

# Curriculum Vitae – Astrid I. Maute

## 1. Education Information

- 2001 University of Stuttgart, Germany, Civil Engineering, Dr.-Ing. (Ph.D.)  
1995 University of Stuttgart, Germany, Civil Engineering, Dipl.-Ing. (B.S./M.S.)

## 2. Work History

- 2019–present Project Scientist III, NCAR High Altitude Observatory, USA.  
2013–2019 Project Scientist II, NCAR High Altitude Observatory, USA.  
2007–2013 Associate Scientist IV, NCAR, High Altitude Observatory, USA.  
2003–2007 Associate Scientist III, NCAR, High Altitude Observatory, USA.  
2001–2003 Associate Scientist II, NCAR, High Altitude Observatory, USA.  
2000–2001 Associate Scientist I, NCAR, High Altitude Observatory, USA.  
1995–1999 Research Associate, Institute of Structural Mechanics, University of Stuttgart, Germany.  
1993–1995 Research and teaching assistant, Institute of Structural Mechanics, University of Stuttgart, Germany.  
1992–1993 University of Calgary, Canada, student with scholarship from the German Academic Exchange Council (DAAD).  
1992–1993 Working experience at structural engineering & design office, Stuttgart, Germany (5 months).  
1991–1992 Teaching assistant, Institute of Mechanics, University of Stuttgart, Germany.  
1989 Internship at a building company, Stuttgart, Germany (6 months).

## 3. Scientific/Technical Accomplishments

- 2018–present Project with Art Richmond, Gang Lu: Developed method to drive TIEGCM with hemispherically asymmetric field-aligned current from AMPERE.  
2016–present Project with Gary Egbert, Patrick Alken, Art Richmond: Develop method to derive ionospheric current model from LEO and ground magnetic observations by using knowledge from the TIEGCM ionospheric current flow.  
2014–2017 Development of TIE-GCM version for the NASA ICON explorer.  
2011–2012 Project with Jeffrey Forbes and Xiaoli Zhang: developed TIE-GCM version driven by Hough Mode Extensions (HME) at the lower boundary to be employed by the NASA explorer ICON.  
2010–2017 Project with Arthur Richmond: developed numerical model of the 3D ionospheric electrodynamics, ionospheric current and associated magnetic perturbation.  
2010–2011 Project with Maura Hagan: modified TIME-GCM lower boundary specification to separate fields into background and perturbations.  
2005–2011 Project with Arthur Richmond, George Millward, Tzu-Wei Fang: developed a two-way coupling of the GIP ionosphere-plasmasphere model with the TIEGCM.  
2005–2007 Project with Arthur Richmond: added gravity and plasma pressure gradient driven current to the TGCMs.  
2004–2009 Project with Arthur Richmond: developed an empirical model of the high latitude magnetosphere-ionosphere energy transfer including the electric field standard deviation based on the DE2 data set for usage in GCMs.

- 2004-2005 Project with Arthur Richmond, Hanli Liu, Ben Foster: included empirical electric field model (Scherliess/Richmond) in WACCM.
- 2000-2010 Project with Arthur Richmond: developed model to calculate geomagnetic perturbations based on the TGCM current system.

#### 4. Community Service

##### 4a. Professional Committees & Affiliations

- 2018-present Member, International Association of Geodesy: Study Group 3 "Coupling processes between thermosphere and ionosphere".
- 2016-present NSF-CEDAR science liaison.
- 2015-2018 CEDAR steering committee member.
- 2011-2016 NCAR Diversity committee member.
- 2009-2016 NCAR WORLS (Women Organizing and Leading Science at NCAR/UCAR) co-chair.
- 2009-present SOARS (Significant Opportunities in Atmospheric Research and Science) steering committee member.
- 2005-2007 HAO representative to the Early Career Scientist Assembly (ECSA) (2005-2007).
- 2001-present American Geophysical Union member.
- 1997-1999 Elected member to the faculty council of the department of civil engineering, University of Stuttgart, Germany.
- 1997-1999 Elected representative of female staff at the department of civil engineering, University of Stuttgart, Germany.

##### 4b. Community services: editorship, conference session and workshop organization, visitors hosted, refereeing, reviewing.

