

APPENDIX A. CUMULATIVE DISTRIBUTIONS OF THE OBSERVED RADIO REFRACTIVITY GRADIENT IN THE GROUND-BASED 100-m LAYER

Stations are listed in alphabetical order, with the geographical coordinates, elevation above mean sea level, period of record, and climatological data. To provide an indication of winter/summer contrasts, the average daily maximum, the average daily minimum, and the mean monthly dew-point temperatures are given for January and July. Precipitation data are the annual totals and the averages for the wettest and driest months. In most cases, the refractivity gradient distributions are based upon radiosonde observations made twice daily (at 0300Z and 1500Z, or 0000Z and 1200Z). The graph shown on the same page as the climatological data gives distributions based on all available observations, regardless of time of day. Additional graphs for each of the seasonal months give separate distributions for each time of observation at certain stations to provide an indication of diurnal variability of the gradients. Where the data base covered the period of change from 0300Z and 1500Z observations to 0000Z and 1200Z observations, these separate distributions are based on the pair of observations with the greater amount of data. At Dayton, Lajes, Mt. Clemens, and Rantoul observations were regularly made four times a day at 6-hr intervals, and four separate distributions are given.

The times of observation have been converted to an arbitrary "Local Standard Time" based on the assumption of zones exactly 15 degrees wide and centered on longitudes of 0°, 15°, 30°, etc. (see figure 2).

Note particularly that the graphs do not show the percentage of a year in which certain gradients may be expected to occur, but only the percentage of occurrence of particular gradients at the time of the brief daily observations in the lowest 100-m layer.

Each graph has a dual scale on the ordinate to show both the refractivity gradient in N-units/km and the equivalent effective earth radius factor, "k", which is used to compensate for ray bending in terrain profile analysis of radio links. The factor "k" is related to the refractivity gradient $\Delta N/\Delta h$ in N-units/km by

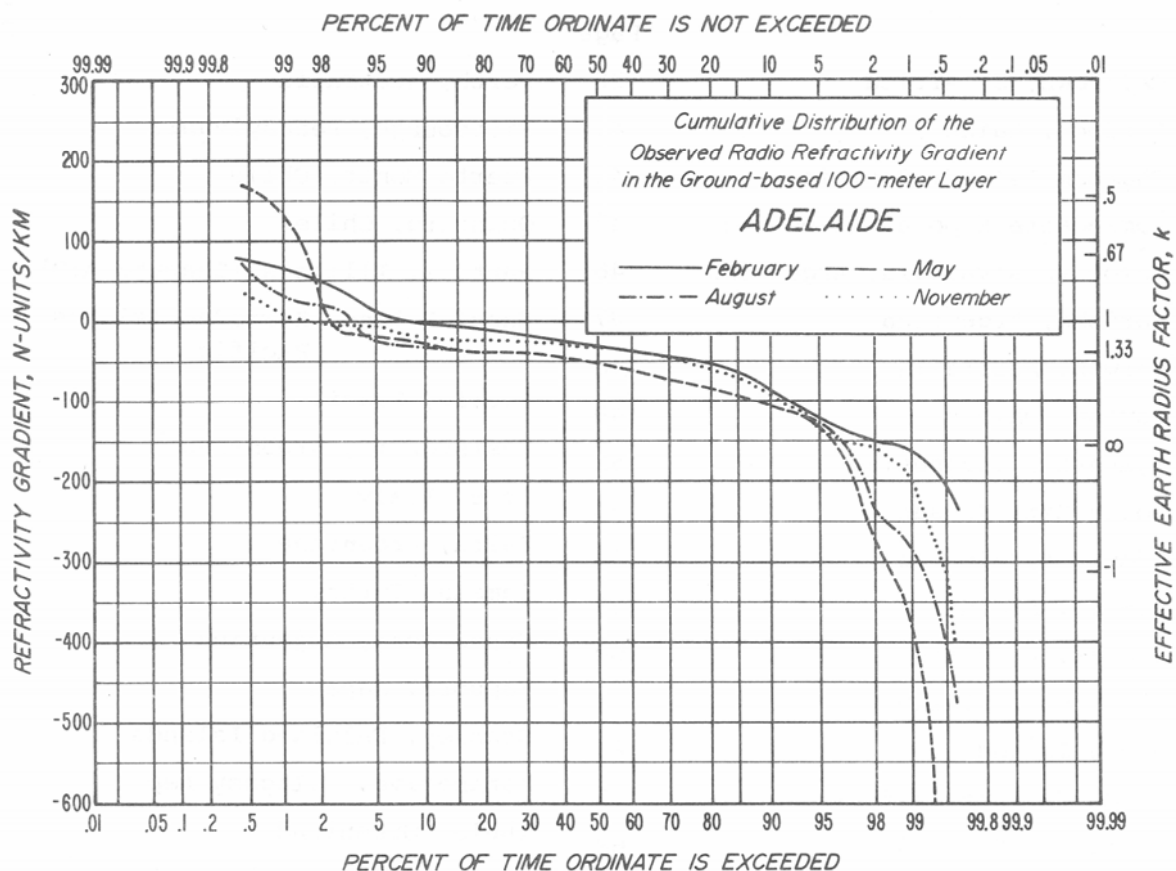
$$k \approx \left[1 + 6370 \frac{\Delta N}{\Delta h} \times 10^{-6} \right]^{-1}$$

