstations*, like N6RO, W6YI, K3LR and KC1XX.

Antennas for Contesting

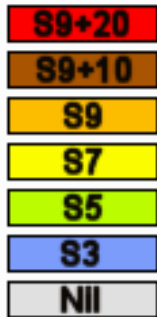
- In past presentations and in various Webinars on contest antennas, I've talked about antennas at multi-multi *superstations*, like N6RO, W6YI, K3LR and KC1XX.
- What about the Little Gun?

Antennas for Contesting

- In past presentations and in various Webinars on contest antennas, I've talked about antennas at multi-multi *superstations*, like N6RO, W6YI, K3LR and KC1XX.
- What about the Little Gun?
- Today, I'll describe more modest antenna installations that can still give you a lot of bang for the buck in contests.

Tools Used in the Analyses

- *VOAAREA*
- *EZNEC Ver. 5*
- *HFTA* (High Frequency Terrain Analysis) for real-world terrains.



S-meter calibration in the following charts; 6 dB per S-unit.

Big Gun Comparison Antennas

- Today, I'll use as a standard of comparison the antennas at N6RO, with a 1500 W transmitter:

80 m: 2-ele. wire quads at 115' and a Four Square

40 m: two 4L40s stacked at 135'/70'

20 m: three 5L20s stacked at 130'/90'/45'

15 m: three 6L15s stacked at 130'/85'/50'

10 m: four 5L10s stacked at 100'/80'/60'/40'

- The ground terrain is essentially flat at N6RO.

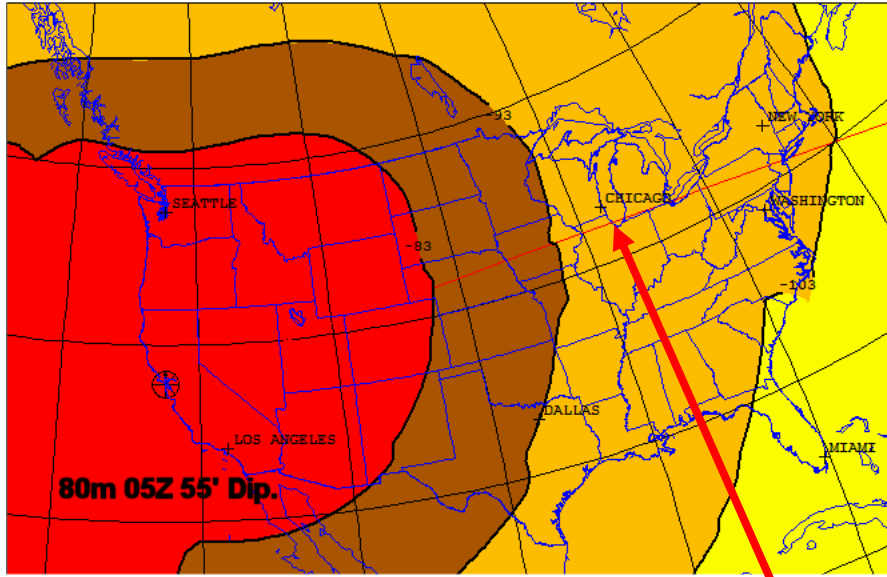
Background: Top two Yagis
in 20-m stack, N6RO

Little Gun Antennas

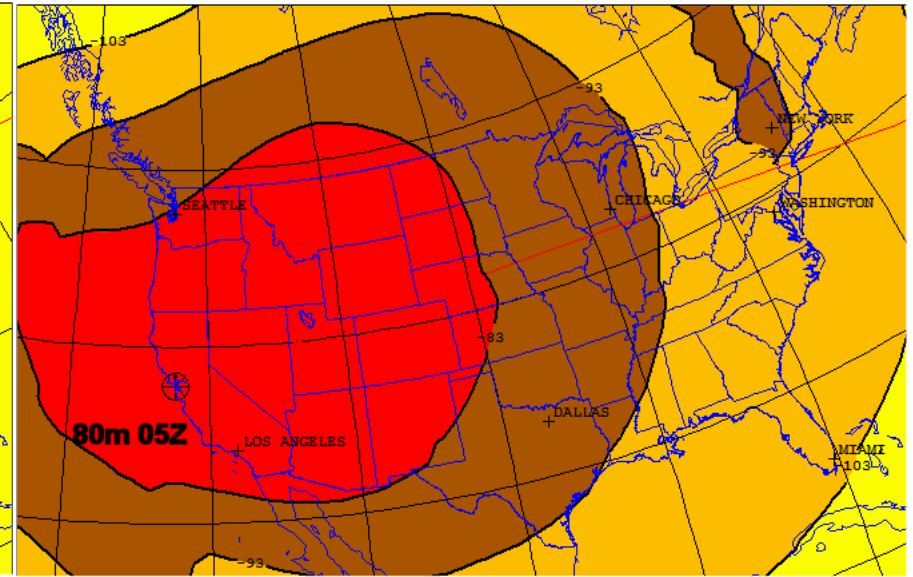
- Here's a more modest station, again over flat terrain, but still with a 1500 W transmitter:

80/40 m: flat-top dipoles at 55'

20/15/10 m: 3-element tribander at 55'



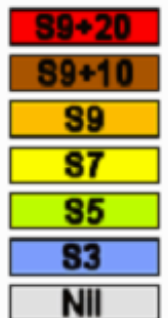
80m Dipole at 55'

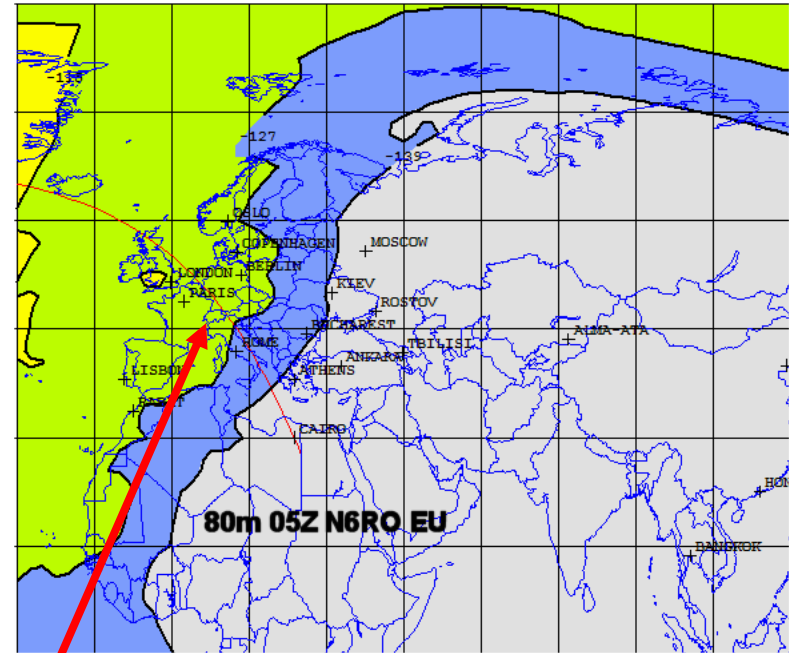
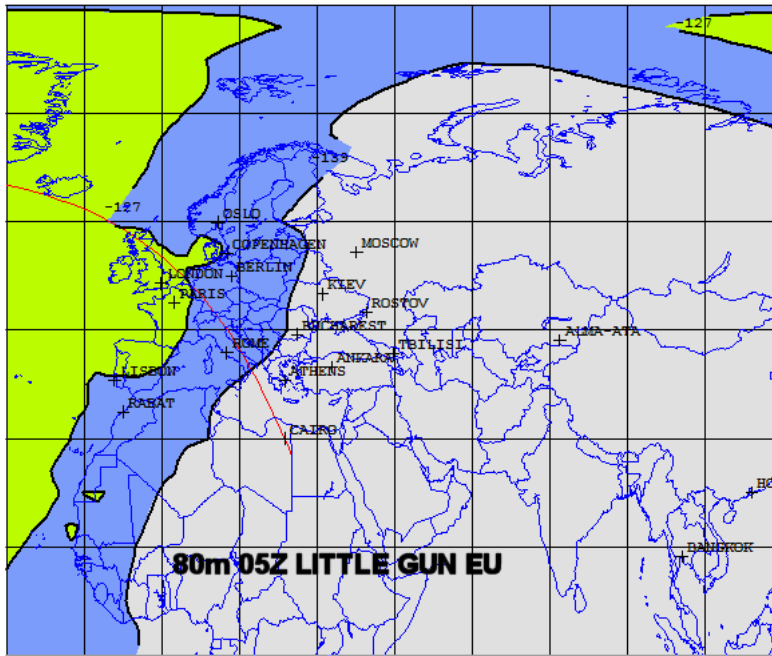


N6RO Quad at 115'

Surprisingly, not a huge difference on 80 meters for domestic US coverage.

