

Biographical Sketch

Daniel Ray Weimer, Ph.D.

Dr. Weimer's PhD thesis work on simultaneous electric field measurements on both Dynamics Explorer satellites has been highly cited, and his empirical models of ionospheric electric potentials and field-aligned current are very well known in the space physics community. He had participated in the development of the Integrated Space Weather Prediction Model (ISM), primarily as the developer of all diagnostic visualization programs. He is an expert in using IDL for both innovative data analysis techniques, empirical model development, and graphics. As the PI in the ACE Guest Investigator Program, Dr. Weimer had developed an innovative technique for measuring IMF propagation delay times between multiple satellites.

Dr. Weimer is now Research Professor of Space Science with the Virginia Tech. Center for Space Science and Engineering Research, and resident at the National Institute of Aerospace in Hampton, VA.

Current research involves an empirical model for predicting geomagnetic variations at the surface of the Earth, and developing a technique to predict changes in the temperature and number density of the thermosphere resulting from auroral heating, to better predict satellite drag perturbations in low Earth orbit.

Refereed Publications as First Author

- Weimer, D. R., C. K. Goertz, D. A. Gurnett, N. C. Maynard, and J. L. Burch, Auroral zone electric fields from DE 1 and 2 at magnetic conjunctions, *J. Geophys. Res.*, *90*, 7479, 1985.
- Weimer, D. R., D. A. Gurnett, C. K. Goertz, J. D. Menietti, J. L. Burch, and M. Sugiura, The current-voltage relationship in auroral current sheets, *J. Geophys. Res.*, *92*, 187, 1987.
- Weimer, D. R., N. C. Maynard, W. J. Burke, and M. Sugiura, Stationary auroral current oscillations resulting from the magnetospheric current generator, *J. Geophys. Res.*, *93*, 11,436, 1988.
- Weimer, D. R., N. C. Maynard, W. J. Burke, and C. Liebrecht, Polar cap potentials and the auroral electrojet indices, *Planet. Space Sci.*, *38*, 1207, 1990.
- Weimer, D. R., L. A. Reinleitner, J. R. Kan, L. Zhu, and S.-I. Akasofu, Saturation of the auroral electrojet current and the polar cap potential, *J. Geophys. Res.*, *95*, 18981-18987, 1990
- Weimer, D. R., J. R. Kan, and S.-I. Akasofu, Variations of the polar cap potential measured during magnetospheric substorms, *J. Geophys. Res.*, *97*, 3945-3951, 1992.
- Weimer, D. R. and D. A. Gurnett, Large-amplitude auroral electric fields measured with DE-1, *J. Geophys. Res.*, *98*, 13,557, 1993.
- Weimer, D. R., Substorm time constants, *J. Geophys. Res.*, *99*, 11,005, 1994.
- Weimer, D. R., J. D. Craven, L. A. Frank, W. B. Hanson, N. C. Maynard, R. A. Hoffman, and J. A. Slavin, Satellite measurements through the center of a substorm surge, *J. Geophys. Res.*, *99*, 23,639-23,649, 1994.
- Weimer, D. R., Reply, *J. Geophys. Res.*, *100*, 5719, 1995.
- Weimer, D. R., Models of high-latitude electric potential derived with a least-error fit of spherical harmonic coefficients, *J. Geophys. Res.*, *100*, 19,595, 1995.