where 6370 km represents the actual earth radius (Dougherty, 1968).

STATION INDEX. REFRACTIVE INDEX DATA

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Adelaide, Australia

34° 56' S, 138° 35' E

11 m m.s.l.

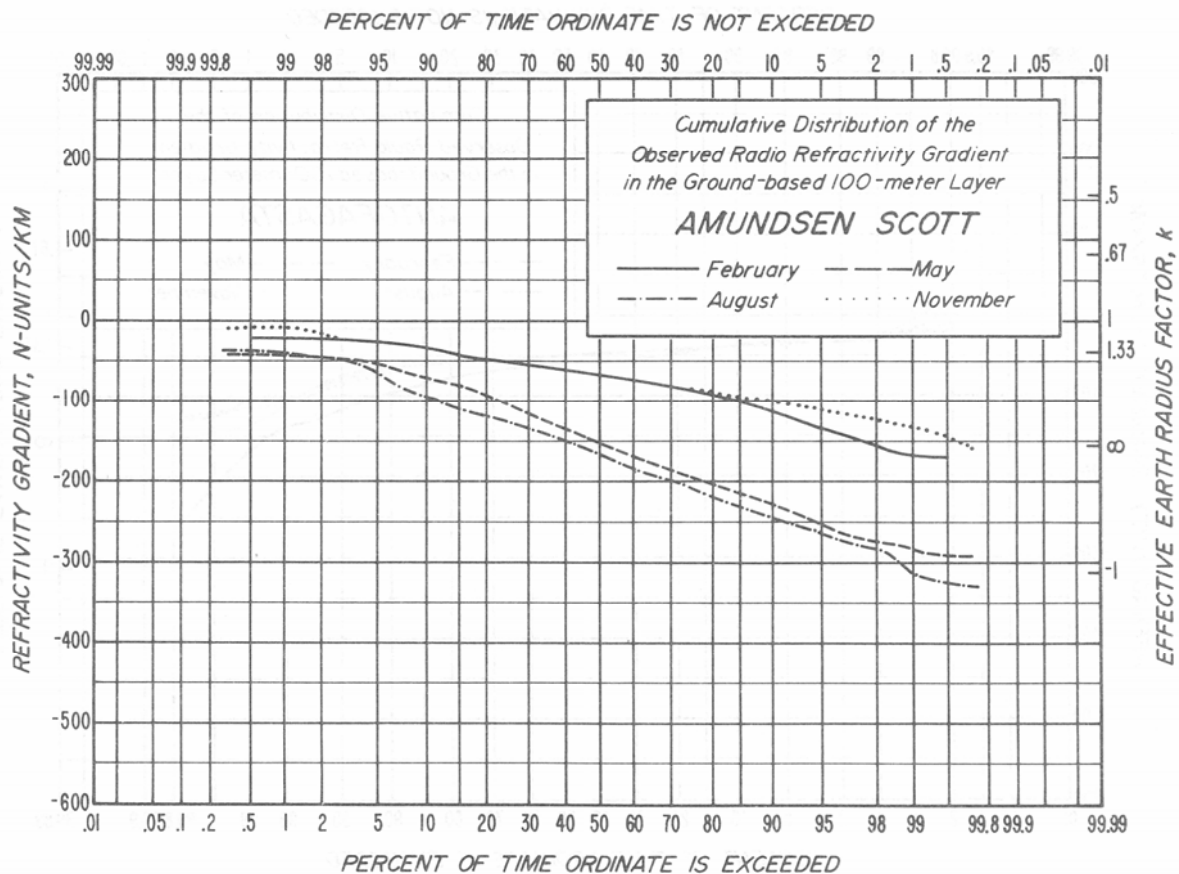
Data: Radiosonde. 0800Z (1700 LST): 2/49 - 11/51
 0700Z (1600 LST): 2/52 - 8/52
 0400Z (1300 LST): 11/52 - 2/53