- 2021 Co-convener AOGS2021 - Session "New Results from COSMIC 2, GOLD, and ICON Missions"
- 2020 Co-convener AGU session "MIT dynamics during storms and substorms".
- 2020 Co-convener AGU session "Mesoscale Processes With Global Scale Consequences Throughout Geospace".
- 2020 SPA AGU fellow committee member.
- 2020 NSF mail-in reviewer.
- 2019-2022 Editor Earth and Space Science.
- 2019 Member of NCAR Strategic Planning Steering Committee.
- 2018 GEM/CEDAR day lead organizer.
- 2018-present Member of Joint Study Group 1 "Coupling processes between magnetosphere, thermosphere and ionosphere" of Global Geodetic Observing System (GGOS) part of the International Association of Geodesy (IAG).
- 2018 Co-convener, COSPAR session "New ionosphere-thermosphere observations and their application in data assimilation modeling".
- 2018 Member, German Science Foundation (DFG) panel review.
- 2017-present Supervisor, post-doctoral researcher Tarique Siddiqui, High Altitude Observatory.
- 2017-present Lead organizer of yearly CEDAR workshop with CPAESS.
- 2017 Co-convener, IAGA session "Imaging global deep Earth conductivity with satellite and ground-based data using (increasingly) realistic external source models".
- 2017 Lead convener, CEDAR workshop session "Middle and low latitude electro-dynamics".

- 2017 Member, NASA proposal review panel.
- 2017 AFOSR mail-in proposal review.
- 2016 Co-organizer, Joint GEM/CEDAR workshop.
- 2016-17 Organizer, CEDAR poster competition.
- 2016 Co-convener, CEDAR workshop session "How do meteorological events couple into the thermosphere-ionosphere system?".
- 2016 Member, Local organizing committee of Workshop "Observation and analysis opportunities collaborating with the ICON and GOLD missions", Boulder, CO.
- 2015 Co-convener, AGU session "Vertical coupling of the lower atmosphere to the thermosphere- ionosphere system".
- 2015 Member, NSF/CEDAR panel review.
- 2015 Member, German Science Foundation (DFG) panel review.
- 2015 AFOSR mail-in proposal review.
- 2015 NASA mail-in proposal review.
- 2014 Lead convener, CEDAR workshop session "Case study of atmospheric-ionospheric effects caused by forcing from below and above".
- 2013 Member, NASA proposal review panel.
- 2013-present ASP postdoc reviews.
- 2013 Lead convener, CEDAR workshop session "Coupling of the lower and upper atmosphere during Stratospheric Sudden Warmings".
- 2012 NSF mail-in proposal review.
- 2005-present Paper reviewer for Journal of Geophysical Research; Geophysical Research Letter; Journal of Atmospheric and Solar-Terrestrial Physics; Earth, Moon and Planets, Advances in Space Research; AGU Advances.
- 2005-present HAO internal publication reviews.
- 2005-present Host of graduate students K. Häusler (GFZ Potsdam, Germany), E. Nanema (CNRST/IRSAT, Burkina Faso), Q. Zhu (U.Texas, Arlington), G. Iyer (U.Texas, Dallas), and visitors S. England (U. California, Berkeley), Katelynn Geer (U. California, Berkeley), H. Vanhamäki (U.o.Oulu, Finland) H. Liu (U.Kyushu, Japan).

#### 4c. Educational Community Service

- 2020 Search committee member HAO director.
- 2020-2021 Member of technical team, Development of Educational Center for Excellence of Education and Outreach at NCAR.
- 2020-2021 HAO representative, Educational lead.
- 2020 Volunteer at Little Shop of Physics, Fort Collins, CSU, Feb. 2020.
- 2019 Thesis committee member: Juan Rodríguez-Zuluaga, GeoForschungsZentrum, Potsdam Germany.
- 2019 Thesis committee member: Naveen T. Kodikara, RMIT University, Australia.
- 2019-present Research adviser: Chuan-Ping Lien, University of Colorado, Boulder.
- 2018 Writing mentor, SOARS student, Amin Taziny, Binghamton University.
- 2018 Mentor, graduate student Gayatri Iyer, University of Texas, Dallas.
- 2016-present Co-chair, HAO working group 7 "Diversity, Outreach, Mentoring and Education".
- 2017-2020 Research adviser, Qingyu Zhu, U.o.Texas, Arlington.
- 2017 Recruiting at the regional APS Conferences for Undergraduate Women in Physics, Boulder.
- 2017 Search committee member for Administrator at HAO.