- Weimer, D. R., A flexible, IMF dependent model of high-latitude electric potentials having “space weather” applications, *Geophys. Res. Lett.*, *23*, 2549, 1996.
- Weimer, D. R., Substorm influence on the ionospheric electric potentials and currents, *J. Geophys. Res.*, *104*, 185, 1999.
- Weimer, D. R., An improved model of ionospheric electric potentials including substorm perturbations and application to the GEM November 24, 1996 event, *J. Geophys. Res.*, *106*, 407, 2001.
- Weimer, D. R., Maps of field-aligned currents as a function of the interplanetary magnetic field derived from Dynamics Explorer 2 data, *J. Geophys. Res.*, *106*, 12,889, 2001.
- Weimer, D. R., D. M. Ober, N. C. Maynard, W. J. Burke, M. R. Collier, D. J. McComas, N. F. Ness, and C. W. Smith, Variable time delays in the propagation of the interplanetary magnetic field, *J. Geophys. Res.*, *107*(A8), 1210, doi:10.1029/2001JA009102, 2002.
- Weimer, D. R., D. M. Ober, N. C. Maynard, M. R. Collier, D. J. McComas, N. F. Ness, C. W. Smith, and J. Watermann, Predicting IMF propagation delay times using the minimum variance technique, *J. Geophys. Res.*, *108*(A1), 10.1029/2002JA009405, 2003.
- Weimer, D. R., Correction to “Predicting IMF propagation delay times using the minimum variance technique”, *J. Geophys. Res.*, *109*, A12104, 10.1029/2004JA010691, 2004.
- Weimer, D. R., Improved ionospheric electrodynamic models and application to calculating Joule heating rates, *J. Geophys. Res.*, 2004JA010884, *110*, A05306, doi:10.1029/2004JA010884, 2005.
- Weimer, D. R., Predicting Surface Geomagnetic Variations Using Ionospheric Electrodynamic Models, *J. Geophys. Res.*, A12307, doi:10.1029/2005JA011270, 2005.
- Weimer, D. R. and J. H. King, Improved Calculations of IMF Phase-Front Angles and Propagation Time Delays, *J. Geophys. Res.*, A01105, doi:10.1029/2007JA012452, 2008.
- Weimer, D. R., C. R. Clauer, M. J. Engebretson, T. L. Hansen, H. Gleisner, I. Mann, and K. Yumoto, Statistical maps of geomagnetic perturbations as a function of the interplanetary magnetic field, *J. Geophys. Res.*, *115*, A10320, doi:10.1029/2010JA015540, 2010.
- Weimer, D. R., B. R. Bowman, E. K. Sutton, and W. K. Tobiska, Predicting global average thermospheric temperature changes resulting from auroral heating, *J. Geophys. Res.*, *116*, A01312, doi:10.1029/2010JA015685, 2011.

Conference Proceedings and Monographs

- Weimer, D. R., The conductance of auroral magnetic field lines, in *Ion Acceleration in the Magnetosphere*, *Geophys. Monogr. Ser.*, vol. 38, edited by T. Chang, AGU, Washington, D. C., pp. 108-113, 1986.
- Weimer, D. R., Auroral E-fields from DE-1 and -2 at magnetically conjugate points, in *Adv. Space Res.*, Vol. 8, No. 9-10, pp. 373-384, 1988.
- Weimer, D. R., Characteristic time scales of substorm expansion and recovery, in Proceedings of the International Conference on Substorms (ICS-1), *Eur. Space Agency Spec. Publ.*, SP-335, 581-586, 1992.
- Weimer, D. R., J. D. Craven, L. A. Frank, W. B. Hanson, and J. A. Slavin, Electric fields and currents associated with a substorm surge, in Substorms 2, Proceedings of the Second

- International Conference on Substorms, University of Alaska Fairbanks, 455-460, 1994.
- Weimer, D. R., A new technique for the mapping of ionospheric field-aligned currents from satellite magnetometer data, in *Magnetospheric Current Systems, Geophys. Monogr. Ser.*, vol. 118, edited by S. Ohtani, R. Fujii, M. Hesse, and R. L. Lysak, AGU, Washington, D. C., pp. 381-388, 2000.
- Weimer, D. R., Constructing maps of field-aligned currents from satellite magnetometer data, in *OIST-4 Proceedings, 4th Oersted international Science Team Conference*, edited by P. Stauning et al., DMI, Copenhagen, pp. 143-148, 2003.

