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Final Technical Report

for

NASA Grant NAG 2-501

Analysis of Magnetic Field Data from the Pioneer Venus Orbiter

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Introduction

The subject grant NAG 2-501 supported the analysis of the magnetic field data from the Pioneer Venus orbiter for the period 10/1/87 to 9/30/94. During that period 188 papers were contributed to scientific meetings that either analyzed the magnetometer data or used the magnetometer data as part of the analysis of a scientific problem. Similarly, 107 papers were published in research journals and books. Members of the team were asked to give 15 invited review papers on the results of the mission and four theses were prepared using these data. These papers and theses are listed in the tables at the back of this report. Table 1 lists the papers presented at meetings analyzing the magnetometer data. Table 2 lists the corresponding papers in journals and books. Table 3 lists the papers presented at meetings in which the magnetometer data was used in a correlative role. Table 4 lists the corresponding papers in journals and books. Table 5 lists the papers invited for presentation at scientific meetings. Table 6 lists the theses analyzing these data.

A brief summary of the work contained in the published papers of Table 2 can serve as a summary of the work accomplished under this grant. We will begin at lowest altitudes and work outwards. The magnetic moment of Venus was discussed in papers (2.1) and (2.55). We found Venus to be essentially devoid of any intrinsic magnetic field. In contrast we found much evidence for the presence of lightning in the Venus atmosphere (2.26, 2.28, 2.32, 2.36). We mapped the altitude distribution (2.8), found geographic cluster (2.13) most probably associated with local time ordering (2.21, 2.23). Some of the waves were clearly electromagnetic propagating below the electron gyro frequency but others were not (2.13, 2.25). For those waves that were electromagnetic we measured the Poynting flux (2.17). We examined the entry data at low altitudes (2.61) and the magnetization of the ionosphere and the atmospheric region below (2.3, 2.6, 2.38, 2.45, 2.49, 2.54, 2.62). We looked at flux ropes in the ionosphere (2.29) and postulated a new means to create them (2.31). On the nightside we studied ionospheric holes (2.50), ionospheric clouds (2.41) and tail rays (2.41). We studied the subsolar ionopause (2.2) and the magnetic barrier (2.42). We examined the altitude asymmetry of the ionopause (2.7), the properties of the magnetosheath (2.52) and the location of the bow shock (2.12, 2.14, 2.24, 2.37, 2.47, 2.48, 2.58) as well as the properties of upstream ions (2.18) and upstream waves (2.35, 2.44, 2.56, 2.57, 2.64). We examined the solar wind interaction overall (2.30, 2.40) and the properties of the magnetotail in particular (2.15, 2.33, 2.39, 2.43, 2.47, 2.59, 2.60). We also used the Pioneer Venus data to learn more about the processes occurring in the solar wind (2.4, 2.16, 2.19, 2.27, 2.51, 2.53, 2.63).

No patents or inventions resulted from this grant. All data obtained by the magnetic field investigation whether raw or processed have been documented and submitted to the Planetary Data System for archiving.

PVO Bibliography

Table 1

1.1 C. T. Russell, M. von Dornum and F. L. Scarf, Impulsive plasma waves in the Venus ionosphere: Spatial distributions, Annual DPS Meeting, Pasadena, CA, November, 1987.

1.2 J. G. Luhmann, C. T. Russell, F. L. Scarf, L. H. Brace and W. C. Knudsen, On the Mars-like limit of the Venus-solar wind interaction: Implications for the intrinsic field of Mars, Annual DPS Meeting, Pasadena, CA, November, 1987.

1.3 C. T. Russell and J. G. Luhmann, The interaction of the solar wind with unmagnetized planets: Implications for Mars, Royal Astronomical Society Meeting, November, 1987.

1.4 J. G. Luhmann, Aeronomical peculiarities of the unmagnetized planets related to the solar wind interaction, Fall AGU Meeting, San Francisco, CA, December 1987.

1.5 J. G. Luhmann, C. T. Russell, E. J. Smith, North-south asymmetries of the interplanetary field inferred from observations at two heliocentric distances, Fall AGU Meeting, San Francisco, CA, December 1987.

1.6 C. T. Russell, M. von Dornum, F. L. Scarf, Geographic mapping of impulsive signals in the night ionosphere of Venus, Fall AGU Meeting, San Francisco, CA, December 1987.

1.7 K. R. Moore, C. T. Russell and J. G. Luhmann, Identification of pickup ion species in the Venus magnetosheath, Fall AGU Meeting, San Francisco, CA, December 1987.

1.8 J. G. Luhmann, C. T. Russell and R. C. Elphic, Venus flux ropes: Global distributions of twist and what they imply, Spring AGU Meeting, Baltimore, MD, May 1988.

1.9 M. von Dornum, C. T. Russell and F. L. Scarf, Impulsive signals in the night ionosphere of Venus: Signals above the electron gyrofrequency, Spring AGU Meeting, Baltimore, MD, May 1988.

1.10 C. T. Russell, M. von Dornum and F. L. Scarf, Impulsive signals in the night ionosphere of Venus: Signals observed below the electron gyrofrequency, Spring AGU Meeting, Baltimore, MD, May 1988.

1.11 C. T. Russell, M. von Dornum and F. L. Scarf, Impulsive signals in the night ionosphere of Venus: Comparison of results obtained at 100 Hz with those obtained at higher frequencies, COSPAR XXVII, Helsinki, Finland, July 1988.

1.12 C. T. Russell and J. L. Phillips, The Ashen Light, COSPAR XXVII, Helsinki, Finland, July 1988.

1.13 J. G. Luhmann, A. Kliore, A. Barnes and L. Brace, Remote sensing of Mars' ionosphere

and solar wind interaction: Lessons from Venus, COSPAR XXVII, Helsinki, Finland, July 1988.

1.14 J. G. Luhmann, C. T. Russell and A. Barnes, A search for the solar roots of the most disturbed interplanetary field interval of solar cycle 21, COSPAR XXVII, Helsinki, Finland, July 1988.

1.15 J. G. Luhmann and C. T. Russell, An assessment of the conditions for critical velocity ionization at the weakly magnetized planets, COSPAR XXVII, Helsinki, Finland, July 1988.

1.16 C. T. Russell, E. Chou, J. G. Luhmann and L. H. Brace, Solar cycle variations in the hot oxygen exosphere as deduced from the location of the Venus Bow Shock, COSPAR XXVII, Helsinki, Finland, July 1988.

1.17 C. T. Russell, Evidence for a dust trail preceding and following asteroid 2201 Oljato, COSPAR XXVII, Helsinki, Finland, July 1988.

1.18 C. T. Russell, M. von Dornum and F. L. Scarf, Pioneer Venus studies of sferics in the night ionosphere: occurrence statistics and amplitudes, presented at 20th DPS Meeting (abstract), BAAS, 20, 834, 1988.

1.19 J. G. Luhmann, A. Kliore, A. Barnes and L. Brace, Remote sensing of Mars' ionosphere and solar wind interaction: lessons from Venus, presented at 20th DPS Meeting (abstract), BAAS, 20, 861, 1988.

1.20 R. Woo, W. L. Sjogren, A. J. Kliore, J. G. Luhmann, L. H. Brace, Radio scintillation measurements of the ionosphere of Venus, presented at 20th DPS Meeting (abstract), BAAS, 20, 834, 1988.

1.21 J. L. Phillips and C. T. Russell, Local time dependence of the Venus ashen light, presented at 20th DPS Meeting (abstract), BAAS, 20, 833, 1988.

1.22 J. G. Luhmann, Solar wind impact, presented at PVO 10th Anniversary Symposium, Ames Research Center, December, 1988.

1.23 T. L. Zhang, E. Chou, J. G. Luhmann, C. T. Russell, L. H. Brace, P. Gazis, S. Stahara and J. R. Spreiter, Solar cycle variation in the position of the Venus bow shock and its implications for the variation in size of the magnetic barrier, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1296, 1988.

1.24 K. R. Moore, D. J. McComas, C. T. Russell and J. D. Mihalov, The average Venus magnetotail, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1296, 1988.

1.25 J. G. Luhmann, Ion dynamics in the environments of comets, Venus and Mars, presented at European Geophysical Society, Barcelona, March 1989.