2017 Writing mentor, SOARS student, Marcel Corchado-Albelo, University of Puerto Rico, Mayagüez Campus.

2016 Tutorial at CEDAR student workshop "Thermospheric Winds".

2016 Science mentor, REU student Eryn Cangi, University of Oregon.

2015-2017 Member, thesis committee, R. Elhawary, U.o.Colorado, Boulder, Aerospace Engineering Science.

2015 Science mentor, REU student Jonathan Barta, Whitworth University, WA.

2015 Science co-mentor, SOARS student, William Evonosky, University of South Florida.

2013-2015 Research adviser, V. Nguyen, U.o.Colorado, Boulder, Aerospace Engineering Science.

2013 Tutorial at CEDAR student workshop "What can I do with the TIE-GCM?".

2013 Co-mentor, graduate student Emmanuel Nanema, CNRST, Burkina Faso.

2013 Presentation at NSF AGS PostDoc visit at NCAR "Some research projects using TIME-GCM and TIE-GCM".

2013 Tutorial at REU summer school at LASP "Earth's upper atmosphere and effects from space weather".

2013 Research adviser, McArthur Jones Jr., U.o.Colorado, Boulder, Aerospace Engineering Science.

2013 Co-mentor, REU student Mina Khan, Mount Holyoke College.

2013 Member, search committee for Software Engineer position at AIM/HAO.

2012 Science mentor, SOARS student Stanley Edwin, University of Alaska-Fairbanks.

2012 Tutorial at REU summer school at LASP "Earth's upper atmosphere and effects from space weather".

2012 Guest speaker at STEM Camp for Girls at Laramie County Community College, October 2012.

2012-present Volunteer at NCAR Super Science Saturday HAO-table (2012, 2013, 2014, 2016, 2017, 2018, 2019).

2012 Co-mentor, REU student Nancy Holden, University of Oklahoma.

2011 Science co-mentor, SOARS student Adrianna Hacker, Colorado School of Mines.

2010-present Poster judge at CEDAR meeting(2013, 2015) and Fall AGU (2010,2013, 2015, 2017, 2018, 2019).

2009 Mentor, REU student Clarah Lelei, Bryn Mawr College.

2008 Co-mentor, ASP graduate student Kathrin Häusler, German Research Center for Geosciences, Potsdam, Germany.

2008 Member, search committee for Student Assistant position at AIM/HAO.

2008 Science co-mentor, SOARS student McArthur Jones Jr., Millersville University.

2007 Search committee member for Associate Scientist at AIM/HAO.

2007 Panel member, Undergraduate Leadership Workshop.

2005 Science mentor, REU student Cedric St. Jean, University of Montreal, Canada.

2004-2008 Workshop presenter at yearly "Girl Scout's Day" at NCAR (2004, 2005, 2008).

2004 Science mentor, SOARS student Bret Harper, University of Colorado, Boulder.

2004 Science mentor, REU student Jeff France, University of Colorado, Boulder.

2003 Science mentor, REU student Linde Clark, Millersville University.

2003-2011 Science fair judge and NCAR judge at Roche Boulder Valley Regional Science Fair (2003, 2004, 2009, 2010, 2011).

2002-2018 Co-organizer, STEM girls conference "Expanding Your Horizon" at CU Boulder, yearly event.

- 2002 Co-mentor, REU student Abena Poku-Awuah, University of Birmingham, UK.
- 2001 Co-mentor, SOARS student Michael Johnson, New Mexico Institute of Mining and Technology.
- 2001 Co-mentor, REU student Abena Poku-Awuah, University of Birmingham, UK.
- 1998 Lecturer, "Numerical methods and algorithms in structural mechanics" (graduate course level), University of Stuttgart, Germany.
- 1997 Lecturer, "Finite elements for structural analysis" (graduate course level), University of Stuttgart, Germany.

## 5. Honors and Awards

- 2019 Editors' Citation for Excellence in Refereeing for Journal of Geophysical Research-Space Physics.
- 2015 HAO Walter O. Roberts Scientific and Technical Advancement award (team award).
- 2013 UCAR Education and Outreach Award (team award).
- 2012 Editors' Citation for Excellence in Refereeing for Journal of Geophysical Research-Space Physics.
- 2011 UCAR Diversity Award.
- 2005 Colorado Young Leadership Award, American Association of University Women.
- 1995 Arthur Fischer Award for quick and excellent study, University of Stuttgart, Germany.
- 1995 Dipl.-Ing. degree with highest honors, University of Stuttgart, Germany.