Temperature (°F): January 86/61; July 59/45

Mean Dewpoint (°F): January 48; July 44

Precipitation (inches): Annual 21.1; June 3.00; February 0.70

Near the east shore of the Gulf of St. Vincent at the foot of the Mt. Lofty ranges. A mediterranean type of climate with warm, dry summers and cool, rainy winters.



Amundsen Scott, Antarctica

90° 00' S, 00° 00'

2800 m m.s.l.

Data: Radiosonde. 0000 and 1200Z: 5/57 - 11/59

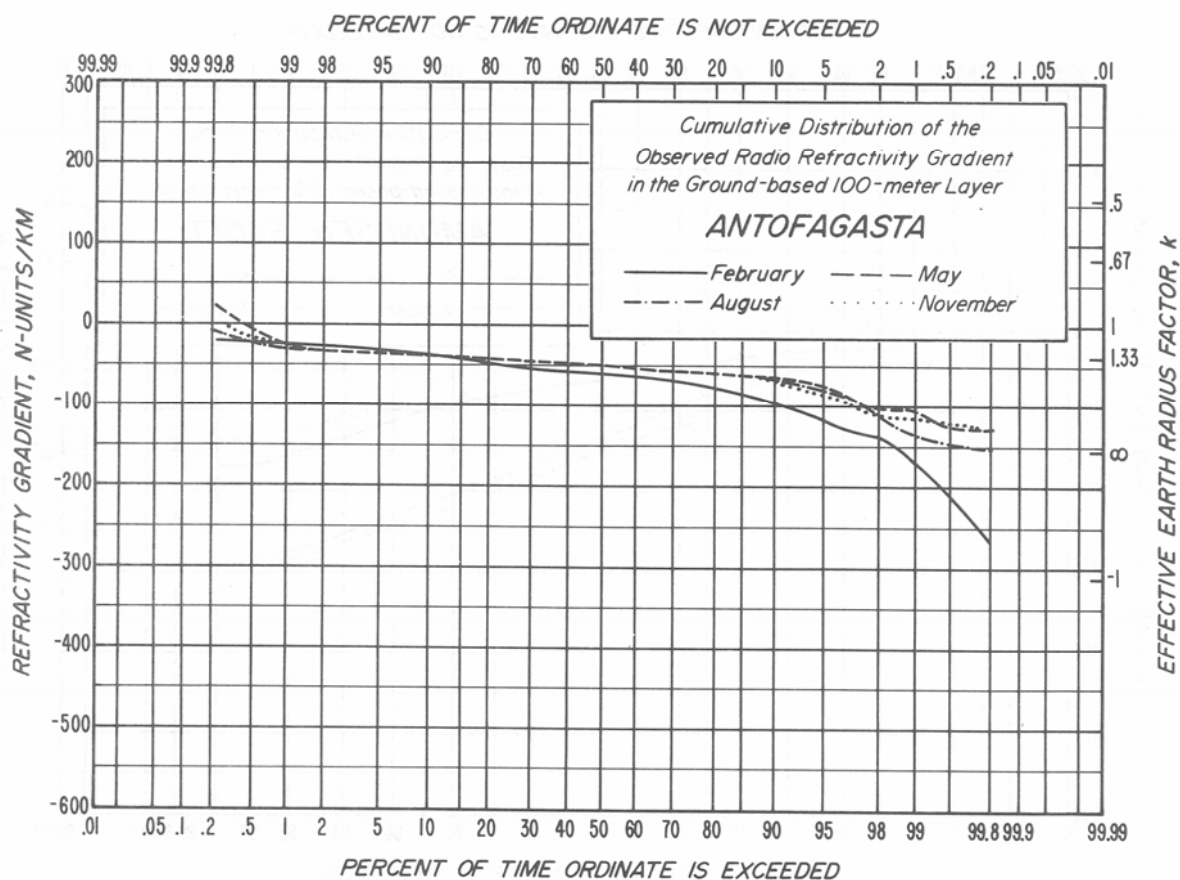
(Data below are for South Pole Station (89-59 S, 00-00.)