1.26 J. G. Luhmann, The solar wind interaction with unmagnetized planets - a tutorial, presented at Chapman Conference on Magnetic Flux Ropes, Bermuda, March 1989.

1.27 C. T. Russell, Venus ionospheric flux ropes, presented at Chapman Conference on Magnetic Flux Ropes, Bermuda, March 1989.

1.28 C. T. Russell, Venus ionospheric flux ropes, presented at European Geophysical Society, Barcelona, March 1989.

1.29 T. L. Zhang, J. G. Luhmann and C. T. Russell, The solar wind interaction with Venus: Observations of the magnetic barrier, presented at the Spring National AGU Meeting (abstract), EOS, 70, 383, 1989.

1.30 C. T. Russell, The solar wind interaction with Venus and Mars, presented at the Spring National AGU Meeting (abstract), EOS, 70, 386, 1989.

1.31 C. T. Russell and M. von Dornum, Statistics of spheric occurrence in the night ionosphere of Venus: An intercomparison of techniques, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.32 R. J. Strangeway, C. M. Ho, and C. T. Russell, Determination of the burst rate for the impulsive VLF signals in the Venus nightside ionosphere, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.33 C. T. Russell, Interplanetary magnetic field enhancements: Observational clues to the possible sources, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.34 K. G. Moore, D. J. McComas, J. G. Luhmann, C. T. Russell, P. Gazis, and J. D. Mihalov, Statistics of ion pickup in the Venus tail region, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.35 T. L. Zhang, J. G. Luhmann, and C. T. Russell, Solar cycle variations in the Venus bow shock, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.36 T. L. Zhang, J. G. Luhmann, and C. T. Russell, Direct observations of the Venus magnetic barrier, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

1.37 K. R. Moore and D. J. McComas, A statistical study of ions and magnetic fields in the Venus magnetotail, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1176, 1989.

1.38 G. K. Crawford, R. J. Strangeway, and C. T. Russell, Electron plasma oscillations in the Venus foreshock, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1177, 1989.

1.39 C. M. Ho, C. T. Russell, and R. J. Strangeway, VLF bursts in the night ionosphere of Venus: Possible association with density gradients, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1178, 1989.

1.40 R. J. Strangeway, C. M. Ho, and C. T. Russell, VLF spherics in the night ionosphere of Venus: Estimate of the flash rate, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1178, 1989.

1.41 T.-L. Zhang, J. G. Luhmann, C. T. Russell, and P. Gazis, Location of the Venus bow shock through the solar cycle and associated changes in the solar wind, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1259, 1989.

1.42 D. S. Orlowski, G. K. Crawford, and C. T. Russell, Upstream waves at Mercury and Venus, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

1.43 M. Ong, J. G. Luhmann, C. T. Russell, L. H. Brace, and R. F. Theis, Venus tail rays and clouds, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

1.44 J. G. Luhmann, C. T. Russell, M. Ong, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, Induced magnetotails of planetary bodies, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

1.45 M. Ong, T. Zhang, J. G. Luhmann, C. T. Russell, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, A comparison of the bow shock locations of Venus and Mars, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.46 K. R. Moore, D. J. McComas, C. T. Russell, and J. D. Mihalov, A statistical study of ions and magnetic fields in the Venus magnetotail, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.47 C. T. Russell, J. G. Luhmann, M. Ong, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, A comparison of the magnetotails of Venus and Mars, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.48 D. J. Moore, McComas, C. T. Russell, J. D. Mihalov, J. R. Spreiter, and S. S. Stahara, Gasdynamic Venus magnetotail model results: Comparison with observed ion distributions and magnetic fields, presented at the AGU Chapman Conference on

Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.49 T.-L. Zhang, K. Schwingenschuh, W. Riedler, J. G. Luhmann, and C. T. Russell, The magnetic barrier at Venus and Mars, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.50 M. Ong, C. T. Russell, J. G. Luhmann, L. H. Brace, and J. L. Phillips, Venus plasma clouds, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

1.51 C. T. Russell, and R. J. Strangeway, Venus lightning: An update, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, The Netherlands, June 1990.

1.52 G. K. Crawford, R. J. Strangeway, and C. T. Russell, Electron plasma oscillations in the Venus foreshock, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, The Netherlands, June 1990.

1.53 C. M. Ho, R. J. Strangeway, and C. T. Russell, Occurrence characteristics of VLF bursts in the nightside ionosphere of Venus, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, The Netherlands, June 1990.

1.54 C. T. Russell, Venus lightning, presented at Western Pacific Geophysics Meeting, Kanazawa, Japan (abstract) EOS, 71, 892, 1990.

1.55 R. J. Strangeway, C. M. Ho and C. T. Russell, Statistical properties of impulsive signals observed in the nightside ionosphere of Venus, presented at the Western Pacific Geophysics Meeting, Kanazawa, Japan (abstract) EOS, 71, 934, 1990.

1.56 G. K. Crawford, R. J. Strangeway and C. T. Russell, Plasma waves observed in the electron and ion foreshock of Venus, presented at the Western Pacific Geophysics Meeting, Kanazawa, Japan (abstract) EOS, 71, 934, 1990.

1.57 J. G. Luhmann, Pickup ions at Venus: Present understanding and unanswered questions, presented at the Western Pacific Geophysics Meeting, Kanazawa, Japan (abstract) EOS, 71, 934, 1990.

1.58 R. J. Strangeway, C. T. Russell and C. M. Ho, Whistler mode waves in the night ionosphere of Venus: Lightning or in situ instabilities, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431, 1990.

1.59 M. Ong, J. G. Luhmann, C. T. Russell, L. H. Brace, R. F. Theis, J. R. Spreiter and S. S. Stahara, Ionospheric clouds at Venus: A consequence of IMF variability?, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431,

1990.

1.60 G. K. Crawford, R. J. Strangeway, C. T. Russell, and J. D. Mihalov, Investigation of plasma wave observations in the ion foreshock of Venus, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431, 1990.

1.61 D. S. Orlowski and C. T. Russell, Properties of the low-frequency electromagnetic waves upstream of the quasi-parallel shock at Venus, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431, 1990.

1.62 J. G. Luhmann, Planetary magnetosheaths, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431, 1990.

1.63 T. L. Zhang, K. Schwingenschuh, W. Riedler, C. T. Russell J. G. Luhmann, An Asymmetry in the bow shock location at Venus and Mars, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 71, 1431, 1990.

1.64 R. J. Strangeway and C. T. Russell, Pioneer Venus VLF measurements: Implications for lightning, presented at the Spring AGU Meeting (abstract) EOS, 72, 172, 1991.

1.65 C.-M. Ho, R. J. Strangeway and C. T. Russell, Control of VLF activity in the nightside ionosphere of Venus by the magnetic field orientation, presented at the Spring AGU Meeting (abstract) EOS, 72, 172, 1991.

1.66 R. J. Strangeway, Whistler mode propagation in weakly magnetized plasmas: Implications for whistler waves at Venus, presented at the Spring AGU Meeting (abstract) EOS, 72, 172, 1991.

1.67 K. Schwingenschuh, T.-L. Zhang, H. Lichtenegger, W. Riedler, G. Gevai, H. Rosenbauer, C. T. Russell and J. G. Luhmann, Mars and Venus bow shock: Effect of solar wind dynamic pressure, presented at the Spring AGU Meeting (abstract) EOS, 72, 186, 1991.

1.68 D. S. Orlowski and C. T. Russell, Characteristics of the low-frequency waves associated with Venus ion-foreshock, presented at the Spring AGU Meeting (abstract) EOS, 72, 186, 1991.

1.69 G. K. Crawford, R. J. Strangeway and C. T. Russell, VLF signatures in the Venus ion foreshock, presented at the Spring AGU Meeting (abstract) EOS, 72, 186, 1991.

1.70 J. G. Luhmann, Evidence for interplanetary magnetic field penetration of Venus, presented at the Spring AGU Meeting (abstract) EOS, 72, 187, 1991.