Refereed Publications as Co-author

- Burch, J. L., Reiff, P. H., J. D. Menietti, R. A. Heelis, W. B. Hanson, S. D. Shawhan, E. G. Shelley, M. Sugiura, D. R. Weimer, and J. D. Winningham, IMF B_y-dependent plasma flow and birkeland currents in the dayside magnetosphere 1. Dynamics Explorer observations, *J. Geophys. Res.*, *90*, 1577, 1985.
- Menietti, J. D., J. D. Winningham, J. L. Burch, W. K. Peterson, J. H. Waite, Jr., and D. R. Weimer, Enhanced ion outflows measured by the DE 1 high altitude plasma instrument in the dayside plasmasphere during the recovery phase, *J. Geophys. Res.*, *90*, 1653, 1985.
- Basu, Su., Sa. Basu, C. Senior, D. Weimer, E. Nielsen, and P. F. Fougere, Velocity shears and sub-km scale irregularities in the nighttime auroral F-region, *Geophys. Res. Lett.*, *13*, 101, 1986.
- Frank, L. A., J. D. Craven, D. A. Gurnett, S. D. Shawhan, D. R. Weimer, J. L. Burch, J. D. Winningham, C. R. Chappell, J. H. Waite, R. A. Heelis, N. C. Maynard, M. Sugiura, W. K. Peterson, and E. G. Shelley, The theta aurora, *J. Geophys. Res.*, *91*, 3177, 1986.
- Engebretson, M. J., L. J. Cahill, Jr., J. H. Waite, Jr., D. L. Gallagher, M. O. Chandler, M. Sugiura, and D. R. Weimer, Wave and plasma observations during a compressional Pc 5 wave event August 10, 1982, *J. Geophys. Res.*, *91*, 6884, 1986.
- Cahill, L. J., N. G. Lin, M. J. Engebretson, D. R. Weimer, and M. Sugiura, Electric and magnetic observations of the structure of the standing waves in the magnetosphere, *J. Geophys. Res.*, *91*, 9985, 1986.
- Waite, J. H., D. L. Gallagher, M. O. Chandler, R. C. Olsen, R. H. Comfort, J. F. E. Johnson, C. R. Chappell, W. K. Peterson, D. R. Weimer, and S. D. Shawhan, Plasma and field observations of a Pc 5 wave event, *J. Geophys. Res.*, *91*, 11,147, 1986.
- Maynard, N. C., T. L. Aggson, E. M. Basinska, W. J. Burke, P. Craven, W. K. Peterson, M. Sugiura, and D. R. Weimer, Magnetospheric boundary dynamics: DE 1 and DE 2 observations near the magnetopause and cusp, *J. Geophys. Res.*, *96*, 3505, 1991.
- Shue, J.-H., and D. R. Weimer, The relationship between ionospheric convection and magnetic activity, *J. Geophys. Res.*, *99*, 401, 1994.
- Menietti, J. D., D. R. Weimer, M. Andre, and L. Eliasson, DE 1 and Viking observations associated with electron conical distributions, *J. Geophys. Res.*, *99*, 23,673, 1994.
- Maynard, N. C., E. J. Weber, D. R. Weimer, J. Moen, T. Onsager, R. A. Heelis, and A. Egeland, How wide in magnetic local time is the cusp? An event study, *J. Geophys. Res.*, *102*, 4765, 1997.
- Maynard, N. C., et al., Geotail measurements compared with the motions of high-latitude auroral

