

For more than four decades, sounding the ionosphere with ionospheric sounders or ionosondes has been the most important technique developed for the investigation of the global structure of the ionosphere, its diurnal, seasonal and solar cycle changes, and its response to solar disturbances. A NBS C3 analogue ionosonde was installed at the Kodaikanal (10° 13' 50" N, 77° 28' 07", geomagnetic latitude 0.8°N) Solar Observatory in 1955, for vertical soundings of the ionosphere. Quarterly soundings were made round the clock. In 1993, a digital ionosonde (model IPS 42/DBD43) was commissioned enabling five minute or better sounding rates. Observations continued up to Jan 12th 2001.

Ionogram: Ionospheric sounders or ionosondes are, in principle, HF radars that record the time of flight or travel of a transmitted HF signal as a measure of its ionospheric reflection height. By sweeping in frequency, typically from 1.0 to 20 MHz, an ionosonde obtains a measurement of the ionospheric reflection height as a function of frequency. A recording of this reflection height measurement as a function of frequency is called an ionogram. Ionograms can be used to determine the electron density distribution as a function of height, $N_e(h)$, from a height that is approximately the bottom of the E layer to generally the peak of the F2 layer, except under spread F conditions or under conditions when the underlying ionization prevents measurement of the F2 layer peak density.

Two typical [day-time (left) and night-time (right)] ionograms produced by the C-3 analog ionospheric recorder using film recording technique are shown in Figure 1. The frequency range is 1.0 to 20 MHz (horizontal axis), and the displayed height range is 1000 km, with 100 km height markers. The critical frequencies are those frequencies at which the ionospheric sounder signals penetrate the respective layers. These frequencies are a measure of the maximum electron density of the respective layers.

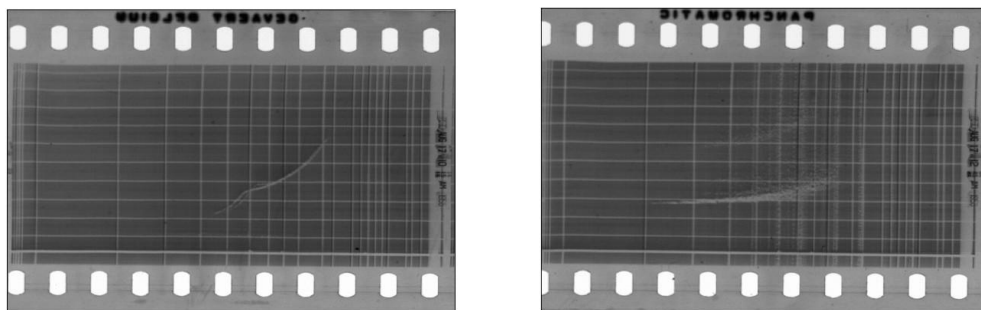


Figure 1

Conventions: URSI-standard-ionogram-information hand book may be referred for identifying characteristic parameters of different ionospheric layers. Following link also provides information on the characteristic parameters that can be deduced from a standard ionogram.

https://www.ngdc.noaa.gov/stp/space-weather/online-publications/miscellaneous/afri_publications/handbook_1985/chapter10

Ionogram data on 35 mm film can be made available to the users. Scaling facility is available at the Observatory. Stay facility, on payment basis, at the observatory guest house be made available on request.

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