1.71 T. L. Zhang, C. T. Russell, J. G. Luhmann, K. Schwingenschuh, H. Lichtenegger and W. Riedler, Interplanetary Magnetic Field Control of the Mars and Venus Bow Shock, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.72 J. G. Luhmann, Inferred Magnetic Fields at the Surface of Venus from Pioneer Venus Orbiter Near-periapsis Measurements, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.73 K. Schwingenschuh, T. L. Zhang, H. Lichtenegger, W. Riedler, G. Gevai, H. Rosenbauer, C. T. Russell and J. G. Luhmann, Solar Wind Control of the Mars and Venus Bow Shock, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.74 O. Vaisberg, V. Smirnov, L. Zelenyi, J. G. Luhmann and C. T. Russell, Current Sheets in the Venus Tail, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.75 R. J. Strangeway, C. T. Russell and C.-M. Ho, On the Polarization of VLF Bursts in the Night Ionosphere of Venus, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.76 D. Orlowski and C. T. Russell, On the Source of 1 Hz waves in Planetary Foreshocks, presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

1.77 Russell, C. T., J. G. Luhmann, T. L. Zhang, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, The Upper Limit to the Martian Magnetic Moment, presented at the 23rd. Annual DPS Meeting (abstract), Am. Astron. Soc., 23, 1214, 1991.

1.78 M.H.G. Zhang, J. G. Luhmann, A. F. Nagy, and S. W. Bougher, The Ancient Oxygen Exosphere of Mars: Implications for Atmosphere Evolution. presented at the 23rd. Annual DPS Meeting (abstract), Am. Astron. Soc., 23, 1215, 1991.

1.79 T.-L. Zhang, J. G. Luhmann, C. T. Russell, J. R. Spreiter, S. S. Stahara, and S. H. Brecht, Comparison of Observations and Models of the Solar Wind Interaction with Venus, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 72, 283, 1991.

1.80 C.-M. Ho, R. J. Strangeway, and C. T. Russell, VLF Bursts in the Nightside Ionosphere of Venus: Lightning Whistlers or Lower Hybrid Drift Waves, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 72, 287, 1991.

1.81 J. G. Luhmann and D. S. Russell, Magnetic Properties of Venus Nightside Ionospheric "Holes", presented at the Fall American Geophysical Union Meeting (abstract), EOS, 72, 288, 1991.

1.82 G. K. Crawford, R. J. Strangeway and C. T. Russell, Plasma Wave Signatures at the Venus Dayside Ionopause, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 72, 288, 1991.

1.83 Orlowski, D. S. and C. T. Russell, Upstream Waves at Venus During Flow Aligned IMF, presented at the Fall American Geophysical Union Meeting (abstract),

EOS, 72, 391, 1991.

1.84 T. Higuchi, C. T. Russell, R. J. Strangeway and G. K. Crawford, Separation of Spin Synchronized Signals in the Pioneer Venus Wave Data using Bayesian Statistical Inference, presented at the Fall American Geophysical Union Meeting (abstract), EOS, 72, 414, 1991.

1.85 Ho, C.-M., R. J. Strangeway, and C. T. Russell, An investigation of VLF plasma wave activity for the nightside Venus ionosphere, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

1.86 Crawford, G. K., R. J. Strangeway, and C. T. Russell, Enhanced VLF emissions at the Venus dayside ionopause, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

1.87 Luhmann, J. G., C. T. Russell, and R. J. Strangeway, Images of the statistical magnetic and electric perturbation of the solar wind by Venus, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

1.88 Luhmann, J. G., and C. T. Russell, PVO magnetometer science goals for final encounter, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 191, 1992.

1.89 Orlowski, D. S., C. T. Russell, D. Krauss-Varban, and N. Omidi, Critical test for Hall-MHD model: Application to the low frequency upstream waves at Venus, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 236, 1992.

1.90 Zhang, T.-L., and C. T. Russell, Unusually distant bow shock encounters at times of very low Mach number, presented at the Spring American Geophysical Union Meeting, EOS Trans. AGU, 73(14), Spring Meeting Suppl., 241, 1992.

1.91 Lindsay, G., C. T. Russell and J. G. Luhmann, On the Source of Interplanetary Shocks at 0.72 AU, presented at the Western Pacific Geophysics Meeting (abstract), EOS, 73(25), Supplement, 73, Hong Kong, August 1992.

1.92 Higuchi, T., and C. T. Russell, A Modern Bayesian Approach to the Analysis of Planetary and Space Physics Data, presented at the Western Pacific Geophysics Meeting (abstract), EOS, 73(25), Supplement, 73, Hong Kong, August 1992.

1.93 Luhmann, J. G., and C. T. Russell, Statistical Pictures of the Ionospheric Field of Venus, presented at the Western Pacific Geophysics Meeting (abstract), EOS, 73(25), Supplement, 80, Hong Kong, August 1992.

1.94 Crawford, G. K., R. J. Strangeway, and C. T. Russell, Enhanced VLF Emissions at the

Venus Dayside Ionopause, presented at the Western Pacific Geophysics Meeting (abstract), EOS, 73(25), Supplement, 80, Hong Kong, August 1992.

1.95 Orlowski, D. S., C. T. Russell, D. Krauss-Varban, and N. Omidi, Critical test for Hall-MHD model: Application to the low frequency upstream waves at Venus, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.96 Orlowski, D. S., C. T. Russell, D. Krauss-Varban, and N. Omidi, On the source of "One Hertz" waves at Venus, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.97 Zhang, T.-L., and C. T. Russell, Unusually distant bow shock encounters at times of very low Mach number, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.98 Crawford, G. K., R. J. Strangeway, and C. T. Russell, VLF emissions at the Venus dayside ionopause, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.99 Verigin, M. I., J. G. Luhmann, and C. T. Russell, On the Venusian magnetotail structure, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.100 Vaisberg, O., V. Smirnov, L. Zelenyi, J. G. Luhmann, and C. T. Russell, Current sheets in the Venus tail, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.101 Luhmann, J. G., C. T. Russell, and R. J. Strangeway, Images of the statistical magnetic and electric perturbation of the solar wind by Venus, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.102 Gringauz, K. I., M. Verigin, J. G. Luhmann, C. T. Russell, and J. Mihalov, On the compressibility of magnetic tails of Mars and Venus, presented at the 4th COSPAR Colloquium on "Critical Problems in the Plasma Environments of Comets and Other Non-Magnetized and Weakly Magnetized Bodies, Ann Arbor, August 1992.

1.103 Ho, C.-M., R. J. Strangeway, and C. T. Russell, Venus planetary lightning rate as deduced from VLF burts, presented at 29th Plenary Meeting COSPAR, Washington DC, August 1992.

1.104 Zhang, T.-L., W. Riedler, K. Schwingenschuh, J. G. Luhmann, C. T. Russell, J. R. Spreiter, S. S. Stahara, and S. H. Brecht, Observations and Models of the Solar Wind Interactions with Venus, presented at the 24th DPS Meeting, Munich, October 1992.

1.105 Luhmann, J. G., D. S. Russell, and C. T. Russell, Magnetic field signatures of merging in the Venus magnetotail, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 334, 1992.

1.106 Lindsay, G. M., J. G. Luhmann, and C. T. Russell, A study of solar cycle dependence of interplanetary disturbances at 0.72 AU, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 437, 1992.

1.107 Orlowski, D. S., C. T. Russell, D. Krauss-Varban, and N. Omidi, Damping of One Hertz whistlers upstream of the Venus bow shock, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 445, 1992.

1.108 Russell, C. T., and R. J. Strangeway, Low altitude magnetic fields and plasma waves, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 186, 1993.

1.109 Strangeway, R. J., C. M. Ho, and C. T. Russell, Plasma wave bursts in the low altitude Venus nightside ionosphere, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 186, 1993.

1.110 Ho, C. M., R. J. Strangeway, C. T. Russell, and J. G. Luhmann, IMF control of the nightside ionosphere of Venus, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 186, 1993.

1.111 Lindsay, G. M., J. G. Luhmann, and C. T. Russell, Flow deflections in the solar wind at 0.72 AU, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 238, 1993.

1.112 Crawford, G. K., R. J. Strangeway, and C. T. Russell, VLF imaging of the Venus electron and ion foreshocks, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 248, 1993.