- boundaries during two substorms, *J. Geophys. Res.*, *102*, 9553, 1997.
- Winglee, R. M., V. O. Papitashvili, and D. R. Weimer, Comparison of the high-latitude ionospheric electrodynamics inferred from global simulations and semiempirical models for the January 1992 GEM campaign, *J. Geophys. Res.*, *102*, 26,961, 1997.
- Maynard, N. C., W. J. Burke, D. R. Weimer, F. S. Mozer, J. D. Scudder, C. T. Russell, W. K. Peterson, and R. P. Lepping, Polar observations of convection with northward interplanetary magnetic field at dayside high latitudes, *J. Geophys. Res.*, *103*, 29, 1998.
- White, W. W., G. L. Siscoe, G. M. Erickson, Z. Kaymaz, N. C. Maynard, K. D. Siebert, B. U. Ö. Sonnerup, and D. R. Weimer, The magnetospheric sash and the cross-tail S, *Geophys. Res. Lett.*, *25*, 1605, 1998.
- Burke, W. J., T. L. Fehring, D. R. Weimer, C. Y. Huang, M. S. Gussenhoven, F. J. Rich, and L. C. Gentile, Observed and predicted potential distributions during the October 1995 magnetic cloud passage, *Geophys. Res. Lett.*, *25*, 3023, 1998.
- Whipple, E. C., J. S. Halekas, J. D. Scudder, W. R. Paterson, L. A. Frank, R. B. Sheldon, N. C. Maynard, D. R. Weimer, C. T. Russell, K. Tsunruda, H. Hayyakawa, and T. Yamamoto, Identification of magnetospheric particles that travel between spacecraft and their use to help obtain magnetospheric potential distributions, *J. Geophys. Res.*, *103*, 93, 1998.
- Menietti, J. D., and D. R. Weimer, DE observations of electric field oscillations associated with an electron conic, *J. Geophys. Res.*, *103*, 431, 1998.
- Kustov, A. V., and D. R. Weimer, SuperDARN detected plasma convection vortices and the global plasma convection, *J. Geophys. Res.*, *103*, 11,653, 1998.
- Burke, W. J., D. R. Weimer, and N. C. Maynard, Geoeffective interplanetary scale sizes derived from regression analysis of polar cap potentials, *J. Geophys. Res.*, *104*, 9989, 1999.
- Hairston, M. R., D. R. Weimer, R. A. Heelis, and F. Rich, Analysis of the ionospheric cross polar cap potential drop and electrostatic potential distribution patterns during the January 1997 CME Event using DMSP data, *J. Atmos. Terr. Phys.*, *61*, 195-206, 1999.
- Maynard, N. C., W. J. Burke, R. F. Pfaff, E. J. Weber, D. M. Ober, D. R. Weimer, J. Moen, S. Milan, K. Maseide, P.-E. Sandholt, A. Egeland, F. Soraas, R. Lepping, S. Bounds, M. H. Acuna, H. Freudenreich, J. S. Machuzak, L. C. Gentile, J. H. Clemmons, M. Lester, P. Ning, D. A. Hardy, J. A. Holtet, J. Stadsnes, and T. van Eyken, Driving dayside convection with northward IMF: Observations by a sounding rocket launched from Svalbard, *J. Geophys. Res.*, *105*, 5245, 2000.
- Siscoe, G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, K. D. Siebert, D. R. Weimer, and W. W. White, Deflected magnetosheath flow at high-latitude magnetopause, *J. Geophys. Res.*, *105*, 12,851-12,857, 2000.
- Maynard, N. C., S. Savin, G. M. Erickson, H. Kawano, Z. Němeček, W. K. Peterson, J. Šafránková, I. Sandahl, J. D. Scudder, G. L. Siscoe, B. U. Ö. Sonnerup, D. R. Weimer, W. W. White, and G. R. Wilson, Observation of the magnetospheric “sash” and its implications relative to solar-wind/magnetosphere coupling: A multisatellite event analysis, *J. Geophys. Res.*, *106*, 6097-6122, 2001.
- Siscoe, G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, K. D. Siebert, D. R. Weimer, and W. W. White, Relation between the cusp and mantle in MHD simulation, *J. Geophys. Res.*, *106*, 10,743-10,749, 2001.
- Siscoe, G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, K. D. Siebert, D. R. Weimer,