80 Meters to USA



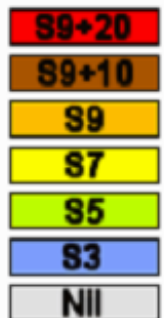


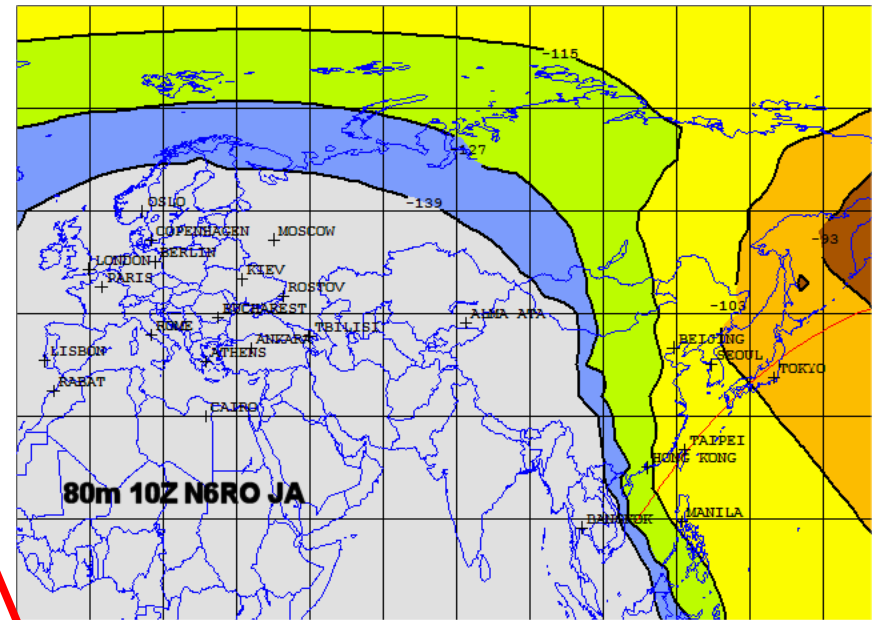
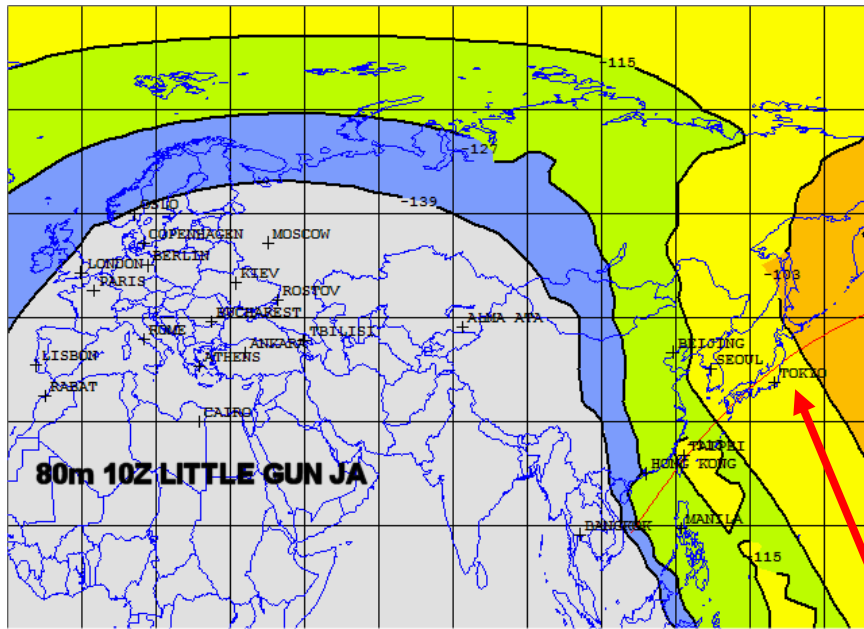
80m Dipole at 55'

N6RO Quad at 115'

Again, not that large a difference on 80 meters between N6RO and a Little Gun to Europe.

80 Meters to Europe



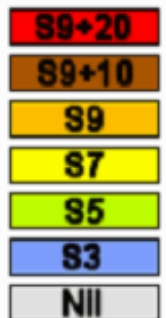


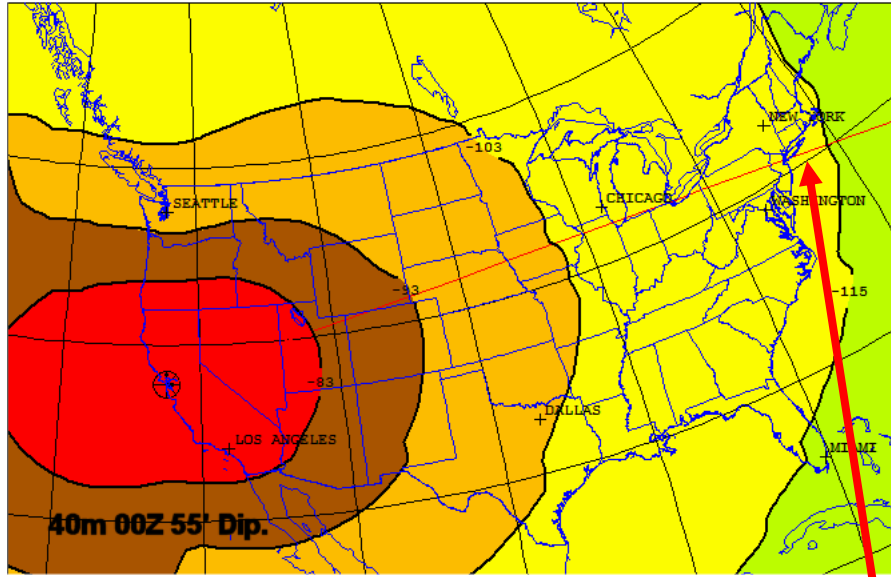
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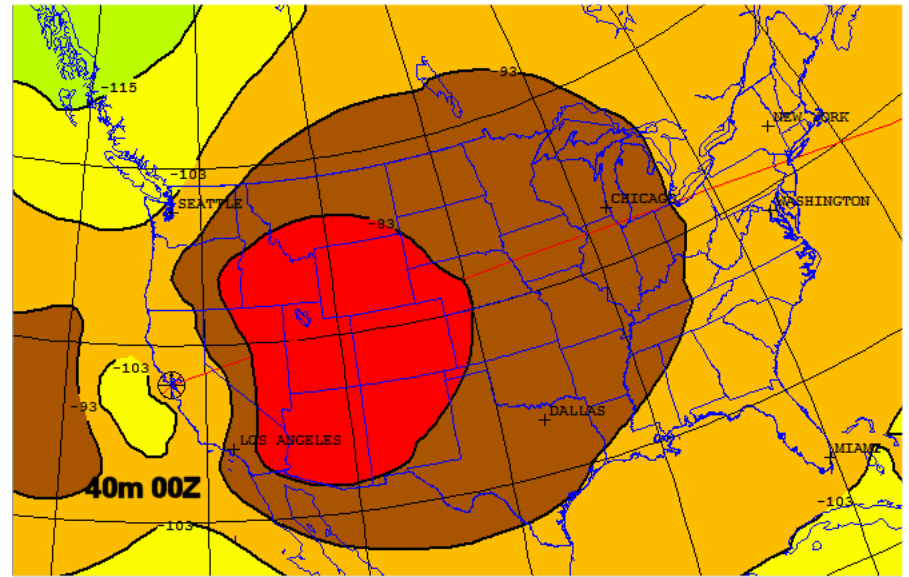
Again, not a huge difference on 80 meters
between N6RO and a Little Gun to Far East.