## 6. Proposals and Grants

### a. Funded / selected(\*) Scientific Proposals

- 2021-2024 \*PI, NASA Living with a Star, "Causes of interhemispheric asymmetries in the ionosphere"
- 2021-2025 \*Co-I (PI Patrick Alken, University of Colorado), NASA US Participating Investigator (USPI), "Spatial structure and temporal evolution of the ionospheric current system"
- 2020-2024 Co-I (PI Gary Egbert, Oregon State University), NASA Living with a Star, "Interdisciplinary Study of Ionospheric Currents and Associated Geoelectric Fields"
- 2020-2022 Co-I (PI- Viacheslav Merkin, JHU-APL), NASA DRIVE Center, "Center for Geospace Storms (CGS)"
- 2019-2020 Co-I (PI- Jeng-Hwa Yee, JHU-APL), NASA HP SMO, "EZIE: Electrojet Zeeman Imaging Explorer – Phase A"
- 2018-2021 Co-I (PI- Hanne Mauriello, UCAR), NSF Division of Atmospheric and Geospace Science, "CEDAR Workshop"
- 2017-2021 Co-I (PI Gang Lu, NCAR) NASA Heliophysics Supporting Research, "Observational and Modeling Investigation of Thermospheric Density Anomaly"
- 2017-2021 Co-I (PI Gang Lu, NCAR) NASA Living with a Star, "Global Ionospheric Electrodynamics and Its Influence on the Thermosphere"
- 2017-2020 PI Air Force Office of Scientific Research, "Evaluation of high latitude forcing methods and assumptions, and their impact on the thermosphere-ionosphere system"
- 2017-2020 Co-I (PI Tomoko Matsuo, University of Colorado, Boulder), NSF CEDAR, "Assimilative Analysis of Low- and Mid-latitude Ionospheric Electrodynamics"

- 2017-2020 Co-I (PI Gang Lu, NCAR) NASA Heliophysics Supporting Research, "Observational and Modeling Investigation of Thermospheric Density Anomaly"
- 2016-2020 Co-I (PI Jeff Forbes, U. Colorado) NASA Heliophysics Supporting Research, "Non-linear Interactions and Complexity in the Atmosphere-Ionosphere System"
- 2016-2019 Co-I (PI Gary Egbert, Oregon State University) NASA- Earth Science, "Empirical modeling of external source fields for improved recovery of mantle conductivity from SWARM and CHAMP data"
- 2015-2018 Co-I (PI Gary Egbert, Oregon State University) NSF- Earth Science, "Collaborative Research: Improved Ionospheric Source Models for Imaging Upper Mantle Transition Zone Resistivity"
- 2013-2019 PI, NASA LWS-TRT, "Coupling of the Atmosphere and Ionosphere During Stratospheric Sudden Warming Events: Signals, Processes and Their Sensitivities"
- 2012-2021 Co-I (PI Thomas Immel, University of California Berkeley), NASA Explorer, "Ionospheric CONnection Explorer (ICON)"
- 2012-2015 Co-I (PI Hanli Liu), NSF CEDAR, "CEDAR: Short-Term Variability of the Upper Atmosphere Across Scales During Stratospheric Sudden Warming Events"
- 2011-2014 Co-I (PI Naomi Maruyama, University of Colorado, Boulder), NSF GEM, "GEM: Identifying Impact of the Coupling to Ionosphere-Thermosphere on the Near-Earth Electric Fields and Currents"
- 2009 - 2012 Co-I (PI Arthur Richmond), NASA Heliophysics Guest Investigator, "Physics of equatorial ionospheric drifts: analysis and modeling of C/NOFS observations"
- 2009 - 2012 Co-I (PI Arthur Richmond), NSF CEDAR, Whole-Atmosphere Modeling of Ionospheric Responses to Atmospheric Variability"
- 2008 - 2012 Co-I (PI Stefan Maus, University of Colorado, Boulder), NASA Earth Surface and Interior grant "Modeling the magnetic signal of wind, pressure and gravity driven currents in the ionospheric F-region"
- 2006 - 2010 Co-I (PI Arthur Richmond), NSF CEDAR grant, "CEDAR: Whole-Atmosphere Modeling of the Thermosphere/Ionosphere Responses to Lower-Atmosphere Dynamics and Variability"
- 2005 - 2008 Co-I (PI Arthur Richmond), NASA Living With a Star, "Quantifying the effects of magnetospheric energy inputs to the thermosphere"
- 2002- 2005 Co-I (PI Barbara Emery), NSF Space Weather, "Space weather: the quantification and validation of variable electrodynamic forcing of the thermosphere"