Temperature (°F): January -16/-23; July -67/-81

Mean Dewpoint (°F): January -24; July -77

Precipitation (inches): Annual 0.1; February 0.05; November and March through September 0.00

Located on the Antarctic plateau. A very severe polar frost type of climate.



Antofagasta, Chile

23° 28' S, 70° 26' W

122 m m.s.l.

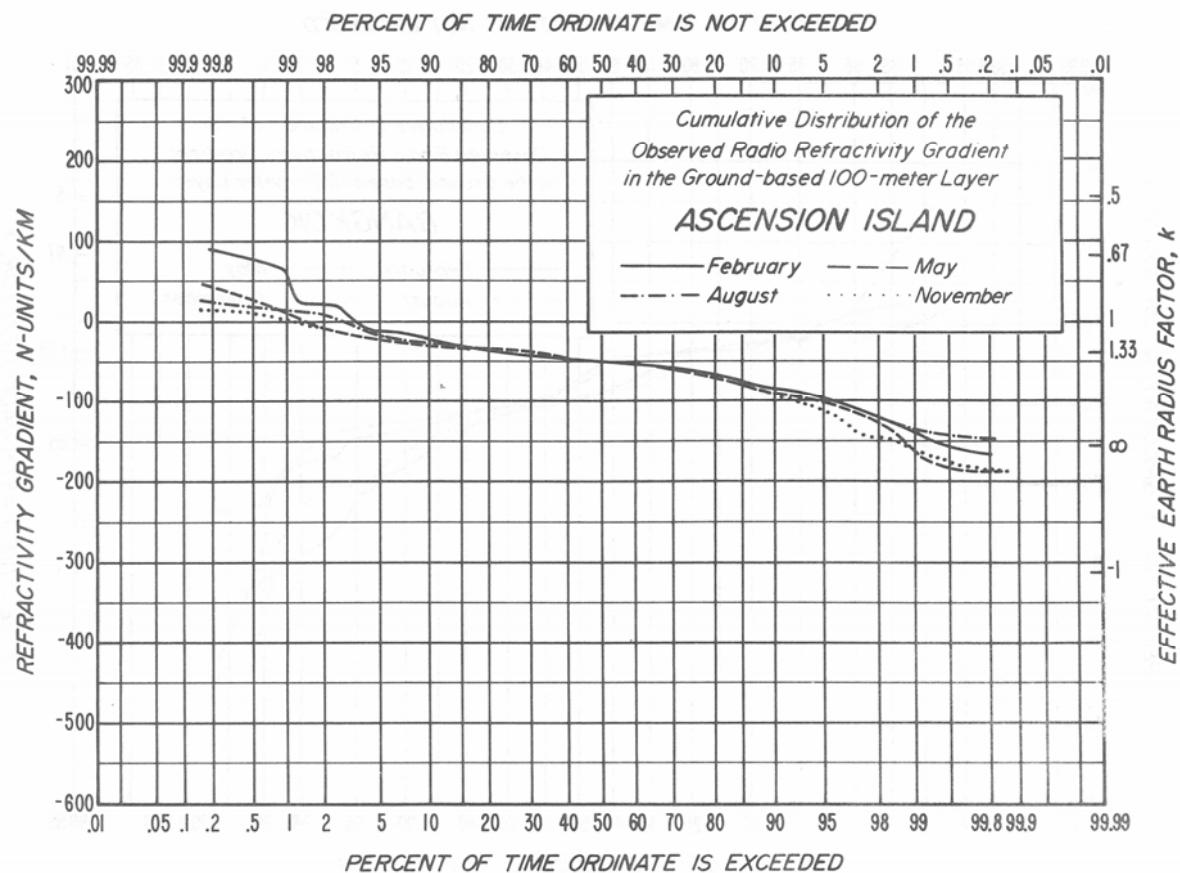
Data: Radiosonde. 0000 and 1200Z (1900 and 0700 LST): 8/57 - 8/62

Temperature (°F): January 76/63; July 63/51

Mean Dewpoint (°F): January 59; July 48

Precipitation (inches): Annual 0.7; July 0.20; December, January, February, March 0.00

A port on the Pacific Ocean in northern Chile on the edge of a desert; it has moderate temperatures and small seasonal variations because of the marine exposure.



Ascension Island

07° 58' S, 14° 24' W

79 m m.s.l.