1.113 Orlowski, D. S., G. Le, C. T. Russell, D. Krauss-Varban, and N. Omidi, Damping characteristic of upstream whistlers, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 248, 1993.

1.114 Russell, C. T., Menu-driven interactive graphics analysis of space physics data, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 265, 1993.

1.115 Luhmann, J. G., A model of the ionospheric tail rays of Venus, presented at Spring National AGU Meeting (abstract), EOS, 74(16), Spring Meeting Suppl., 187, 1993.

1.116 Lindsay, G. M., C. T. Russell, J. G. Luhmann, and P. Gazis, Long term variations in the solar wind, presented at 7th Scientific Assembly of IAGA, Buenos Aires, August, 1993.

1.117 Lindsay, G. M., J. G. Luhmann, C. T. Russell, and P. Gazis, Radial evolution of stream interface orientation, presented at 7th Scientific Assembly of IAGA, Buenos Aires, August, 1993.

1.118 Mihalov, J. D., A. Barnes, and C. T. Russell, Correlations of nightside escaping ion flows with magnetic field directions at Venus, presented at 7th Scientific Assembly of IAGA, Buenos Aires, August, 1993.

1.119 Crawford, G. K., R. J. Strangeway, and C. T. Russell, Plasma waves observed above the dayside ionopause of Venus: Evidence for an additional transition layer, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 375, 1993.

1.120 Mihalov, J. D., A. Barnes, and C. T. Russell, Correlations of nightside ion flows with magnetic field directions at Venus, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 376, 1993.

1.121 Xu, Y., K. K. Khurana, M. G. Kivelson, and C. T. Russell, A comparison of the variable cross-section bow shock model of Venus with PVO observations, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 376, 1993.

1.122 Strangeway, R. J., C. M. Ho, and C. T. Russell, Evidence for Langmuir oscillations and a low density cavity in the Venus magnetotail, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 376, 1993.

1.123 Smirnov, V., O. L. Vaisberg, A. Fedorov, F. Dunjushkin, C. T. Russell, J. G. Luhmann, and D. S. Intriligator, Acceleration of plasma in the Venusian tail, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 380, 1993.

1.124 Lindsay, G. M., J. G. Luhmann, and C. T. Russell, Coronal mass ejections, stream interactions, and their potential geomagnetic effectiveness, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 486, 1993.

1.125 Khurana, K. K., M. G. Kivelson, Z. Wang and C. T. Russell, The effect of the solar wind dynamic pressure an dion pickup on the Venusian bow shock, presented at Spring National Meeting of AGU (abstract) EOS, 75(16) Supplement, 272, 1994.

1.126 Lindsay, G. M., C. T. Russell, and J. G. Luhmann, Dst predictions based on upstream solar wind measurements, presented at Spring National Meeting of AGU (abstract) EOS 75(16) Supplement, 313, 1994.

1.127 O. Vaisberg, A. Fedorov, F. Dunjushkin, V. Smirnov, L. Avanov, C. T. Russell, and J. Luhmann, Ion populations in the tails of Venus and Mars, presented at the 30th COSPAR Scientific Assembly, Hamburg, July 1994.

1.128 D. S. Orlowski and C. T. Russell, Comparison of properties of upstream whistlers at different planets, presented at the 30th COSPAR Scientific Assembly, Hamburg, July 1994.

1.129 D. S. Orlowski, C. T. Russell, D. Krauss-Varban, and N. Omidi, Comparative analysis of propagation modes of ULF upstream waves at inner and outer planets, presented at the 30th COSPAR Scientific Assembly, Hamburg, July 1994.

1.130 G. M. Lindsay, J. G. Luhmann, C. T. Russell, and P. Gazis, Solar cycle variation of intrplanetary shocks, coronal mass ejections and stream interactions observed at 0.7 AU, presented at the 30th COSPAR Scientific Assembly, Hamburg, July 1994.

Table 2

2.1 J. L. Phillips and C. T. Russell, Revised upper limit on the internal magnetic moment of Venus, Adv. Space Res., 7(12), (12)291-(12)294, 1987.

2.2 C. T. Russell, R. N. Singh, J. G. Luhmann, R. C. Elphic, and L. H. Brace, Waves on the subsolar Venus ionopause, Adv. Space Res., 7, 115-118, 1987.

2.3 J. G. Luhmann, J. L. Phillips, and C. T. Russell, Studies of the configuration of the Venus ionospheric magnetic field, Adv. Space Res., 7(12), (12)101-(12)106, 1987.

2.4 J. G. Luhmann, C. T. Russell, and E. J. Smith, Asymmetries of the interplanetary field inferred from observations at two heliocentric distances, Solar Wind VI-Proceedings of the Sixth International Solar Wind Conference, pp. 323-327, August 1987.

2.5 J. L. Phillips, Comment on paper by Kar and Mahajan, Geophys. Res. Lett., 14, 1068, 1987.

2.6 J. G. Luhmann, A 3-dimensional diffusion/convection model of the large scale magnetic field in the Venus ionosphere, J. Geophys. Res., 93, 5909-5914, 1988.

2.7 J. L. Phillips, J. G. Luhmann, W. C. Knudsen, and L. H. Brace, Asymmetries in the location of the Venus ionopause, J. Geophys. Res., 93, 3927-3941, 1988.

2.8 C. T. Russell, M. von Dornum, and F. L. Scarf, The altitude distribution of impulsive signals in the night ionosphere of Venus, J. Geophys. Res., 93, 5915-5921, 1988.

2.9 C. T. Russell, M. von Dornum, and F. L. Scarf, Evidence for planetographic clustering of impulsive electric signals at low altitudes in the night ionosphere of Venus, Nature, 331, 591-594, 1988.

2.10 J. L. Phillips and C. T. Russell, The Venus Ashen Light: Observing campaign for 1988, Sky and Telescope, 75, 250-252, 1988.

2.11 J. G. Luhmann, Comment on paper by Kar and Mahajan, Geophys. Res. Lett., 15, 118-119, 1988.

2.12 C. T. Russell, E. Chou, J. G. Luhmann, P. Gazis, L. Brace and W. R. Hoegy, Solar and interplanetary control of the location of the Venus Bow Shock, J. Geophys. Res., 93, 5461-5469, 1988.

2.13 C. T. Russell, M. von Dornum, and F. L. Scarf, VLF bursts in the night ionosphere of Venus: Effects of the magnetic field, Planet. Space Sci., 36, 1211-1218, 1988.

2.14 W. C. Knudsen, J. G. Luhmann, C. T. Russell, and F. L. Scarf, The Venus precursor:

An environmental effect on the Pioneer Venus spacecraft, J. Geophys. Res., 94, 197, 1989.

2.15 J. A. Slavin, D. S. Intriligator, and E. J. Smith, Pioneer Venus Orbiter magnetic field and plasma observations in the Venus magnetotail, J. Geophys. Res., 94, 2383, 1989.

2.16 K. W. Behannon, L. F. Burlaga, J. T. Hoeksema, and L. W. Klein, Spatial variation and evolution of heliospheric sector structure, J. Geophys. Res., 94, 1245, 1989.

2.17 C. T. Russell, M. von Dornum, and R. J. Strangeway, VLF bursts in the night ionosphere of Venus: Estimates of the poynting flux, Geophys. Res. Lett., 16, 579, 1989.

2.18 K. R. Moore, D. J. McComas, C. T. Russell, and J. D. Mihalov, Superthermal ions observed upstream of the Venus bow shock, J. Geophys. Res., 94, 3843, 1989.

2.19 J. G. Luhmann, C. T. Russell, and A. Barnes, A search for the solar roots of the most disturbed interplanetary field interval of solar cycle 21, Adv. Space Res., 9, (4)153-(4)158, 1989.

2.20 C. T. Russell, Comment on "On the response of ionospheric magnetisation to solar wind dynamic pressure from the Pioneer Venus measurements by J. Kar and K. K. Mahajan," Geophys. Res. Lett., 16, 771-772, 1989.

2.21 C. T. Russell, M. von Dornum, and F. L. Scarf, Source locations for impulsive electric signals seen in the night ionosphere of Venus, Icarus, 80, 390-415, 1989.