80 Meters to Japan





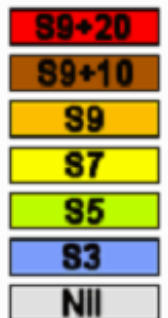
40m Dipole at 55'

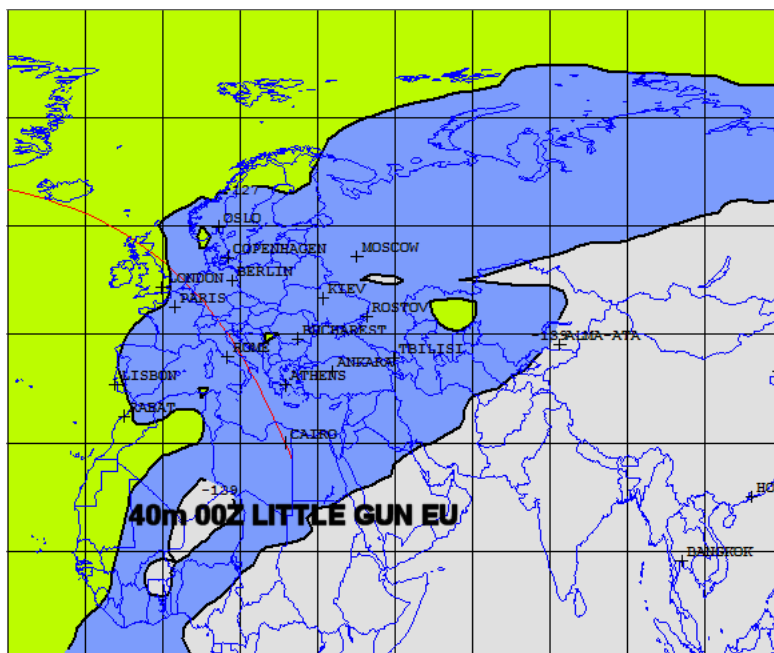


N6RO Stacked 4L40s at
130'/70'

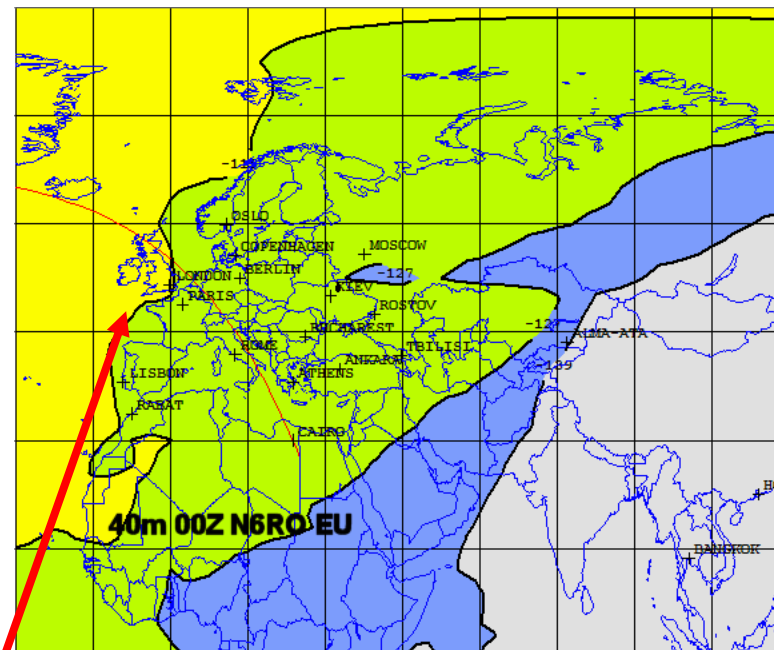
Difference of about 2 S-units on East Coast.

40 Meters to USA





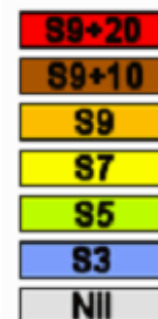
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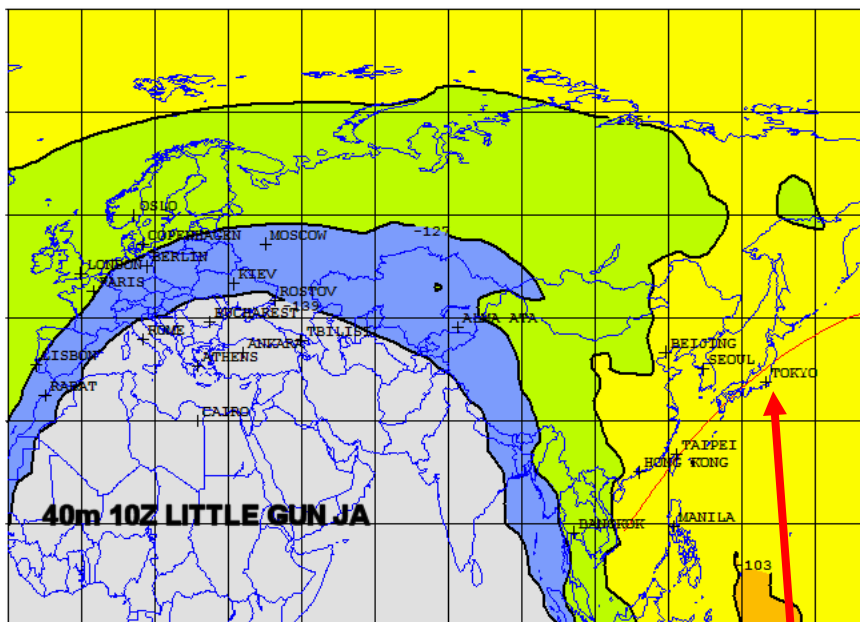


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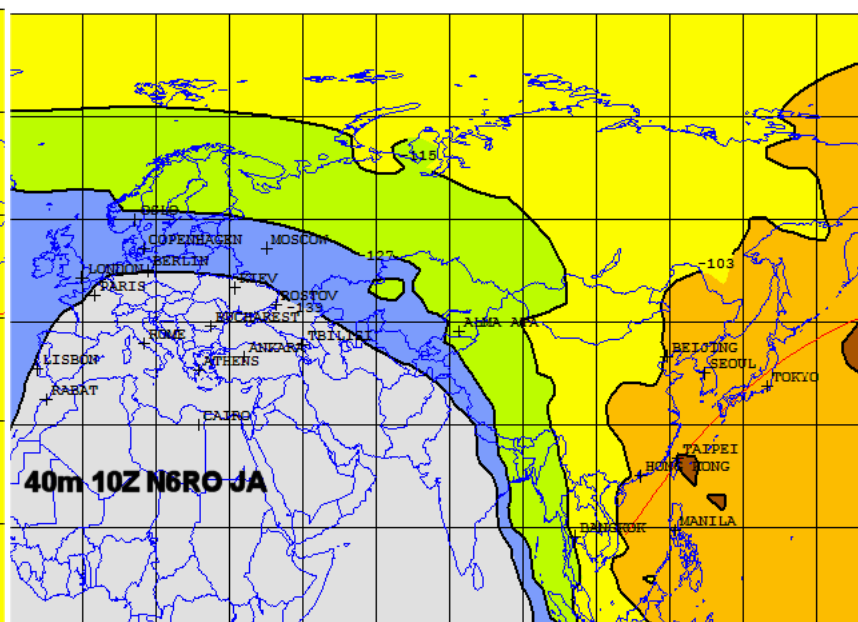
Difference of about 2 S-units into Europe.