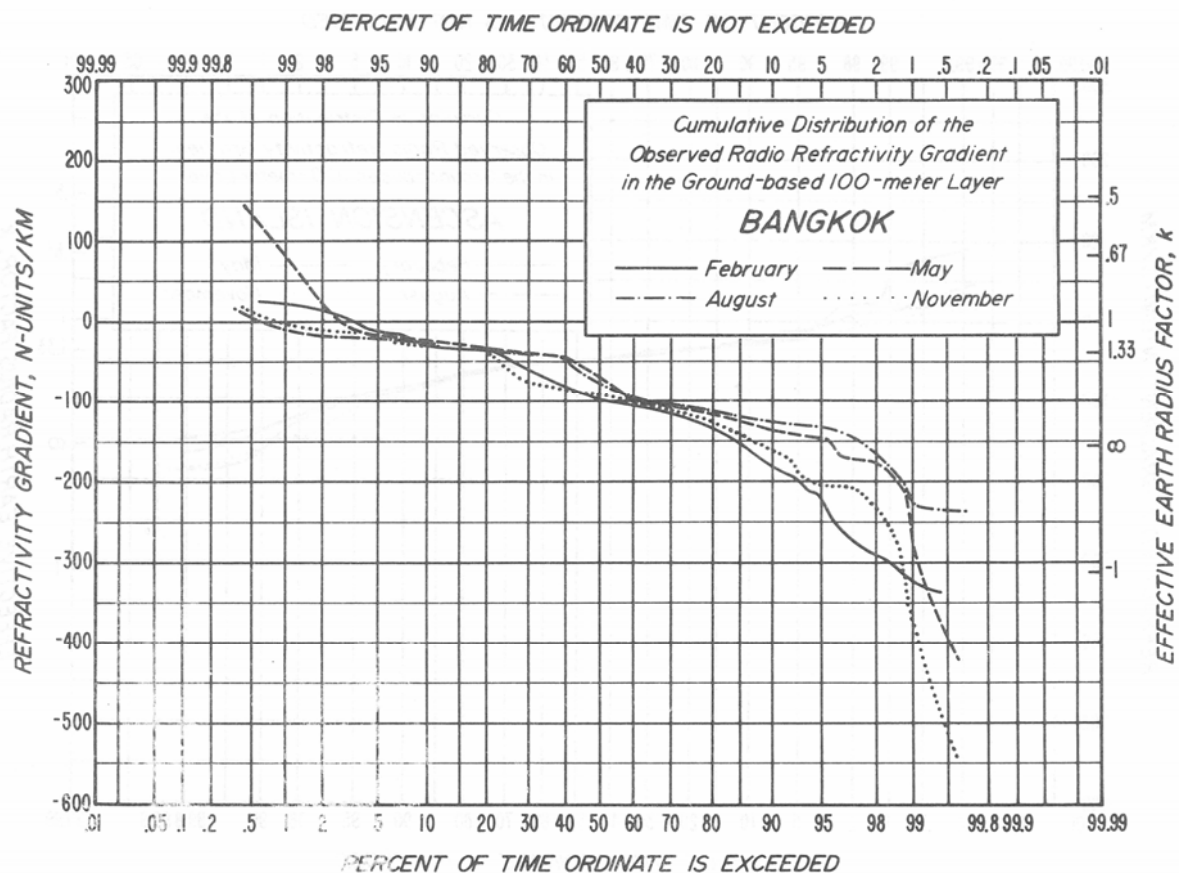
Data: Radiosonde. 0000 and 1200Z (2300 and 1100 LST): 2/58 - 11/62
(0600 and 1800Z observations included for
11/59 and part of 11/58)

Temperature (°F): January 85/73; July 84/72

Mean Dewpoint (°F): January 68; July 65

Precipitation (inches): Annual 9.0; November 2.10; June, July, August 0.03

A volcanic island 4 km wide and 13 km long; Green Mountain rises to 875 m.
A mild tropical climate in the southeast trade wind region.



Bangkok, Thailand

13° 44' N, 100° 30' E

10 m m.s.l.

Data: Radiosonde. 0000 and 1200Z (0700 and 1900 LST): 8/57 - 11/59

Temperature (°F): January 89/67; July 90/76

Mean Dewpoint (°F): January 66; July 75

Precipitation (inches): Annual 57.8; September 14.04; December 0.08

Located on the Chao Phraya River near the Gulf of Siam. A tropical monsoon type of climate with pronounced wet and dry seasons.

