APPENDIX E. ERRATA FOR HARPA REPORT

HARPA: A versatile Three-Dimensional Hamiltonian Ray-Tracing Program for Acoustic Waves in the Atmosphere Above Irregular Terrain" by R. Michael Jones, J. P. Riley, and T. M. Georges

2 February 1987

Page xi: change line 12 to:
   Table 7.23 Definitions of the parameters in common block /HDRC/....157

Page 21: Following "The profile:" circle the units "km" in the columns labeled z_i and δ_i.

Page 31 and 199: At mid-page, change "stop frequency stepping" to "stop elevation-angle stepping," and change W30, W31, and W32 to W278, W279, and W280, respectively.

Page 33 and 221: Change the Model Check Number from 3.0 to 2.0.

Page 50: Change "Phase path, km" to Phase time, sec" and "Group path, km" to "Pulse travel time, sec."

Page 59: In Table 4.1, change "NPABS" to "NPABSR".

Page 69: Change the last two lines to read:
*** Format type 1 implies format number A (see Table 5.3).
*** Format type 2 implies format number 1, 2, or 3 (see Table 5.3).

Page 79: Change description following W(21) to read "Set = 1 to stop elevation-angle increment when the ray goes out of bounds."

Page 94-98: Add the following to the captions for Figures 6.1 through 6.5: "Circled block numbers correspond to program statement numbers."

Page 98: Change the comment near the lower branch of the "Test Mode" block to read: "MODE = 4 and $Y_{i,1} \neq 0$".

Page 101: In the last sentence of Section 6.4 change the table mentioned from Table 7.9 to Table 7.17.

Page 102: In the second line of the first full paragraph change the equation mentioned from Eq. (4.1) to Eq. (6.30).

Page 126 and 128: Change the captions so that the parenthetical expressions following ANWNL and AWWNL begin "(Acoustic, No Winds..." and "(Acoustic, With Winds...").

Page 127: Change the name of PROGRAM NITIAL to PROGRAM RAYTRC in the second block down.

Page 136: Change the first note in the caption of Figure 7.10 to read: "*
See Equation (6.83) to estimate the time of nearest closest approach to
the specified surface."

Page 155: Add the variable names NDEVGRP and NDEVBIN to Table 7.19.

Page 158: Replace Table 7.23 by:

Table 7.23--Definitions of the parameters in common block /HDRC/

Position in common	Variable name	Definition
1	INITID	Character string for user name and phone number identifier for graphics output
2	DAT	Character string for the date of the computer run
3	TOD	Character string for the time of day of the computer run

Page 168: In line 9, replace PGRKPH with PGRPH.
In line 11, replace $\partial g/\partial\theta$ by $\partial g/\partial\phi$.

Page 222: Change the Model Check Number from 2.0 to 3.0.

Make the following changes in both the source-code listing (Appendix D) and
in the program itself:

Page 251: Following the line "UCON 30" in LOGICAL FUNCTION UCON, insert the
line: IF(CONV.EQ.-1.0) CONV = 1.0/EARTHR   UCON305

Page 251: Replace line "UCON 38" in LOGICAL FUNCTION UCON by:
CNVV(1,3) = -1.0   UCON380

Page 361: Replace line "TTANH554" in SUBROUTINE TTANH5 by:
ZIM1 = Z0   TTANH554

Page 395: Replace line "RVERT 21" in SUBROUTINE RVERT by:
DATA RECORR/3.0/   RVERT21

Add the following routine:

```
      FUNCTION ITOC(N)                                          ITOC0020
C     RETURN 7 CHARACTER STRING REPRESENTATION OF INTEGER N     ITOC0030
C     IF NUMBER IS TOO LARGE OR SMALL USE FLOATING POINT FORMAT ITOC0040
      CHARACTER ITOC*7                                          ITOC0050
      IF(N.LT.-9999.OR.N.GT.99999) GO TO 100                    ITOC0060
      ITOC=' '                                                  ITOC0070
      WRITE(ITOC,'(I7)',ERR=100) N                              ITOC0080
      RETURN                                                    ITOC0090
100   WRITE(ITOC,'(2PG7.0)') FLOAT(N)                           ITOC0100
      END                                                       ITOC0110
```