2.22 C. T. Russell, Reply, J. Geophys. Res., 94, 12,093-12,094, 1989.

2.23 C. T. Russell and R. N. Singh, A re-examination of impulsive VLF signals in the night ionosphere of Venus, Geophys. Res. Lett., 16, 1481-1484, 1989.

2.24 C. T. Russell, E. Chou, J. G. Luhmann, and L.H. Brace, Solar cycle variations in the neutral exosphere inferred from the location of the Venus bow shock, Adv. Space Res., 10, (5)5-(5)9, 1990.

2.25 C. T. Russell, M. von Dornum, and F. L. Scarf, Impulsive signals in the night ionosphere of Venus: Comparison of results obtained below the local electron gyro frequency with those above, Adv. Space Res., 10, (5)37-(5)40, 1990.

2.26 C. T. Russell and F. L. Scarf, Evidence for lightning of Venus, Adv. Space Res., 10, (5)125-(5)136, 1990.

2.27 C. T. Russell, Interplanetary magnetic field enhancements: Evidence for solar wind dust trail interactions, Adv. Space Res., 10, (3)159-(3)162, 1990.

2.28 C. T. Russell, Data from Pioneer Venus indicative of lightning, Astro. Vestnik, 24, 40-48, 1990.

2.29 C. T. Russell, Magnetic flux ropes in the ionosphere of Venus, in Physics of Magnetic Flux Ropes, 413-423, American Geophysical Union, Washington, D. C., 1990.

2.30 J. G. Luhmann, The solar wind interaction with unmagnetized planets: A tutorial, in Physics of Magnetic Flux Ropes, 401, American Geophysical Union, Washington, D. C., 1990.

2.31 J. G. Luhmann, "Wave" analysis of Venus ionospheric flux ropes, in Physics of Magnetic Flux Ropes, 425, American Geophysical Union, Washington, D. C., 1990.

2.32 C. T. Russell, Comment on "VLF emission bursts in the terrestrial and Venusian nightside troughs, by K. Maeda and J. M. Grebowski", Nature, 345, 213, 1990.

2.33 K. R. Moore, D. J. McComas, C. T. Russell and J. D. Mihalov, A statistical study of ions and magnetic fields in the Venus magnetotail, J. Geophys. Res., 95, 12005-12018, 1990.

2.34 T. L. Zhang, K. G. Luhmann and C. T. Russell, The solar cycle dependence of the location and shape of the Venus bow shock, J. Geophys. Res., 95, 14961-14967, 1990.

2.35 D. S. Orlowski, G. K. Crawford, C. T. Russell, Upstream waves at Mercury, Venus and Earth: Comparison of the properties of one Hertz waves, Geophys. Res. Lett., 17, 2293-2296, 1990.

2.36 C. T. Russell, Venus lightning, in Venus Aeronomy, 317-356, Kluwer Academic Publishers Dordrecht, 1991; see also Space Sci. Rev., 55, 317-356, 1991.

2.37 T. L. Zhang, K. Schwingenschuh, C. T. Russell, J. G. Luhmann, Asymmetries in the location of the Venus and Mars bow shock, Geophys. Res. Lett., 18, 127-129, 1991.

2.38 J. G. Luhmann and T. E. Cravens, Magnetic fields in the ionosphere of Venus, Space Sci. Rev., 55, 201-274, 1991.

2.39 K. R. Moore, D. J. McComas, C. T. Russell, S. S. Stahara and J. R. Spreiter, Gasdynamic modeling of the Venus magnetotail, J. Geophys. Res., 96, 5667-5682, 1991.

2.40 K. R. Moore, V. A. Thomas and D. J. McComas, Global hybrid simulation of the solar wind interaction with the dayside of Venus, J. Geophys. Res., 96, 7779-7791, 1991.

2.41 M. Ong, J. G. Luhmann, C. T. Russell, R. J. Strangeway and L. H. Brace, Venus ionospheric "clouds": Relationship to the magnetosheath field geometry, J. Geophys.

Res., 96, 11133-11144, 1991.

2.42 T. L. Zhang, J. G. Luhmann and C. T. Russell, The magnetic barrier at Venus, J. Geophys. Res., 96, 11145-11154, 1991.

2.43 J. G. Luhmann, C. T. Russell, K. Schwingenschuh and Ye. Yeroshenko, A Comparison of the induced magnetotails of planetary bodies: Venus, Mars, and Titan, J. Geophys. Res., 96, 11199-11282, 1991.

2.44 D. S. Orlowski and C. T. Russell, ULF waves upstream of the Venus bow shock: Properties of one-Hertz waves, J. Geophys. Res., 96, 11271-11282, 1991.

2.45 J. G. Luhmann, Induced magnetic fields at the surface of Venus inferred from Pioneer Venus Orbiter near-periapsis measurements, J. Geophys. Res., 96, 18831-18840, 1991.

2.46 M. Ong, J. G. Luhmann, C. T. Russell and R. J. Strangeway, Venus ionospheric tail rays: Spatial distributions and interplanetary magnetic field control, J. Geophys. Res., 96, 17751-17761, 1991.

2.47 C. T. Russell, M. Ong, J. G. Luhmann, K. Schwingenschuh, W. Riedler and Ye. Yeroshenko, Bow shocks and magnetotails of Venus and Mars: A comparison, Adv. Space Res., 12, (9)163-(9)167, 1992.

2.48 C. T. Russell and T.-L. Zhang, Unusually distant bow shock encounters at Venus, Geophys. Res. Lett., 19, (8)833-(8)836, 1992.

2.49 J. G. Luhmann, Pervasive large-scale magnetic fields in the Venus nightside ionosphere and their implications, J. Geophys. Res., 97, 6103-6121, 1992.

2.50 J. G.Luhmann and D. S. Russell, Magnetic fields in the Venus nightside ionospheric holes: Collected Pioneer Venus Orbiter observations, J. Geophys. Res., 97, 10267-10282, 1992.

2.51 J. G. Luhmann, T. L. Zhang, S. M. Petrinec, C. T. Russell, P. Gazis, and A. Barnes, Solar cycle 21 effects on the interplanetary magnetic field and related parameters at 0.7 and 1.0 AU, J. Geophys. Res., 98, 5559-5572, 1993.

2.52 T. L. Zhang, C. T. Russell, J. G. Luhmann, J. R. Spreiter and S. S. Stahara, On the spatial range of validity of the gas dynamic model in the magnetosheath of Venus, Geophys. Res. Lett., 20, 751-754, 1993.

2.53 J. G. Luhmann, T. L. Zhang, S. M. Petrinec, C. T. Russell, P. Gazis, and A. Barnes, Solar cycle 21 effects on the interplanetary magnetic field and related parameters at 0.7 and 1.0 AU, J. Geophys. Res., 98, 5559-5572, 1993.

2.54 C. T. Russell, Comment on "Missing pressure in the dayside ionosphere of Venus" by P. A. Cloutier, B. K. Stewart, and H. A. Taylor, Geophys. Res. Lett., 20, 2151-2152, 1993.

2.55 C. T. Russell, Magnetic fields of the terrestrial planets, J. Geophys. Res., 98, 18,681-18,695, 1993.

2.56 D. S. Orlowski, C. T. Russell, D. Krauss-Varban and N. Omidi, On the source of upstream whistlers in the Venus foreshock, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 217-227, Pergamon Press, Oxford, 1993.

2.57 D S. Orlowski, C. T. Russell, D. Krauss-Varban and N. Omidi, ULF waves in Venus upstream region: Critical test for two fluid model, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 229-239, Pergamon Press, Oxford, 1993.

2.58 C. T. Russell, T. L. Zhang, and J. G. Luhmann, On the cause of distant bow shock encounters, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 241-246, Pergamon Press, Oxford, 1993.

2.59 M. Verigin, J. G. Luhmann, and C. T. Russell, On the Venus ion magnetotail structure, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 259-263, Pergamon Press, Oxford, 1993.

2.60 K. I. Gringauz, M. Verigin, J. G. Luhmann, C. T. Russell, and J. Mihalov, On the compressibility of the magnetic tails of Mars and Venus, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 265-270, Pergamon Press, Oxford, 1993.