40 Meters to Europe





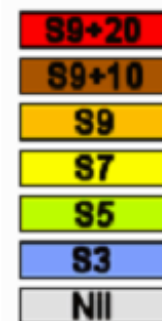
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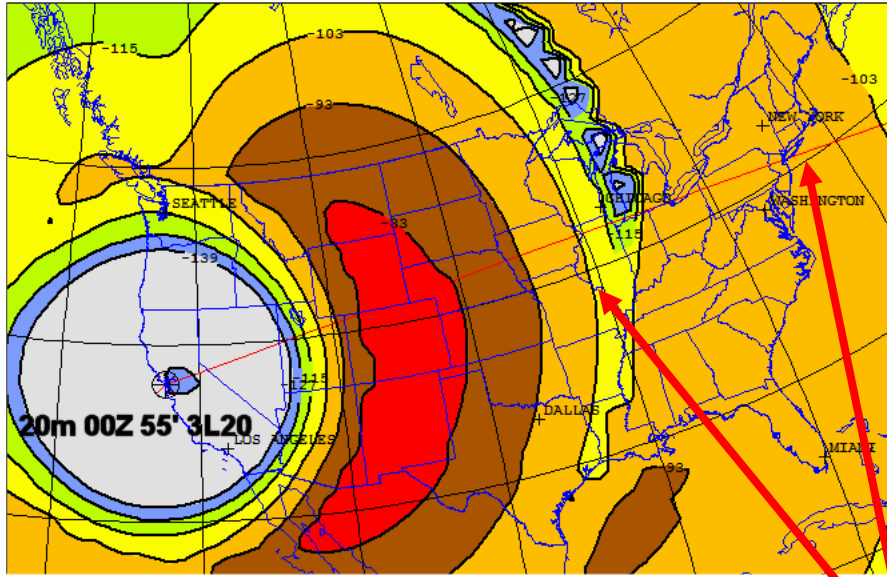


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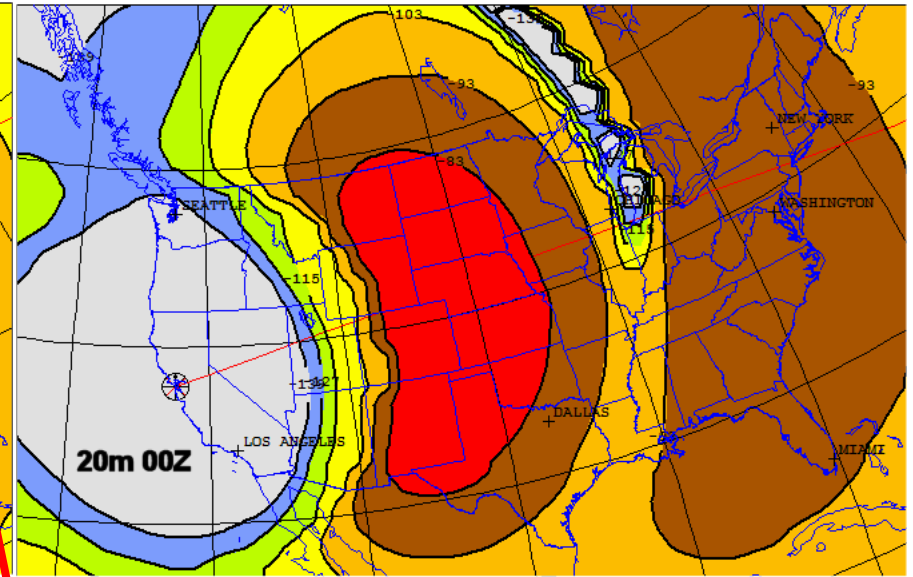
Difference of about 2 S-units into Far East.

40 Meters to Japan





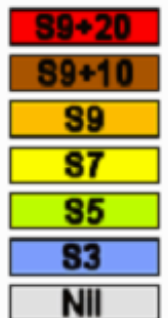
3L20 at 55'

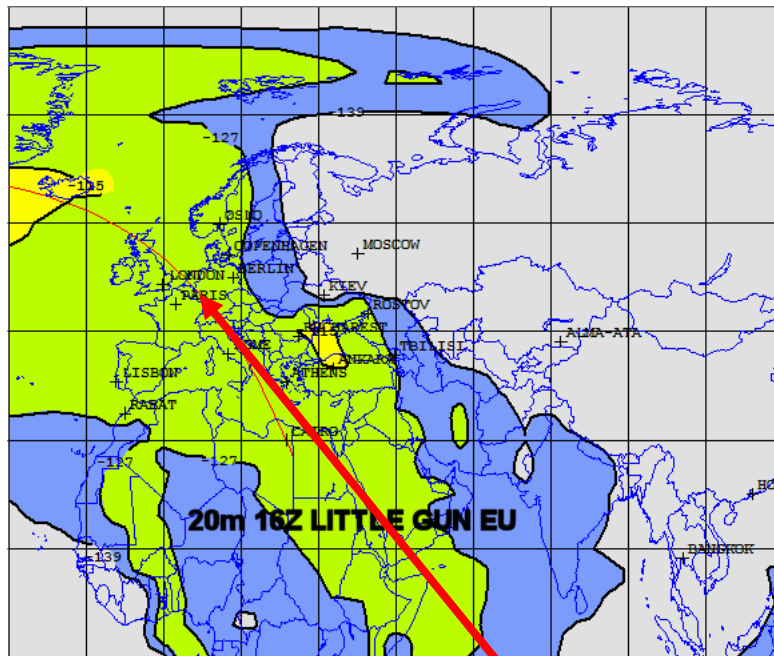


N6RO Stacked 5L20s at
130'/90'/45'

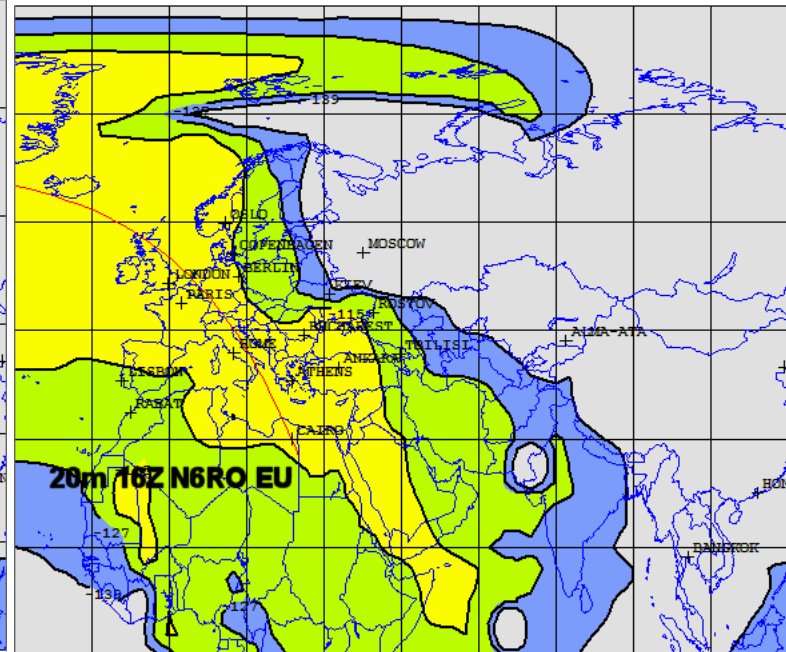
Difference of about 2 S-units into East Coast.