## **b. Educational/ Diversity proposal**

- 2012 PI, NCAR Diversity grant, "Expanding Your Horizons conference"
- 2011 PI, NCAR Diversity grant, "Expanding Your Horizons conference"
- 2010 PI (Co-PI Brigitte Baeuerle), NCAR Diversity grant, "WORLS Seminar Series"

## **7. Publication List**

### **7.1 Thesis**

"Adaptive finite element methods in structural dynamics", Ph.D. thesis, Institute of Structural Mechanics, Department of Civil Engineering, University of Stuttgart, Germany, 2001.

### **7.2 Referred Journal Articles**

(Maiden name: Schleupen; ORCID: [orcid.org/0000-0003-3393-0987](https://orcid.org/0000-0003-3393-0987))

1. Schleupen, A. and E. Ramm (2000) Local and global error estimations in linear structural dynamics, *Computers & Structures*, 76, pp. 741-756.
2. Schleupen, A., K. Maute, and E. Ramm (2000) Adaptive FE-procedure in shape optimization, *Structural Optimization*, 19, pp. 282-302.
3. Doumbia V., A. Maute, and A.D. Richmond (2007) Simulation of equatorial electrojet magnetic effects with the thermosphere-ionosphere-electrodynamics general circulation model, *J. Geophys. Res.*, 112(A09309). doi:10.1029/2007JA012308
4. Hagan, M.E., A. Maute, R.G. Roble, A.D. Richmond, T.J. Immel, and S.L. England (2007) Connections between deep tropical clouds and the Earth's ionosphere, *Geophys. Res. Lett.*, 34(L20109). doi:10.1029/2007GL030142
5. Deng, Y., A. Maute, A.D. Richmond, and R.G. Roble (2008) Analysis of thermospheric response to magnetospheric inputs, *J. Geophys. Res.*, 113(A04301). doi:10.1029/2007JA012840
6. Fang, T.W., A.D. Richmond, J.Y. Liu, A. Maute, C.H. Lin, C.H. Chen, and B. Harper (2008) Model simulation of the equatorial electrojet in the Peruvian and Philippine sectors, *Journal of Atmospheric and Solar-Terrestrial Physics*, 70(17). doi:10.1016/j.jastp.2008.04.021
7. Fang, T.-W., A.D. Richmond, J.Y. Liu, and A. Maute (2008) Wind dynamo effects on ground magnetic perturbations and vertical drifts, *J. Geophys. Res.*, 113(A11313). doi:10.1029/2008JA013513
8. Hagan, M.E., A. Maute, and R.G. Roble (2009) Tropospheric tidal effects on the middle and upper atmosphere, *J. Geophys. Res.*, 114(A01302). doi:10.1029/2008JA013637
9. Rougier, J., S. Guillas, A. Maute, and A.D. Richmond (2009) Expert knowledge and multivariate emulation: the Thermosphere-Ionosphere Electrodynamic General Circulation Model (TIE-GCM), *Technometrics*, 51, 414-424.
10. Deng, Y., A. Maute, A.D. Richmond, and R. G. Roble (2009) Impact of electric field variability on Joule heating and thermospheric temperature and density, *Geophys. Res. Lett.*, 36(L08105). doi:10.1029/2008GL036916
11. Guillas, S., J. Rougier, A. Maute, A.D. Richmond, and C.D. Linkletter (2009) Bayesian calibration of the Thermosphere-Ionosphere Electrodynamic General Circulation Model (TIE-GCM), *Geosci. Model Dev.*, 2, 137-144.
12. Häusler, K., H. Lühr, M.E. Hagan, A. Maute, and R.G. Roble (2010) Comparison of CHAMP and TIME-GCM nonmigrating tidal signals in the thermospheric zonal wind, *J. Geophys. Res.*, 115(D00I08). doi:10.1029/2009JD012394
13. Liu, H.-L., B. Foster, M.E. Hagan, J. McInerney, A. Maute, L. Qian, A.D. Richmond, R.G. Roble, S.C. Solomon, R.R. Garcia, D. Kinnison, D.R. Marsh, A.K. Smith, J. Richter, F. Sassi, and J. Oberheide (2010) Thermosphere extension of the Whole Atmosphere Community Climate Model, *J. Geophys. Res.*, 115(A12302). doi:10.1029/2010JA015586
14. Zaka, K.Z. , A.T. Koba , V. Doumbia , A.D. Richmond, A. Maute , N.M. Mene, O.K. Obrou, P. Assamoi, K. Boka, J.-P. Adohi, C. Amory- Mazaudier (2010) Simulation of electric field and current during the June 11, 1993, disturbance dynamo event: comparison with the observations, *J. Geophys. Res.* 115(A11307). doi:10.1029/2010JAO15417