2.61 C. T. Russell, R. J. Strangeway, J. G. Luhmann, and L. H. Brace, The magnetic state of the lower ionosphere during Pioneer Venus entry phase, Geophys. Res. Lett., 20, 2723-2726, 1993.

2.62 C. M. Ho, R. J. Strangeway, C. T. Russell, J. G. Luhmann, and L. H. Brace, The nightside ionosphere of Venus under varying levels of solar EUV flux, Geophys. Res. Lett., 20, 2727-2730, 1993.

2.63 G. M. Lindsay, C. T. Russell, and J. G. Luhmann, On the sources of interplanetary shocks at 0.72 AU, J. Geophys. Res., 99, 11-17, 1994.

2.64 D. S. Orlowski, C. T. Russell, D. Krauss-Varban, and N. Omidi, A test of the Hall-MHD model: Application to low-frequency upstream waves at Venus, J. Geophys. Res., 99, 169-178, 1994.

Table 3

3.1 K. W. Behannon, L. F. Burlaga, J. T. Hoeksema, L. W. Klein, Spatial variation and evolution of heliospheric sector structure, Fall AGU Meeting, San Francisco, CA, December 1987.

3.2 R. Woo, W. L. Sjogren, J. G. Luhmann, C. T. Russell and L. H. Brace, Simultaneous radio scintillation and plasma measurements of the solar wind interaction with the ionosphere of Venus, Spring AGU Meeting, Baltimore, MD, May 1988.

3.3 K. R. Moore, D. J. McComas and C. T. Russell, Unusual plasma events upstream of the Venus bow shock, Spring AGU Meeting, Baltimore, MD, May 1988.

3.4 R. N. Singh, Plasma density hole formation in the nightside of Venus, presented at COSPAR XXVII, Helsinki, Finland, July 1988.

3.5 E. G. Fontheim and L. H. Brace, Venus bow shock precursor, presented at COSPAR XXVII, Helsinki, Finland, July 1988.

3.6 J. D. Mihalov, A. Barnes and C. T. Russell, Observations of shock-energized ions upstream from Venus' bow shock, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1288, 1988.

3.7 C. M. Ho, M. von Dornum, R. J. Strangeway and C. T. Russell, Polarization of low frequency waves observed in the nightside Venus ionosphere, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1294, 1988.

3.8 M. von Dornum, C. T. Russell and R. J. Strangeway, Altitude dependence of the amplitude of impulsive VLF noise in the nightside Venus ionosphere, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1294, 1988.

3.9 C. T. Russell, Evidence for lightning on Venus, The Contributions of F. L. Scarf, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1294, 1988.

3.10 K. K. Mahajan, H. G. Mayr and L. H. Brace, On the lower altitude limit of Venusian ionosphere, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1296, 1988.

3.11 H. G. Mayr, K. K. Mahajan, L. H. Brace and I. Harris, The Venus ionopause: theoretical considerations, observations and definitions, presented at the Fall National AGU Meeting (abstract), EOS, 69, 1296, 1988.

3.12 J. G. Luhmann and J. U. Kozyra, Dayside pickup ion precipitation at Venus and Mars: Spatial distributions and energy deposition, presented at Spring National AGU Meeting (abstract), EOS, 70, 386, 1989.

3.13 L. H. Brace, R. F. Theis, J. G. Luhmann, and J. D. Mihalov, Response of the Venus ionotail to changes in the solar EUV flux, solar wind pressure and the IMF: Implications for Mars, presented at Spring National AGU Meeting (abstract), EOS, 70, 386, 1989.

3.14 R. Woo, A. J. Kliore, L. Mullen, and J. G. Luhmann, Radio scintillation measurements of the solar wind interaction with the ionospheres of Venus and Mars, presented at Spring National AGU Meeting (abstract), EOS, 70, 387, 1989.

3.15 J. G. Luhmann, The solar wind interaction with Venus and Mars: Cometary analogies and contrasts, presented at the AGU Chapman Conference on Cometary Plasma Processes, Guildford, England, July 1989.

3.16 L. H. Brace, R. F. Theis, J. G. Luhmann, and J. D. Mihalov, Solar wind and solar cycle control of the Venus nightside upper atmospohere, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

3.17 H. Perez-de-Tejada, D. S. Intriligator, and R. J. Strangeway, The intermediate plasma transition of the Venus ionosheath: PVO evidence, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

3.18 K. K. Mahajan, J. M. Grebowsky, and L. H. Brace, Morphology of the Venus "superthermal" ionopause, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1177, 1989.

3.19 G. K. Crawford, R. J. Strangeway, and C. T. Russell, Plasma waves observed in the Venus electron and ion foreshock regions, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

3.20 K. K. Mahajan, J. M. Grebowsky, R. E. Hartle, L. H. Brace, W. T. Kasprzak, and R. J. Strangeway, Some features of plasma waves at the Venus ionopause, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

3.21 C. M. Ho, C. T. Russell, and R. J. Strangeway, Statistical studies of the occurrence of VLF bursts in the night ionosphere of Venus, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 71, 550, 1990.

3.22 G. K. Crawford, R. J. Strangeway, and C. T. Russell, Electron plasma oscillations in the foreshocks of Venus and Mars, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

3.23 L. H. Brace, R. F. Theis, J. D. Mihalov, and J. G. Luhmann, Solar cycle effects on the ionotail and nightside ionosphere of Venus, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, June, 1990.

3.24 J. L. Phillips and C. T. Russell, The Venus ashen light: Results of the 1988 observing campaign, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, June, 1990.

3.25 C. T. Russell, M. Ong, J. G. Luhmann, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, The bow shocks and magnetotails of Venus and Mars: A comparison, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, June, 1990.

3.26 J. G. Luhmann, Comparative studies of the solar wind interaction with weakly magnetized planets, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, June, 1990.

3.27 C. T. Russell, J. G. Luhmann, K. Schwingenschuh, W. Riedler, and Ye. Yeroshenko, Upstream waves at Mars, presented at the Twenty-Eighth Plenary Meeting of the Committee on Space Research, Den Haag, June, 1990.

3.28 V. S. Sonwalkar, D. L. Carpenter and R. J. Strangeway, On the question of lightning on Venus, presented at the Fall American Geophysical Union Meeting (abstract) EOS, 71, 1431, 1990.

3.29 J. D. Mihalov, A. Barnes, D. S. Intriligator, L. H. Brace, W. C. Knudsen, C. T. Russell J. G. Luhmann, Characteristics of altitude, energy and solar cycle dependence of superthermal ion fluxes on Venus' nightside, presented at the Fall American Geophysical Union Meeting (abstract) EOS, 71, 1431, 1990.

3.30 K. L. Miller, W. Zhao and L. Gordon, Evidence of a re-compression shock wave in the nightside ionosphere of Venus, presented at the Fall American Geophysical Union Meeting (abstract) EOS, 71, 1431, 1990.

3.31 J. W. Bieber and C. W. Smith, North/south asymmetry of the interplanetary magnetic field spiral: Radial variation, presented at the Fall American Geophysical Union Meeting (abstract) EOS, 71, 1431, 1990.

3.32 V. S. Sonwalkar, Testing radio bursts observed on the nightside of Venus for evidence of whistler-mode propagation from lightning, presented at the Spring AGU Meeting (abstract) EOS, 72, 172, 1991.

3.33 L. H. Brace, Reexamination of the Venus ionotail using plasma, magnetic field, and electric field measurements, presented at the Spring AGU Meeting (abstract) EOS, 72, 187, 1991.

3.34 C. Nairn, R. Grard, L. Brace, R. Strangeway, J. Luhmann and K. Schwingenschuh, Comparative studies of plasma and wave observations in the night sectors of Mars and Venus, presented at the IUGG XX Assembly, Vienna, Austria, August, 1991.