20 Meters to USA





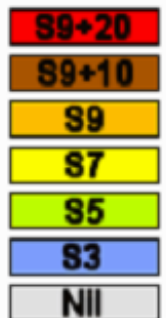
3L20 at 55'

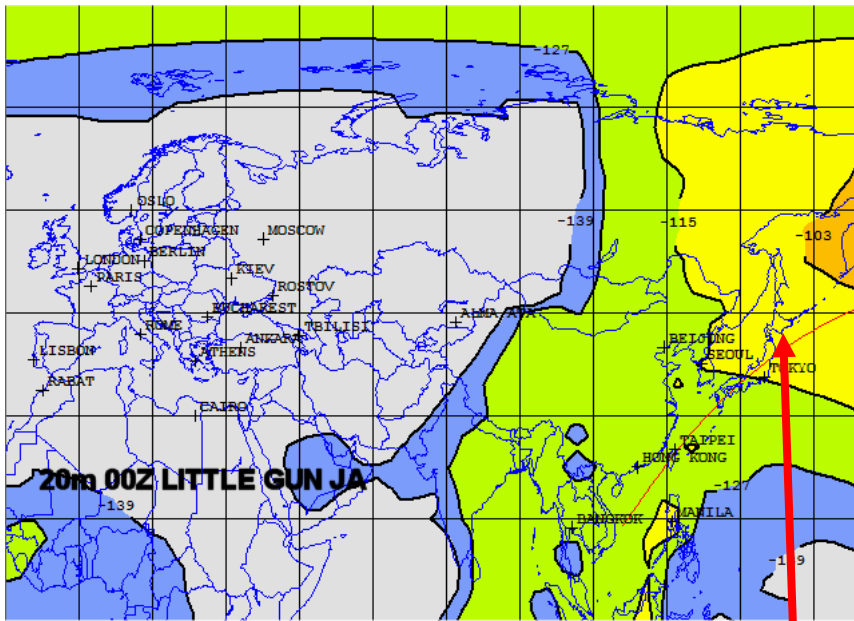


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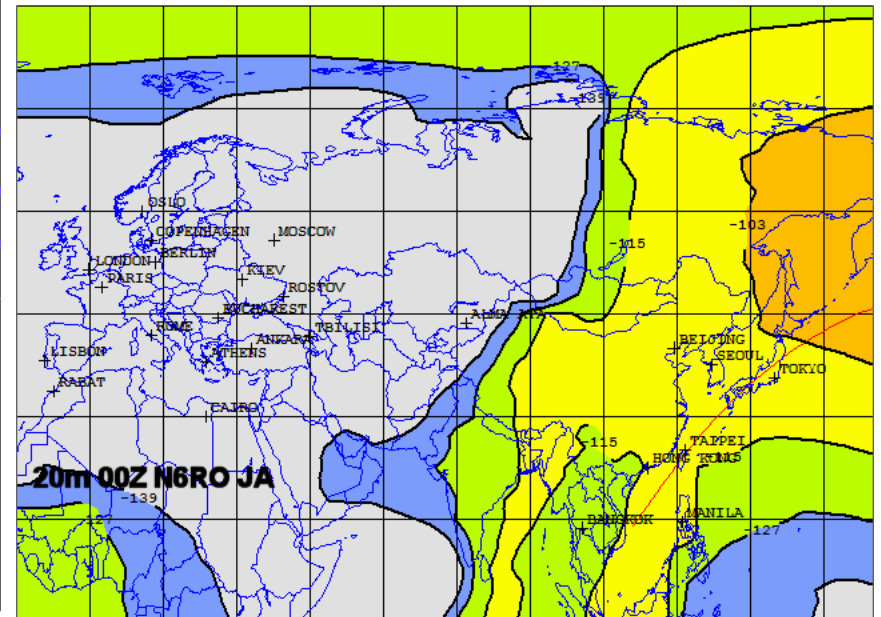
Difference of about 2 S-units into Europe.

20 Meters to Europe





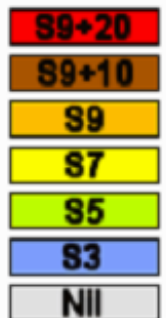
3L20 at 55'

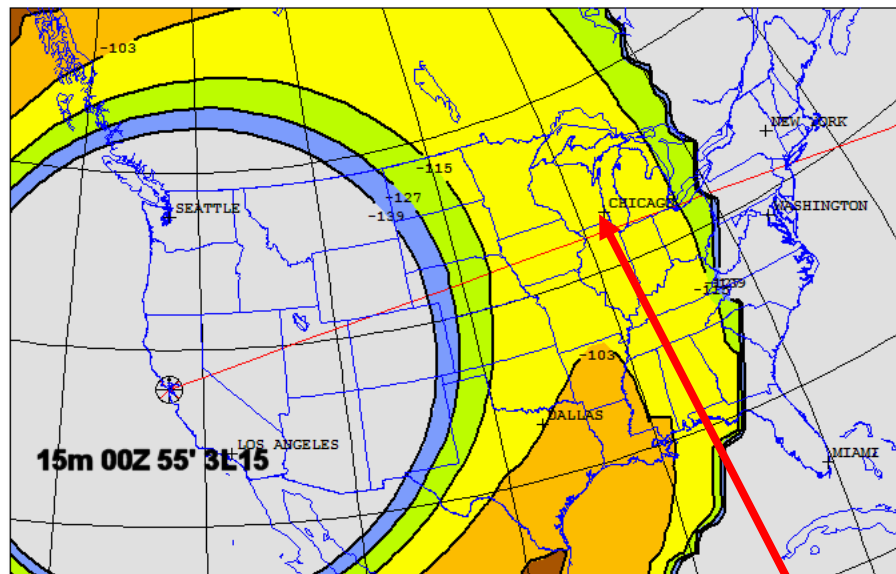


N6RO Stacked 5L20s at
130°/90°/45°

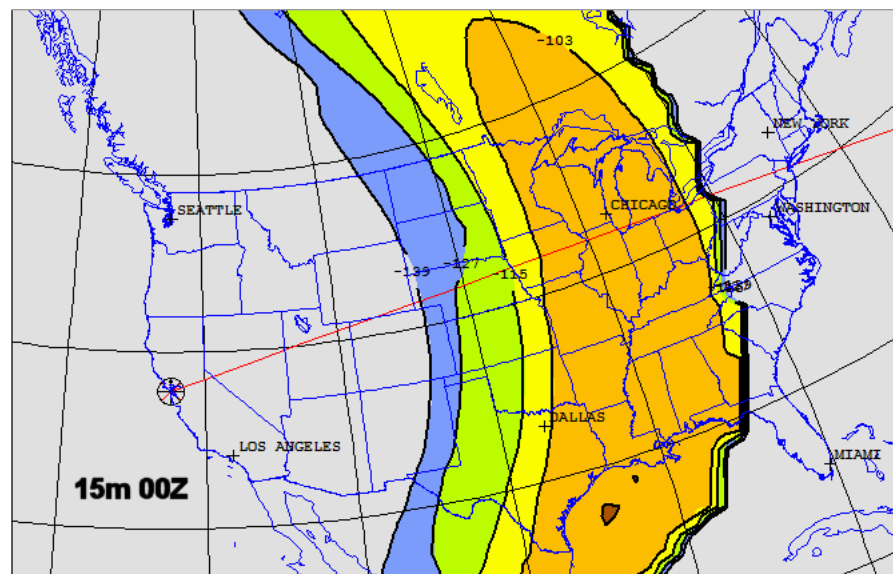
Moderately stronger into Far East on 20 meters.