- and W. W. White, Global role of E_{\parallel} in magnetopause reconnection, *J. Geophys. Res.*, *106*, 13,015-13,022, 2001.
- Siscoe, G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, K. D. Siebert, D. R. Weimer, and W. W. White, Magnetospheric sash dependence on IMF direction, *Geophys. Res. Lett.*, *28*, 1921-1924, 2001.
- White, W. W., J. A. Schoendorf, K. D. Siebert, N. C. Maynard, D. R. Weimer, G. L. Wilson, B. U. Ö. Sonnerup, G. L. Siscoe, and G. M. Erickson, MHD simulation of magnetospheric transport at the mesoscale, *Space Weather, Geophysical Monograph Series Vol. 125*, edited by Paul Song, Howard J. Singer, and George L. Siscoe, pp. 229-240, American Geophys. Union, 2001.
- Maynard, N. C., G. L. Siscoe, B. U. Ö. Sonnerup, W. W. White, K. D. Siebert, D. R. Weimer, G. M. Erickson, J. A. Schoendorf, D. M. Ober, and G. R. Wilson, The response of ionospheric convection to changes in the IMF: Lessons from a MHD simulation, *J. Geophys. Res.*, *106*, 21,429-21,451, 2001.
- Maynard, N. C., W. J. Burke, P.-E. Sandholt, J. Moen, D. M. Ober, M. Lester, D. R. Weimer, and A. Egeland, Observations of simultaneous effects of merging in both hemispheres, *J. Geophys. Res.*, *106*, 24,551, 2001.
- Sonnerup, B. U. O., K. D. Siebert, W. W. White, D. R. Weimer, N. C. Maynard, J. A. Schoendorf, G. R. Wilson, G. L. Siscoe, and G. M. Erickson, Simulations of the magnetosphere for zero interplanetary magnetic field: The ground state, *J. Geophys. Res.*, *106*, 29,419-29,434, 2001.
- Liemohn, M. W., J. U. Kozyra, M. R. Hairston, D. R. Weimer, G. Lu, A. J. Ridley, T. H. Zurbuchen, and R. M. Skoug, Consequences of a saturated convection electric field on the ring current, *Geophys. Res. Lett.*, *29*(9), 1348, doi:10.1029/2001GL014270, 2002.
- Siscoe G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, J. A. Schoendorf, K. D. Siebert, D. R. Weimer, W. W. White, and G. R. Wilson, Hill model of transpolar potential saturation: Comparisons with MHD simulations, *J. Geophys. Res.*, *107*, 10.1029/2001JA000109, 2002.
- Siscoe, G. L., G. M. Erickson, B. U. O. Sonnerup, N. C. Maynard, J. A. Schoendorf, K. D. Siebert, D. R. Weimer, W. W. White, and G. R. Wilson, Flow-through magnetic reconnection, *Geophys. Res. Lett.*, *29*(13), 1626, doi:10.1029/2001GL013536, 2002.
- Angelopoulos, V., M. Temerin, I. Roth, F. S. Mozer, D. Weimer, and M. R. Hairston, Testing global storm-time electric field models using particle spectra on multiple spacecraft, *J. Geophys. Res.*, *107*(A8), 1194, doi:10.1029/2001JA900174, 2002.
- Maynard, N. C., W. J. Burke, J. Moen, D. M. Ober, J. D. Scudder, J. B. Sigwarth, G. L. Siscoe, B. U. Ö. Sonnerup, W. W. White, K. D. Siebert, D. R. Weimer, G. M. Erickson, L. A. Frank, M. Lester, W. K. Peterson, C. T. Russell, G. R. Wilson, and A. Egeland, Responses of the open-closed field line boundary in the evening sector to IMF changes: A source mechanism for Sun-aligned arcs, *J. Geophys. Res.*, *108*(A1), 1006, doi:10.1029/2001JA000174, 2003.
- Maynard, N. C., W. J. Burke, J. Moen, P. E. Sandholt, M. Lester, D. M. Ober, D. R. Weimer, and W. W. White, Bifurcation of the cusp: Implications for understanding boundary layers, *AGU Monograph on the Low-Latitude Boundary Layer*, 2002.
- Erickson, G. M., G. L. Siscoe, D. R. Weimer, K. D. Siebert, M. A. Heinemann, B. U. O.