3.35 C. M. Ho, R. J. Strangeway, and C. T. Russell, Further identification of the wave mode of bursty VLF signals in the nightside Venus ionosphere, presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

3.36 L. H. Brace, R. Strangeway and J. G. Luhmann, Plasma waves and magnetic fields associated with ionospheric tail rays at Venus, presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

3.37 R. Woo and A. J. Kliore, Magnetization of the ionospheres of Venus and Mars: Results from radio occultation measurements, presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

3.38 O. Vaisberg, J. G. Luhmann, C. T. Russell, V. Smirnov, A. Fedorov and D. S. Intriligator, Inferred and observed plasma parameters in the Venusian tail, presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

3.39 G. K. Crawford, R. J. Strangeway and C. T. Russell, Plasma waves in the Venus foreshock, presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

3.40 Curtis, S. A., Ion acceleration near the dayside Venus ionosphere, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

3.41 Kar, J., J. M. Grebowsky, R. E. Hartle, J. G. Luhmann, L. H. Brace, On the structure of near-terminator ionopause of Venus, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

3.42 Strangeway, R. J., Expected VLF wave observations during the Pioneer Venus final encounter, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 192, 1992.

3.43 Cloutier, P. A., Solar wind interaction with the Venusian ionosphere, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 192, 1992.

3.44 Strangeway, R. J., An assessment of plasma instabilities or planetary lightning as a source for the VLF bursts detected at Venus, presented at 29th Plenary Meeting COSPAR, Washington DC, August 1992.

3.45 Singh, R. N., Asymmetric global escape of high frequency lightning signals from Venus atmosphere, presented at 29th Plenary Meeting COSPAR, Washington DC, August 1992.

3.46 Perez-de-Tejada, H., The intermediate transition of the Venus ionosheath, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 334, 1992.

3.47 Ho, C-M., R. J. Strangeway, and C. T. Russell, Venus nightside ionospheric irregularities and their relationship to VLF bursts, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 334, 1992.

3.48 Crawford, G. K., R. J. Strangeway, and C. T. Russell, Asymmetry in Venus VLF electron foreshock emissions, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 441, 1992.

3.49 Higuchi, T., and C. T. Russell, A modern bayesian approach to automatic transaction for the separation of spin synchronized signals, presented at Fall AGU Meeting (abstract), EOS Supplement (Oct. 27), p. 491, 1992.

3.50 Curtis, S. A., Ion acceleration near the dayside Venus ionosphere, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

3.51 Kar, J., J. M. Grebowsky, R. E. Hartle, J. G. Luhmann, L. H. Brace, On the structure of near-terminator ionopause of Venus, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 189, 1992.

3.52 Strangeway, R. J., Expected VLF wave observations during the Pioneer Venus final encounter, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 192, 1992.

3.53 Cloutier, P. A., Solar wind interaction with the Venusian ionosphere, presented at the Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 192, 1992.

3.54 Russell, C. T., Hydromagnetic waves in other planetary magnetospheres, presented at 7th Scientific Assembly of IAGA, Buenos Aires, August, 1993.

3.55 Orlowski, D. S., G. Le, C. T. Russell, D. Krauss-Varban, and N. Omidi, Damping properties of upstream whistlers, presented at 7th Scientific Assembly of IAGA, Buenos Aires, August, 1993.

3.56 Hoegy, W. R., and K. D. Cole, Electric fields and electron and ion velocities in the Venus subsolar ionosphere as derived from Pioneer Venus Orbiter data, presented at

Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 375, 1993.

3.57 Hartle, R. E., Vertical flow reversals in the ionosphere of Venus, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 375, 1993.

3.58 Perez-de-Tejada, H., D. S. Intriligator, and R. J. Strangeway, Evidence for changes in ion composition across the intermediate transition of the Venus ionosheath, presented at Fall National Meeting of AGU (abstract), EOS, 74(43) Supplement, 376, 1993.

Table 4

4.1 F. L. Scarf and C. T. Russell, Evidence of lightning and volcanic activity on Venus, Science, 240, 222, 1988.

4.2 C. T. Russell, M. von Dornum, and F. L. Scarf, The altitude distribution of impulsive signals in the night ionosphere of Venus: Further evidence for lightning generation, J. Geophys. Res., 93, 5915, 1988.

4.3 H. Shinagawa and T. E. Cravens, A one-dimensional multispecies magnetohydrodynamic model of the dayside ionosphere of Venus, J. Geophys. Res., 93, 11263, 1988.

4.4 D. S. Intriligator, Results of the first statistical study of Pioneer Venus Orbiter plasma observations in the distant Venus tail: Evidence for a hemispheric asymmetry in the pickup of ionospheric ions, Geophys. Res. Lett., 16, 117, 1989.

4.5 R. Woo, W. L. Sjogren, J. G. Luhmann, A. J. Kliore, and L. H. Brace, Solar wind interaction with the ionosphere of Venus inferred from radio scintillation measurements, J. Geophys. Res., 94, 1473, 1989.

4.6 C. T. Russell, Planetary magnetic fields, in The Encyclopedia of Solid Earth Geophysics, edited by D. E. James, 938-945, Van Nostrand Reinhold, New York, 1989.

4.7 C. T. Russell and J. L. Phillips, The Ashen Light, Adv. Space Res., 10, (5)137-(5)141, 1990.

4.8 J. L. Phillips and C. T. Russell, Results from the Ashen Light campaign, Sky and Telescope, 79, 108-111, 1990.

4.9 W. R. Hoegy, L. H. Brace, W. T. Kasprzak, and C. T. Russell, Small-scale plasma, magnetic and neutral density fluctuations in the nightside Venus ionosphere, J. Geophys. Res., 95, 4085-4102, 1990.

4.10 J. G. Luhmann and C. T. Russell, An assessment of the conditions for critical velocity ionization at the weakly magnetized planets, Adv. Space Res., 10, (7)71-(7)76, 1990.

4.11 R. J. Strangeway, Letter in Nature, 345, 213, 1990.

4.12 G. K. Crawford, R. J. Strangeway and C. T. Russell, Electron plasma oscillations in the Venus foreshock, Geophys. Res. Lett., 17, 1805-1808, 1990.

4.13 R. Woo and A. Kliore, Magnetization of the ionospheres of Venus and Mars: Results from radio occultation measurements, J. Geophys. Res., 96, 11073-11082,

1991.

4.14 T. E. Cravens and H. Shinagawa, The ionopause current layer at Venus, J. Geophys. Res., 96, 11119-11132, 1991.

4.15 T. K. Breus, A. M. Krymskii, R. Lundin, E. M. Dubinin, J. G. Luhmann, Ye. G. Yeroshenko, S. V. Barabash, V. Ya. Mitnitskii, N. F. Pissarenko, and V. A. Styashkin, The solar wind interaction with Mars: Consideration of Phobos 2 mission observations of an ion composition boundary on the dayside, J. Geophys. Res., 96, 11165, 1991.

4.16 E. Dubinin, R. Lundin, W. Riedler, K. Schwingenschuh, J. G. Luhmann, C. T. Russell and L. H. Brace, Comparison of observed plasma and magnetic field structure in the wakes of Mars and Venus, J. Geophys. Res., 96, 11189, 1991.

4.17 J. G. Luhmann, The solar wind interaction with Venus and Mars: Cometary analogies and contrasts, Cometary Plasma Processes, Geophysical Monograph 61, American Geophysical Union, p.5-16, 1991.

4.18 J. G. Luhmann, Space Plasma Physics research progress 1987-1990: Mars, Venus and Mercury, Rev. of Geophys., Supplement, U.S. National Report to IUGG, p.965-975, April 1991.

4.19 J. L. Phillips and D. J. McComas, The magnetosheath and magnetotail of Venus, Space Sci. Rev., 55, 1-80, 1991.

4.20 L. H. Brace and A. J. Kliore, The structure of the Venus ionosphere, Rev. of Geophys., 55, 81-164, 1991.

4.21 R. J. Strangeway, Plasma waves at Venus, Rev. of Geophys., 55, 275-316, 1991.

4.22 G. K. Crawford, R. J. Strangeway and C. T. Russell, Variations in plasma wave intensity with distance along the electron foreshock boundary at Venus, Adv. Space Res., 11, (9)93-(9)96, 1991.

4.23 C.-M. Ho, R. J. Strangeway and C. T. Russell, Occurrence characteristics of VLF bursts in the nightside ionosphere of Venus, J. Geophys. Res., 96, 21,361-21,369, 1991.

4.24 C. T. Russell, The Pioneer Venus mission, in Geophys. Monograph 66, p.225, American Geophysical Union, Washington, DC, 1991.