20 Meters to Japan





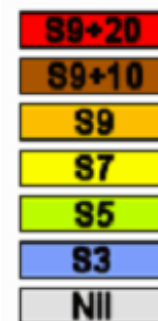
3L15 at 55'

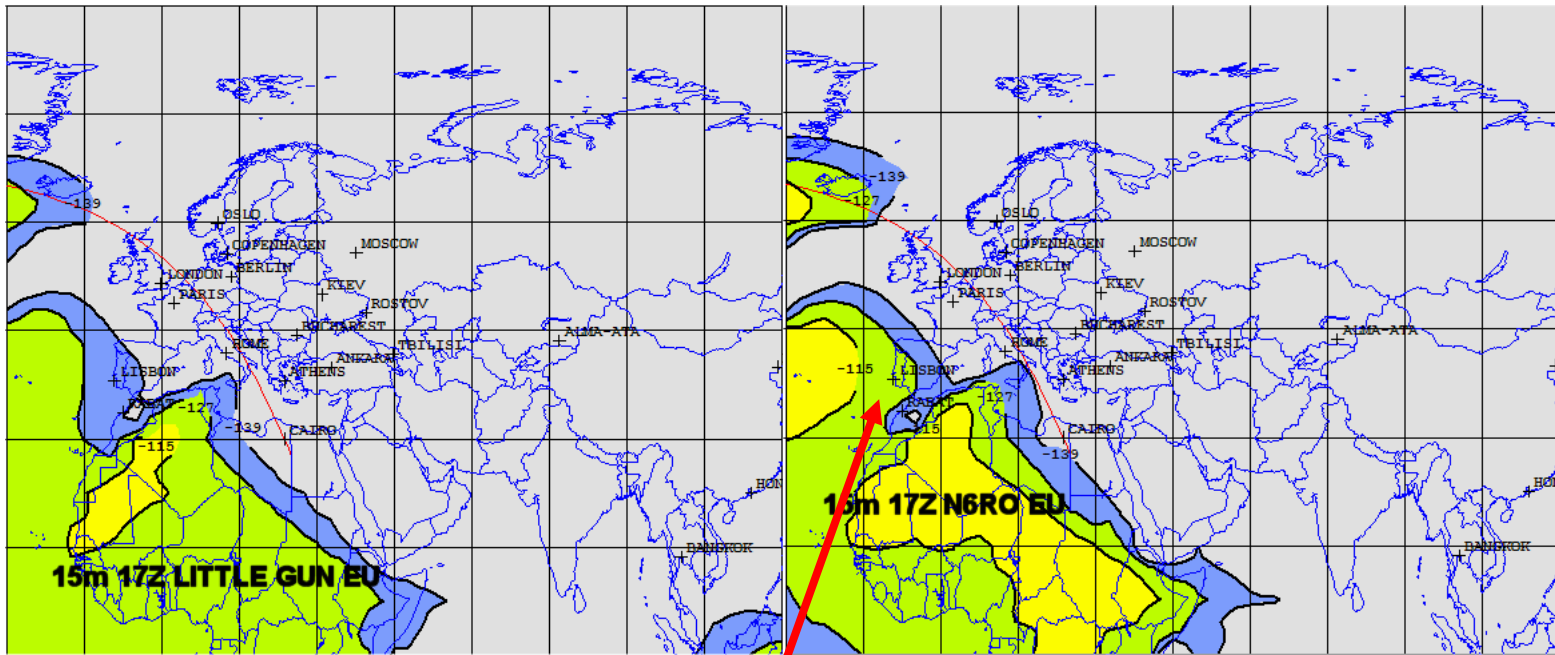


N6RO Stacked 6L15s at
130'/85'/50'

Significant difference in upper Midwest on 15 meters,
especially as band fades and angles get lower.

15 Meters to USA



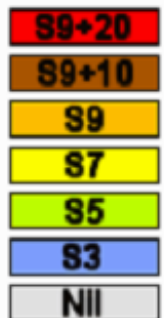


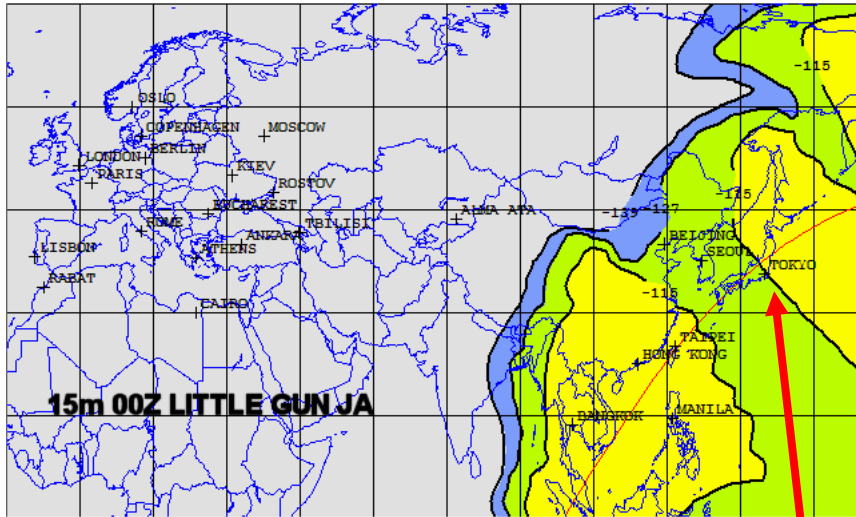
3L15 at 55'

N6RO Stacked 6L15s at
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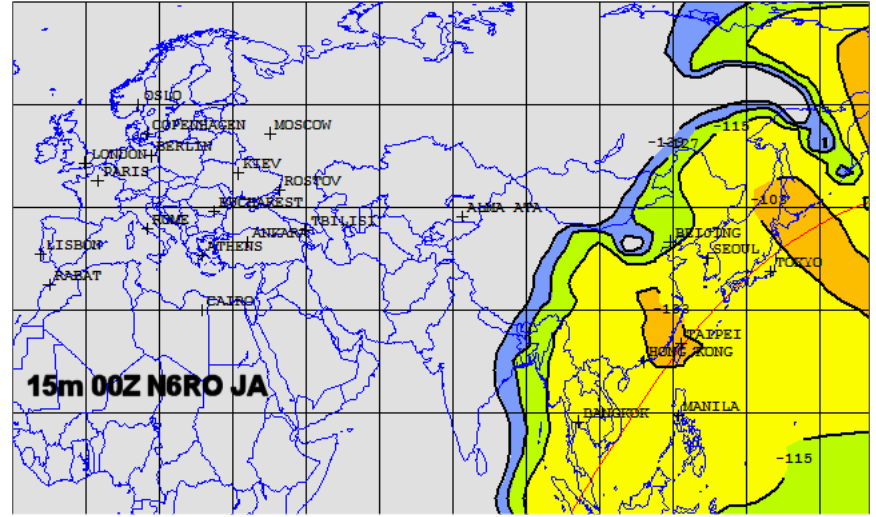
Some, but not all that much difference, on 15 meters.
This is for a Low level of solar activity.