- Sonnerup, N. C. Maynard, and W. W. White, Prediction of Alfvénic Turbulence Near the Magnetospheric Sheath, *Planet. Space Sci.*, 2002.
- Siscoe, G. L., G. M. Erickson, B. U. Ö. Sonnerup, N. C. Maynard, J. A. Schoendorf, K. D. Siebert, D. R. Weimer, W. W. White, and G. R. Wilson, MHD properties of magnetosheath flow, *Planet. Space Sci.*, 2002 .
- Eriksson, S., L. G. Blomberg, and D. R. Weimer, Comparing a spherical harmonic model of the global electric field distribution with Astrid-2 observations, *J. Geophys. Res.*, 107(A11), 1391, doi:10.1029/2002JA009313, 2002.
- Maynard, N. C., B. U. Ö. Sonnerup, G. L. Siscoe, D. R. Weimer, K. D. Siebert, G. M. Erickson, W. W. White, J. A. Schoendorf, D. M. Ober, G. R. Wilson, and M. A. Heinemann, Predictions of magnetosheath merging between IMF field lines of opposite polarity, *J. Geophys. Res.*, 107(A12), 1456, doi:10.1029/2002JA009289, 2002.
- N. C. Maynard, D. M. Ober, W. J. Burke, J. D. Scudder, M. Lester, M. Dunlop, J. A. Wild, A. Grocott, C. J. Farrugia, E. J. Lund, C. T. Russell, D. R. Weimer, K. D. Siebert, A. Balogh, M. Andre, H. Rème, Polar, Cluster and SuperDARN evidence for high-latitude merging during southward IMF: temporal/spatial evolution, *Annales Geophysicae*, 21, 2233-2258, 2003 .
- N. C. Maynard, W. J. Burke, J. D. Scudder, D. M. Ober, G. L. Siscoe, W. W. White, K. D. Siebert, D. R. Weimer, G. M. Erickson, J. Schoendorf, M. A. Heinemann, Observed and simulated depletion layers with southward IMF, *Annales Geophysicae*, 22, 2151-2169, 2004.
- N. C. Maynard, J. Moen, W. J. Burke, M. Lester, D. M. Ober, J. D. Scudder, K. D. Siebert, D. R. Weimer, C. T. Russell, A. Balogh, Temporal-spatial structure of magnetic merging at the magnetopause inferred from 557.7-nm all-sky images, *Annales Geophysicae*, 22, 2917-2942, 2004.
- Y. Ebihara, M. Ejiri, H. Nilsson, I. Sandahl, M. Grande, J. F. Fennell, J. L. Roeder, D. R. Weimer, T. A. Fritz, Multiple discrete-energy ion features in the inner magnetosphere: 9 February 1998, event, *Annales Geophysicae*, 22, 1297-1304, 2004.
- Bargatze, L. F., R. L. McPherron, J. Minamora, and D. Weimer, A new interpretation of the Weimer et al. [2003] solar wind propagation delay technique, *J. Geophys. Res.*, 110, A07105, doi:10.1029/2004JA010902, 2005.
- Wilson, G. R., D. R. Weimer, J. O. Wise, and F. A. Marcos, The response of the thermosphere to joule heating and particle precipitation, *J. Geophys. Res.*, 111, A10314, doi:10.1029/2005JA011274, 2006.
- Burke, W. J., C. S. Lin, M. P. Hagan, C. Y. Huang, D. R. Weimer, J. O. Wise, L. C. Gentile, and F. A. Marcos, Stormtime global thermosphere: A driven-dissipative thermodynamic system, *J. Geophys. Res.*, 114, A06306, doi:10.1029/2008JA013848, 2009.
- Kelley, Michael C., G. Crowley, and Daniel R. Weimer, Comparison of the Hill–Siscoe polar cap potential theory with the Weimer and AMIE models, *J. Atmos. Terr. Phys.*, doi:10.1016/j.jastp.2009.02.011, 2009.
- Pulkkinen, A., M. Kuznetsova, A. Ridley, J. Raeder, A. Vapirev, D. Weimer, R. S. Weigel, M. Wiltberger, G. Millward, L. Rastätter, M. Hesse, H. J. Singer, and A. Chulaki, Geospace Environment Modeling 2008–2009 Challenge: Ground magnetic field perturbations, *Space Weather*, 9, S02004, doi:10.1029/2010SW000600, 2011.