

REFRACTIVITY PROFILE STATISTICS RELATED TO PROPAGATION ASSESSMENT OF COASTAL CITIES OF IRAN IN THE VICINITY OF THE PERSIAN GULF

J. Goldhirsh

Johns Hopkins University, APL

Statistics associated with ducting and non-ducting profiles were examined for three coastal cities, located in the vicinity of the Persian Gulf; namely, Bushehr, Bandar Abbas and Cha Bahar. The results were compiled from a database of pressure, temperature and dew point measured from approximately 1000 radiosondes during the spring-summer of 1973 and winter of 1974 by the U.S. Air Force (Ko et al., "Refractivity Profiles for the Persian Gulf," Technical Report STD-N-522, Applied Physics Laboratory, Johns Hopkins University, Laurel, MD Sept 27, 1987.) Modified refractive index-height profiles were calculated from these radiosonde measurements, and cumulative density distributions of duct heights and duct slopes were subsequently determined for both bi-linear and tri-linear surface-based ducts. Non-ducting profiles were also statistically examined in terms of K-Factor and layer-heights. The layer-height for the non-ducting profile was assumed to correspond to the first significant height level of the radiosonde measurement, above which, the profile was assumed to have a refractivity-height slope corresponding to that of a standard atmosphere. The likelihoods of propagation conditions such as ducting, superrefraction, subrefraction and extreme subrefraction were determined for each of the coastal locations. Typical or "most-probable" profiles were generated for bi-linear, tri-linear ducts and non-ducting cases for both spring-summer and winter periods. This is the first time profiles have been determined for the Persian Gulf such that duct-heights or layer-heights were correlated with slopes of the modified refractive index below them. For example, Bushehr, the most northern of the above mentioned cities near the middle latitude of the Persian Gulf, showed for the spring-summer period that the most-probable bi-linear duct had a height of 180 m and a correlated duct slope below it of -125 M/km down to the surface. The slope above the duct-height was assumed to be standard. This contrasts with the most-probable bi-linear duct for the winter period, for which the duct-height was 100 m and the duct slope below it was -25 M/km. The most-probable non-duct profile during the winter period was found to have a K-Factor of 1.35 from the surface up to a layer-height of 95 m. Based on 247 radiosondes measurements for Bushehr during the spring-summer period, ducting occurred 92% of the time. This compared to 21% of the time during the winter relative to 92 radiosondes. Of the ducting cases during the spring-summer period, 69% were of the bi-linear type and 31% were tri-linear. A comparative description of similar types of propagation related statistics for the three coastal locations will be presented.

Abstract Submission Form
2006 National Radio Science Meeting

Abstract: goldhirsh14673

Date Received: September 6, 2005

1. (a) Julius Goldhirsh
11100 Johns Hopkins Road
Laurel, MD
20723-6099 USA
Julius.Goldhirsh@jhuap
(b) 443-778-5042
(c) 978-428-5518
2. F - Wave Propagation and Remote Sensing
3. (a)
4. C - Contributed Paper
5. No special instructions