Observation of Ionospheric Modification Using High Power Oblique HF transmissions

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Abstract: A series of experiments were carried out during late May 1991 to investigate changes produced in the ionosphere by a high power HF transmitter operating at a frequency approximately two times the F-layer critical frequency. These high power oblique transmissions heated a region of the ionosphere some 1200km east of the Delano, CA Voice of America relay station, operating with an effective radiated power of 90 dBW. An HF probe signal was used to detect changes in the ionosphere as it passed through the modified region. The probe system, operating at a frequency very close to the heater frequency, frequently showed amplitude changes that correlate well with the ten minute on/off cycling of the high power transmitter. This preliminary study used several signal processing methods to detect these changes in the presence of strong polarization fading. The results indicate that the amplitude of the probe signal decreased by 2 to 3 dB, often within 15 to 30s after the high power transmitter was turned on.

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