

## Observation of HF Sudden Frequency Deviation on 22 May 2021

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A Sudden Frequency Deviation (SFD) is a change in the received frequency of a fixed carrier caused by rapid changes in Earth's ionosphere from a solar flare. SFD concepts are discussed in detail in {Reeve15}. In the observation discussed here (figure 1), the carrier was from the WWVH 15 MHz time-frequency transmitter located approximately 4 km up the beach from Kekaha, Hawaii. The receiver station includes an Icom R-8600 wideband receiver connected to an 8-element KMA-1832 log periodic dipole array in Anchorage, Alaska. Argo software captured the demodulated carrier and showed a +2, -10 Hz deviation over a period of about 6 min.

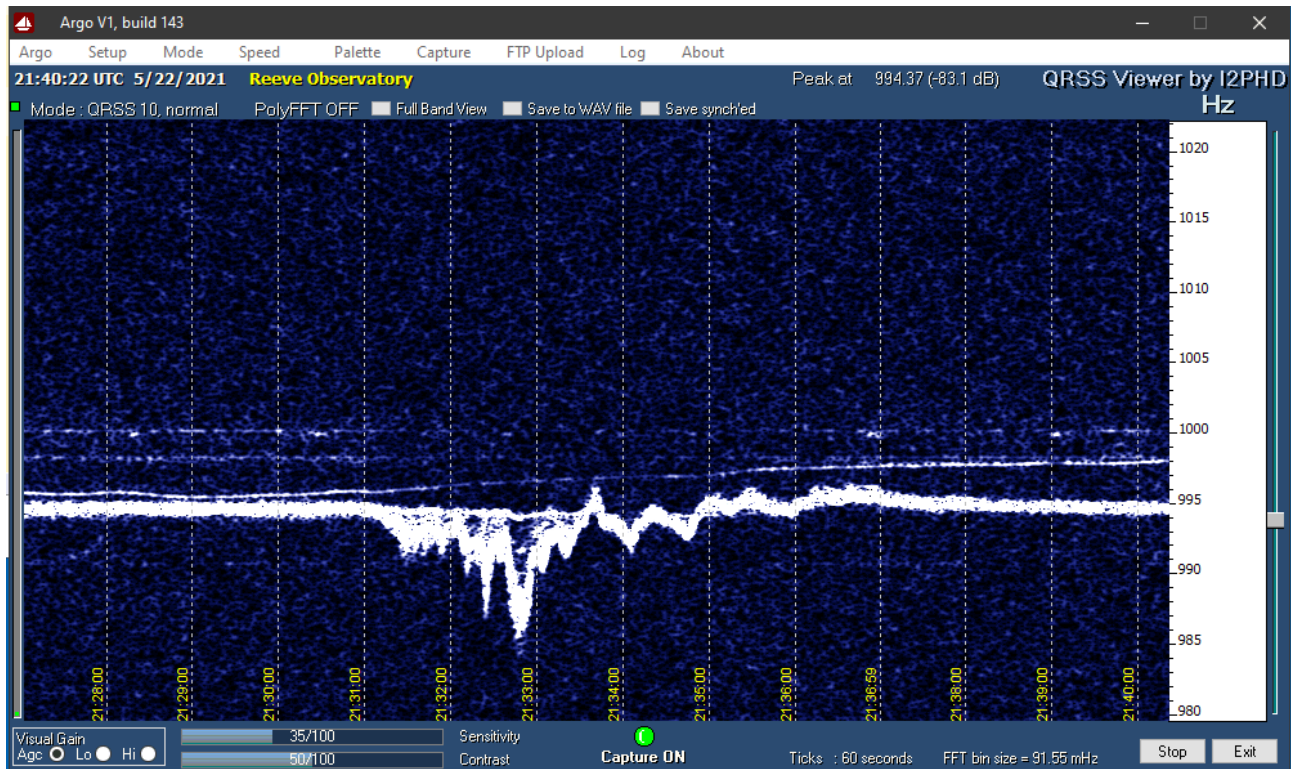


Figure 1 ~ The thick white trace is the WWVH carrier demodulated to 995 Hz over the time period 2127 to 2140 UTC. Frequency is shown on the right vertical scale. The signal shows several cycles of rapid frequency change with the largest negative peak of 10 Hz just before 2133. The faint traces are spurious signals.

The SFD likely was caused by a solar x-ray event in active region 2824 that produced an M1.4 flare observed from 2130 to 2136 UTC. See {SWPC-FCST} and {SWPC-EVNT} for 22 May 2021. The effects can be seen in the SFD trace from 2131 to 2136. Radio effects of the flare also were observed at Anchorage during this time period up to 415 MHz.

### References & Weblinks:

- {Reeve15} [http://www.reeve.com/Documents/Articles%20Papers/Propagation%20Anomalies/Reeve\\_SuddenFreqDevConcepts\\_P1.pdf](http://www.reeve.com/Documents/Articles%20Papers/Propagation%20Anomalies/Reeve_SuddenFreqDevConcepts_P1.pdf)
- {SWPC-FCST} <ftp://ftp.swpc.noaa.gov/pub/forecasts/discussion/>
- {SWPC-EVNT} <ftp://ftp.swpc.noaa.gov/pub/indices/events/>