4.25 A. O. Fedorov, O. L. Vaisberg, D. S. Intriligator, R. Z. Sagdeev, and A. A. Galeev, A large-amplitude rotational wave in the Venusian ionosheath, J. Geophys. Res., 96, 87-99, 1992.

4.26 J. G. Luhmann, Comparative studies of the solar wind interaction with weakly magnetized planets, Adv. Space Res., 12, (9)191-(9)203, 1992.

4.27 C. T. Russell and R. J. Strangeway, Venus lightning: An update, Adv. Space Res., 12, (9)43-(9)50, 1992.

4.28 C.-M. Ho, R. J. Strangeway, and C. T. Russell, Control of VLF burst activity in the nightside ionosphere of Venus by the magnetic field orientation, J. Geophys. Res., 97, 11,673-11,680, 1992.

4.29 R. J. Strangeway, An assessment of lightning or in situ instabilities as a source for whistler mode waves in the night ionosphere of Venus, J. Geophys. Res., 97, 12203-12216, 1992.

4.30 J. Kar, K. K. Mahajan, S. Ghosh and l. H. Brace, A reconsideration of the effects of terminator ionopause height on the nightward ion transport at Venus, J. Geophys. Res., 97, 13899-13902, 1992.

4.31 J. G. Luhmann and M. Tatrallyay, Highlights of the Chapman Conference on Venus and Mars: Atmospheres, ionospheres and solar wind interactions, Adv. Space Res., 12, (9)129-(9)133, 1992.

4.32 J. G. Luhmann and M. Tatrallyay, Highlights of the Chapman Conference on Venus and Mars: Atmospheres, ionospheres and solar wind interactions, Adv. Space Res., 12, (9)129-(9)133, 1992.

4.33 J. G. Luhmann, Comparative studies of the solar wind interaction with weakly magnetized planets, Adv. Space Res., 12, (9)191-(9)203, 1992.

4.34 C. T. Russell, Solar system, magnetic and electric fields, in Encyclopedia of Physical Science and Technology, Vol.15, p. 410-428, Academic Press, New York, 1992.

4.35 C. T. Russell, Planetary magnetospheres, Rep. Prog. Phys., 56, 687, 1993.

4.36 C. T. Russell, Planetary lightning, Annu. Rev. Earth Planet. Sci., 21, 43-87, 1993.

4.37 G. K. Crawford, R. J. Strangeway and C. T. Russell, VLF emissions in the Venus foreshock: Comparison with terrestrial observations, J. Geophys. Res., 98, 15,305-15,317, 1993.

4.38 G. K. Crawford, R. J. Strangeway, and C. T. Russell, VLF emissions at the Venus dayside ionopause, in Plasma Environments of Non-Magnetic Planets, edited by T. I. Gombosi, 253-258, Pergamon Press, Oxford, 1993.

4.39 R. J. Strangeway, C. T. Russell, C. M. Ho, and L. H. Brace, Plasma waves observed

at low altitudes in the tenuous Venus nightside ionosphere, Geophys. Res. Lett., 20, 2767-2770, 1993.

4.40 R. J. Strangeway, C. T. Russell, and C. M. Ho, Observation of intense wave bursts at very low altitudes within the Venus nightside ionosphere, Geophys. Res. Lett., 20, 2771-2774, 1993.

4.41 C. M. Ho, R. J. Strangeway, and C. T. Russell, Evidence for Langmuir oscillations and a low density cavity in the Venus magnetotail, Geophys. Res. Lett., 20, 2775-2778, 1993.

4.42 G. K. Crawford, R. J. Strangeway, and C. T. Russell, VLF imaging of the Venus foreshock, Geophys. Res. Lett., 20, 2801-2804, 1993.

4.43 J. G. Luhmann, A model of the ionospheric tail rays of Venus, J. Geophys. Res., 98, 17615-17621, 1993.

Table 5

5.1 C. T. Russell and F. L. Scarf, Evidence for lightning on Venus, COSPAR XXVII, Helsinki, July 1988.

5.2 C. T. Russell, Interplanetary magnetic field enhancements: Observational clues to the possible sources, presented at the Sixth Scientific Assembly, International Association of Geomagnetism and Aeronomy, Exeter, England, July 1989.

5.3 J. G. Luhmann, The solar wind interaction with Venus and Mars: Cometary analogies and contrasts, presented at the AGU Chapman conference on Cometary Plasma Processes, Guildford, England, July 1989.

5.4 C. T. Russell, Planetary electrodynamics, presented at the Fall National AGU Meeting (abstract), EOS, 70, 1020, 1989.

5.5 C. T. Russell, The Pioneer Venus mission, presented at the AGU Chapman Conference on Comparative Study of Venus and Mars: Atmospheres, Ionospheres and Solar Wind Interactions, Balatonfured, Hungary, June, 1990.

5.6 J. G. Luhmann, Solar wind-ionosphere coupling at Venus and Mars (invited) presented at the IUGG XX General Assembly, Vienna, Austria, August 1991.

5.7 J. G. Luhmann, Ionosphere coupling at Venus and Mars (invited), presented at the IUGG XX General Assembly, Vienna, Austria, August, 1991.

5.8 C. T. Russell, T. L. Zhang, J. G. Luhmann, K. Schwingenschuh, and W. Riedler, Observational evidence for mass-loading at Venus and Mars (invited), presented at the IUGG XX General Assembly, Vienna, Austria, August 1991.

5.9 C. T. Russell, K. Schwingenschuh and J. A. Slavin: The Venus and Mars bow shocks (invited), presented at the IUGG XX General Assembly, Vienna, Austria, August 1991.

5.10 J. G. Luhmann, C. T. Russell, T. L. Zhang, and S. Petrinec, The interplanetary magnetic field in the inner solar system (invited), presented at the IUGG XX General Assembly, Vienna, Austria, August 1991.

5.11 C. T. Russell, Magnetotails (invited), presented at the IUGG XX Assembly, Vienna, Austria, August 1991.

5.12 Russell, C. T., Magnetic fields of the terrestrial planets, Spring American Geophysical Union Meeting (abstract), EOS Trans. AGU, 73(14), Spring Meeting Suppl., 55, 1992.

5.13 Russell, C. T., Unsolved Problems in the Solar Wind Interactions with Venus, presented at the Western Pacific Geophysics Meeting (abstract), EOS, 73(25),

Supplement, 80, Hong Kong, August 1992.

5.14 Russell, C. T., The solar wind interaction with Venus: A comparison of Galileo and Pioneer Venus results, presented at 29th Plenary Meeting COSPAR, Washington DC, August 1992.

5.15 Russell, C. T., Planetary bow shocks, presented at the AGU Chapman Conference on Solar Wind Sources of ULF Waves, Williamsburg, Virginia, September 1992.

Table 6

Masters Theses

M. Ong, Solar Wind Interaction With Venus: Plasma Clouds and Tail Rays, Department of Earth and Space Sciences, University of California Los Angeles, March 1991.

Ph.D. Theses

R. C. Elphic, A Study of Magnetic Flux Ropes in the Venus Ionosphere, Department of Earth and Space Sciences, University of California, Los Angeles, June 1982.

D. J. McComas, Field Reversing Magnetotail Current Sheets: Earth, Venus and Comet Giacobini Zinner, Department of Earth and Space Sciences, University of California, Los Angeles, September 1986.

R. J. Phillips, Interplanetary Magnetic Field Effects on the Interaction of the Solar Wind with Venus, Department of Earth and Space Sciences, University of California, Los Angeles, June 1987.

K. R. Moore, Pickup Ions at Venus, Department of Earth and Space Sciences, University of California, Los Angeles, September 1990.

T.-L. Zhang, Solar Wind Interaction with Venus and Mars, Department of Earth and Space Sciences, University of California, Los Angeles, June 1991.

C.-M. Ho, Plasma Waves in the Nightside Ionosphere of Venus, Department of Earth and Space Sciences, University of California, Los Angeles, March 1993.

G. K. Crawford, A Study of Plasma Waves Arising from the Solar Wind Interaction with Venus, Department of Earth and Space Sciences, University of California, Los Angeles, July 1993.