15 Meters to Europe





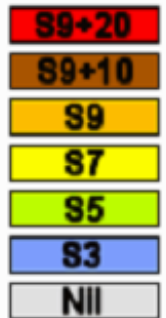
3L15 at 55'

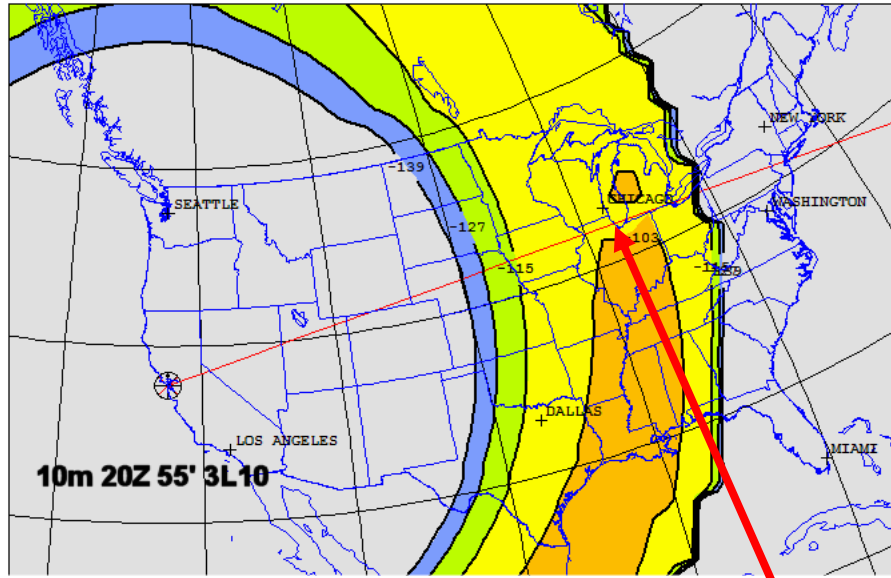


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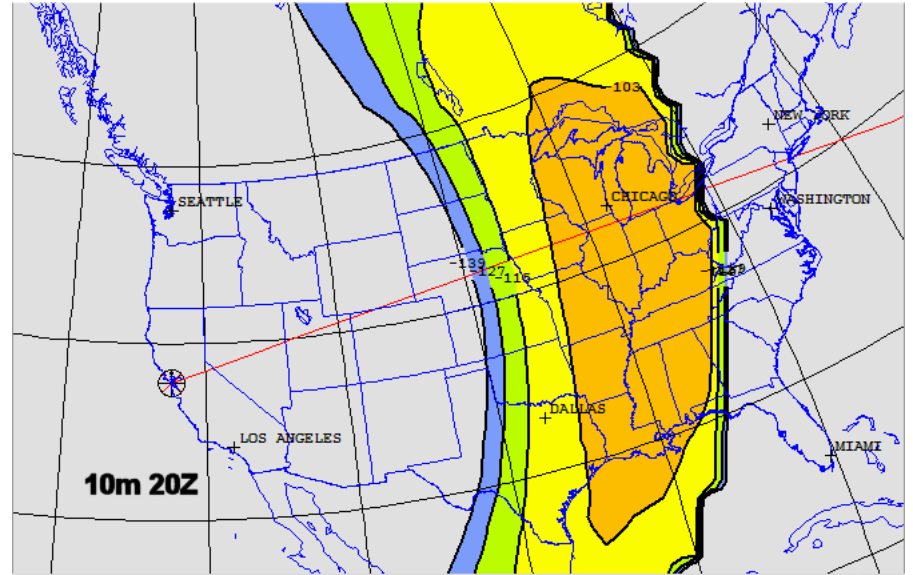
About 2 S-units down from N6RO stacks into
Far East.

15 Meters to Japan





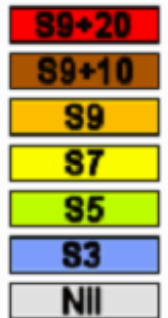
3L10 at 55'



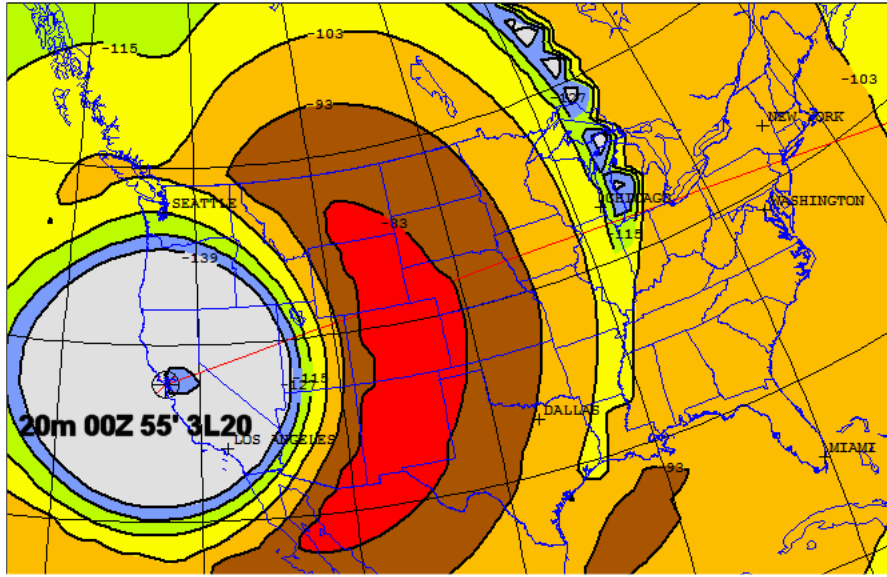
N6RO Stacked 5L10s at
100'/80'/60'/40'

Some, but not overwhelming difference, on 10 meters.

10 Meters to USA

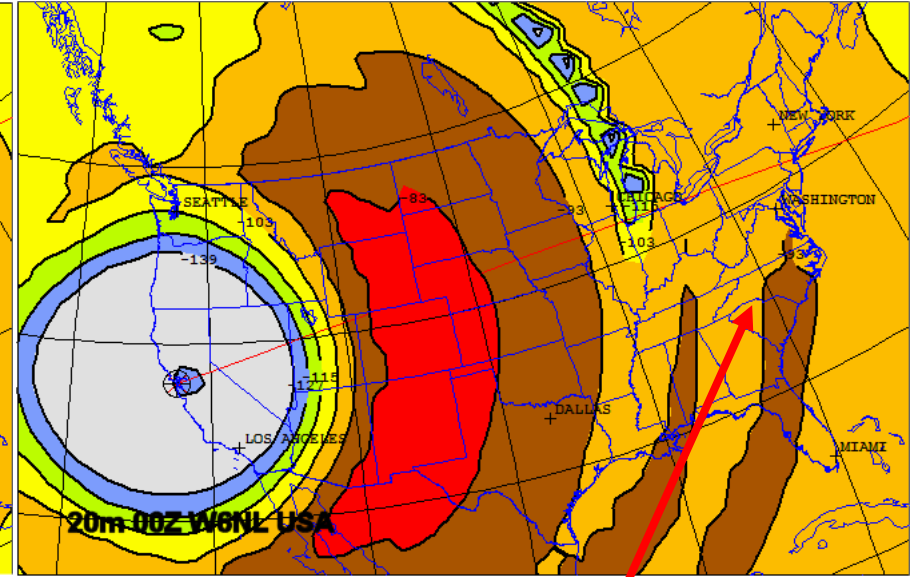


What About Terrain?

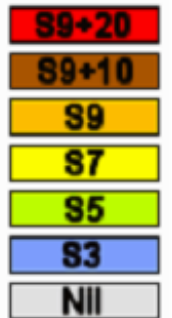


3L20 at 55' on flat
ground

Being on a mountain makes a difference, even
domestically.

