

Coastal areas and river valleys are especially likely to have anomalous propagation related to air stratification, and extreme refractivity values are most likely to occur in layers of rather limited vertical extent. The decrease in probability of extreme gradients that occurs as the averaging interval is increased is illustrated by the distribution for Cardington (see Appendix C).

Tropical and sub-tropical regions generally have larger diurnal and interdiurnal variations in refractivity gradients than do temperate regions (Hart et al., 1971). Extreme gradients are also much more common in the tropics, and over layers of limited thickness (up to a few tens of meters) may at times exceed ± 1000 N-units/km. Use of the data from the nearest RAOB station is not always a satisfactory approach to radio-climatological estimates in the tropics, unless local modifications of the indicated refractivity are considered. A radio-meteorological investigation in the Mekong Delta of Viet Nam (Samson and Maloney, 1971) showed that significant long-term differences existed even over distances on the order of 100 km.

The refractivity is highly sensitive to humidity, which can change rapidly over comparatively limited horizontal or vertical distances in the tropics. Such changes often occur in land/sea breeze circulations, trade-wind subsidence regions, and monsoonal flows. At higher latitudes, however, the movement of air masses involved in large-scale weather systems may effectively produce a temporary "tropical" environment in a normally "temperate" region, as when warm, moist air masses move over the central U.S. from the Gulf of Mexico. Thus the extreme gradients common to many tropical regions can also be expected to occur at times in more temperate regions.

5. CONCLUSIONS

Refractivity data from RAOBs can be of value in link design and performance estimates, but its applicability is subject to the limitations discussed in the preceding section. The data in Appendix C must therefore be applied with considerable engineering judgment.

6. ACKNOWLEDGMENT

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The maps, graphs, and figures used in this report were prepared by Mary E. McClanahan of ITS.