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TROPICAL IONOSPHERE AND RADIO SYSTEMS

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A wide spectrum of radio waves, from VLF to microwaves, is being used for long distance radio communication. For the last 7 decades and more, ionospheric layers are being exploited routinely for radio communication over long distances in HF Bands. HF communication remained to be the main stay for long distance communication around the globe until 1980s when SATCOM emerged in a big way. Ionospheric communication has been particularly attractive to low latitude countries like India because of the natural advantages the ionosphere offers at these latitudes in terms of availability of higher band widths and relatively very low vulnerability to magnetic storms. While SATCOM offers radio communications in VHF and microwaves with reliabilities of an order of magnitude higher, it has to neccessarily compromise with the nuisance value of ionosphere in its communication path. The problems arise because of the embedded, moving irregularities in the ionosphere particularly in equatorial and low latitudes and also due to the group retardation of the radio waves as they pass through the ionosphere. These problems can be countered to a certain extent by using frequencies in much higher bands, but such frequency bands will have to contend with tropospheric problems caused by rain and water vapour with their abundance in the tropics. Special emphasis will be laid on those ionospheric features that degrade the performance of Radio systems and remedial measures to improve the reliability on short and long term basis.