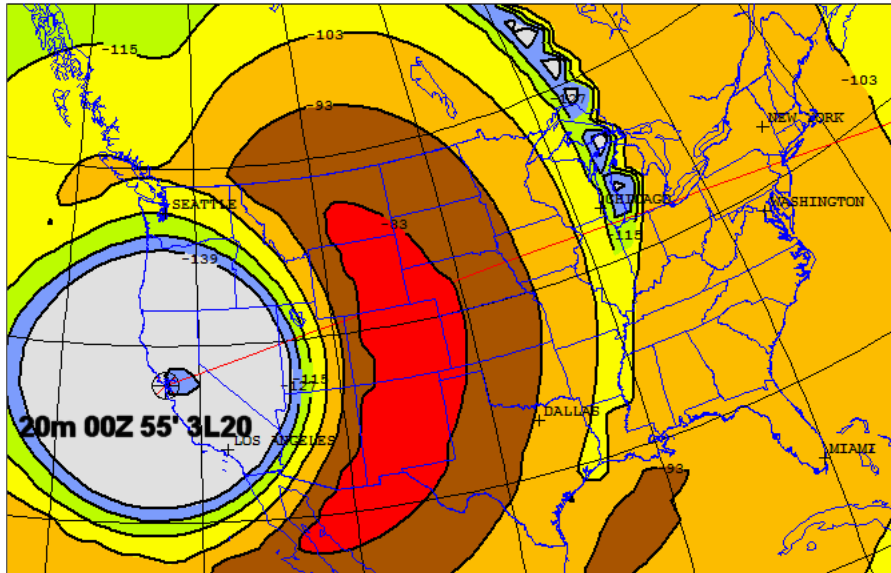


3L20 at 55' on W6NL's
3400' mountaintop

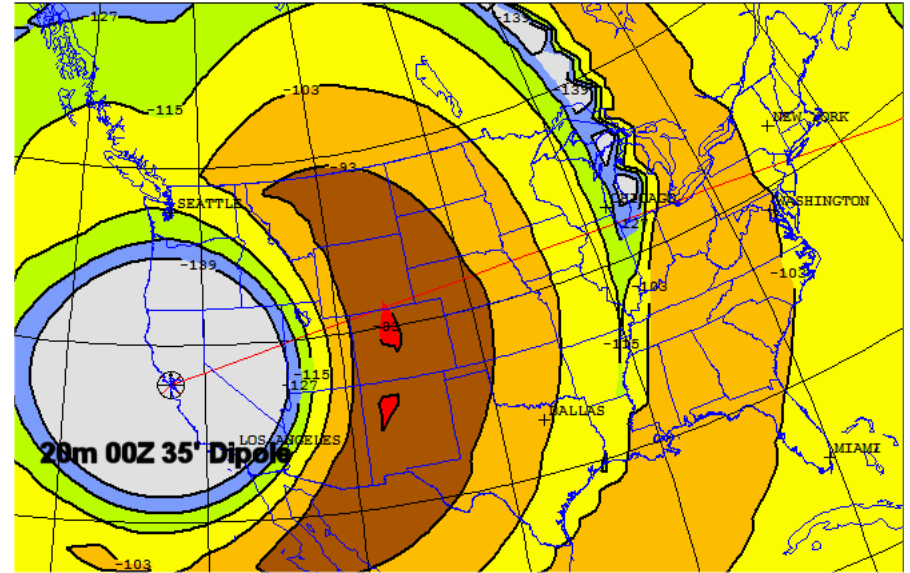


Terrain: 20 Meters to USA

What About a Low Dipole?



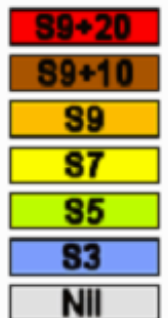
3L20 at 55'

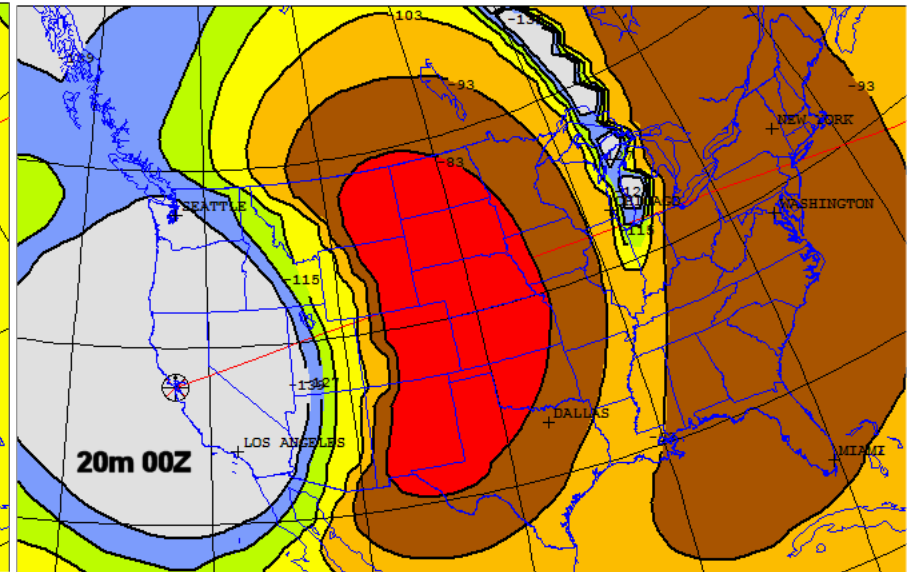
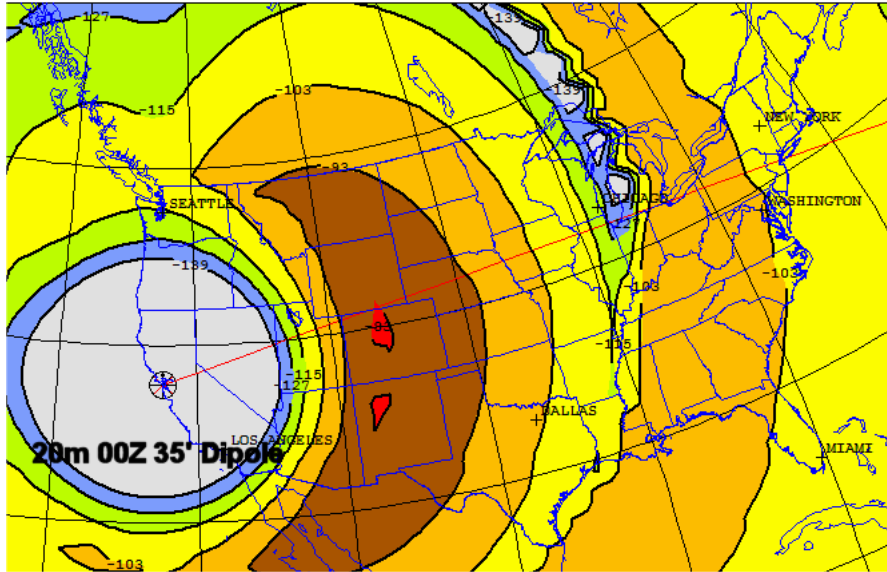


Dipole at 35'

Comparing a tribander to a dipole at 35' — almost 2 S-units difference.

Dipole: 20 Meters to USA



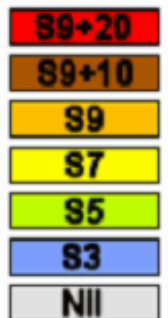


Dipole at 35'

N6RO Stacked 5L20s at
130'/90'/45'

Comparing a 35' dipole to N6RO stacks: max
difference of about 4 S-units into East Coast.

Dipole: 20 Meters to USA



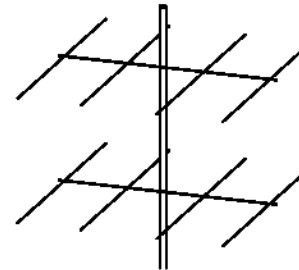
Everything Works – Sort of!

**The range of HF antenna gain is not huge —
from about -20 dBi to $+20$ dBi.**

- A 40-dB range covers antenna such as a radiating light bulb up to a stack of monoband Yagis.



40 dB



A Short Course on HF Antennas for Contesting

- Today I have presented comparisons between a Big Gun multi-multi contest station and a more modest Little Gun.

A Short Course on HF Antennas for Contesting

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- In most instances, the Big Gun was stronger by 2 S-units, the difference between 1500 W and 100 W.

A Short Course on HF Antennas for Contesting

- Today I have presented comparisons between a Big Gun multi-multi contest station and a more modest Little Gun.
- In most instances, the Big Gun was stronger by 2 S-units, the difference between 1500 W and 100 W.
- So, a Little Gun won't be able to steal N6RO's frequency... but he still can have *lots* of fun working contests!

Further Listening/Reading

- Check out the following URLs:
 - <http://nccc.cc>, click “Webinars”
 - <http://pvrc.org>, click “Recorded webinars”