Pop Quiz

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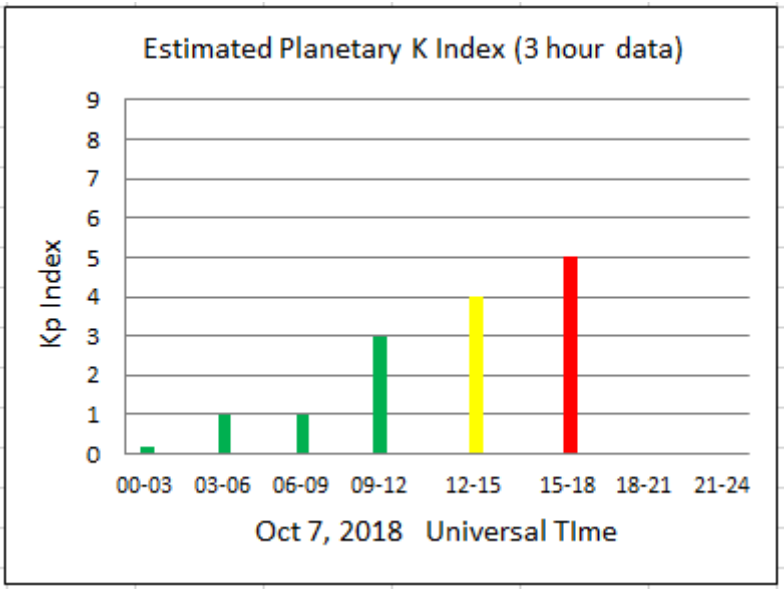
Suppose you're monitoring the K indices (at https://www.swpc.noaa.gov/ in the lower right panel, for example) and you see the following progression on a given day for the first six values of the Kp index (Kp is the 3-hour planetary K index – a compilation of many observatories to see a worldwide view of the activity of the Earth's magnetic field).



What should you do?

A) Turn off your radio as the F2 region is going to be depleted of electrons and there won't be any propagation.

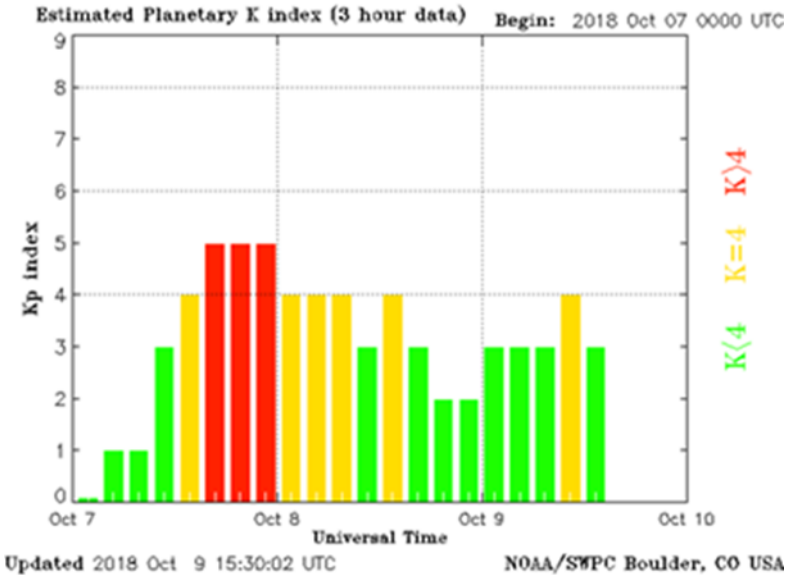
B) Check the higher HF bands for enhanced propagation.

If you chose A, you might miss out on a golden opportunity to enjoy some unusual propagation. If you chose B, you probably realize that there can be a short-term enhancement in F2 region propagation on low and mid latitude paths when the K index initially spikes up.

The B scenario is what happened for the 2018 running of the California QSO Party (October 6 and 7). On Saturday the 6th, no W6 stations were heard on 10-meters here in the Midwest. That isn't unusual as the MUF (maximum usable frequency) for this path at solar minimum during the daytime would only be about 20 MHz.

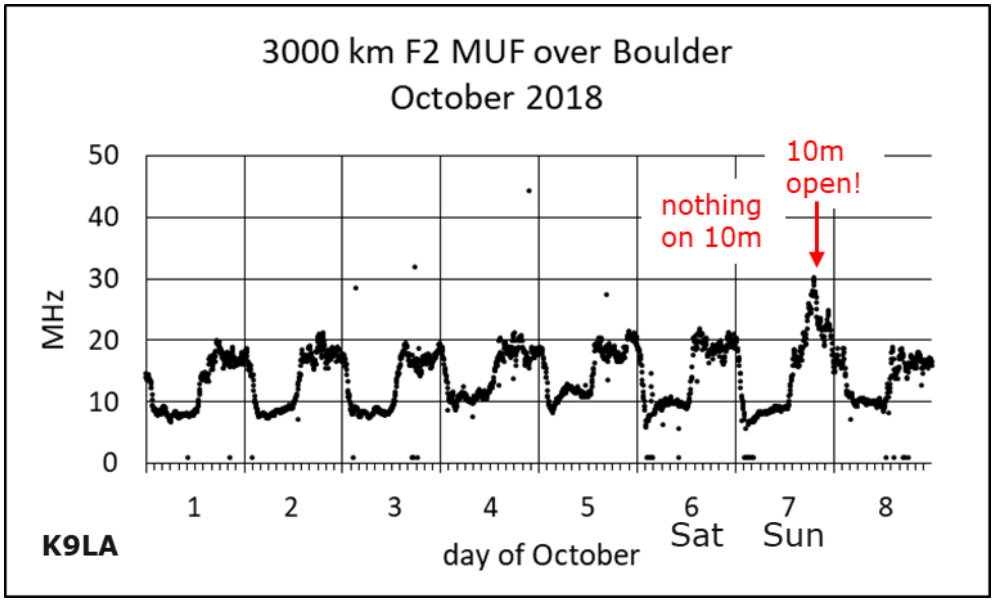
But on Sunday the 7th, the path from the Midwest to W6 on 10-meters opened. What happened was an enhancement in the F2 region electron density due to the Kp index spiking up in the 12-15z period on October 7. This is the positive phase of a geomagnetic storm.

Here's the Kp index for October 7, 8 and 9 of 2018. It's a more complete picture of the previous Kp index plot.



You can see the Kp index spiking up to 4 in the 12-15z period on the 7th, and to 5 in the 15-18z, 18-21z and 21-24z periods on the 7th before settling down a bit.

And we're in luck – the Boulder ionosonde is along the Midwest to W6 path and is about at the midpoint. Here's the Boulder 3000 km MUF data for the first 8 days in October 2018. This is the MUF for a 3000 km path with Boulder as the midpoint.



For the first 6 days of October 2018, the maximum MUF during the daytime was indeed around 20 MHz. But after the Kp index spiked up on the 7th, the MUF increased to a bit over 30 MHz

for a short time. Thus 10-meters opened up and there were many QSOs to be had if you were on 10-meters at the right time.

So the next time the Kp index spikes up, don't immediately turn off your radio. Check the higher HF bands to see if there is an F2 region enhancement. It doesn't happen all the time, but it's worth a quick check.