15. England, S.L., T.J. Immel, J.D. Huba, M.E. Hagan, A. Maute, R. DeMajistre (2010) Modeling of multiple effects of atmospheric tides on the ionosphere: an examination of possible coupling mechanisms responsible for the longitudinal structure of the equatorial ionosphere, *J. Geophys. Res.*, *115*(A05308). doi:10.1029/2009JA014894
16. Ma, R., J. Xu, W. Wang, J. Lei, H.-L. Liu, A. Maute, and M.E. Hagan (2010) Variations of the nighttime thermospheric mass density at low and middle latitudes, *J. Geophys. Res.*, *115*(A12301). doi:10.1029/2010JA015784
17. Alken, P., S. Maus, A. D. Richmond, and A. Maute (2011) The ionospheric gravity and diamagnetic current systems, *J. Geophys. Res.*, *116*(A12316). doi:10.1029/2011JA017126
18. Pedatella, N. M., J. M. Forbes, A. Maute, A. D. Richmond, T.-W. Fang, K. M. Larson, and G. Millward (2011) Longitudinal variations in the F region ionosphere and the topside ionosphere-plasmasphere: Observations and model simulations, *J. Geophys. Res.*, *116*(A12309). doi:10.1029/2011JA016600
19. Marsal, S., A. D. Richmond, A. Maute, and B. J. Anderson (2012) Forcing the TIEGCM model with Birkeland currents from the Active Magnetosphere and Planetary Electrodynamics Response Experiment, *J. Geophys. Res.*, *117*(A06308). doi:10.1029/2011JA017416
20. Pedatella, N. M., H.-L. Liu, A. D. Richmond, A. I. Maute, and T.-W. Fang (2012) Simulations of solar and lunar tidal variability in the mesosphere and lower thermosphere during sudden stratosphere warmings and their influence on the low-latitude ionosphere, *J. Geophys. Res.*, *117*(A08326). doi:10.1029/2012JA017858
21. Rodrigues, F., G. Crowley, R. Heelis, A. Maute, and A. Reynolds (2012) On TIE-GCM simulation of the evening equatorial plasma vortex, *J. Geophys. Res.*, *117*(A05307). doi:10.1029/2011JA017369
22. Lu, G., L. Goncharenko, M. J. Nicolls, A. Maute, A. Coster, and L. J. Paxton (2012) Ionospheric and thermospheric variations associated with prompt penetration electric fields, *J. Geophys. Res.*, *117* (A08312). doi:10.1029/2012JA017769
23. Heelis, R. A., G. Crowley, F. Rodrigues, A. Reynolds, R. Wilder, I. Azeem, and A. Maute (2012) The role of zonal winds in the production of a pre-reversal enhancement in the vertical ion drift in the low latitude ionosphere, *J. Geophys. Res.*, *117*(A08308). doi:10.1029/2012JA017547
24. Maute, A., A.D. Richmond, R. Roble (2012) Sources of low-latitude ionospheric ExB drifts and their variability, *J. Geophys. Res.*, *117*(A06312). doi:10.1029/2011JA017502
25. Pedatella, N. M., M. E. Hagan, and A. I. Maute (2012) The comparative importance of DE3, SE2, and SPW4 on the generation of wavenumber-4 longitude structures in the low-latitude ionosphere during September equinox, *Geophys. Res. Lett.*, *39*(L19108). doi:10.1029/2012GL053643
26. Richmond, A. D., A. Maute (2013, 2014) Ionospheric electrodynamics modeling, in *Modeling the Ionosphere-Thermosphere System* (eds J. Huba, R. Schunk and G. Khazanov), John Wiley & Sons, Ltd, Chichester, UK. doi: 10.1002/9781118704417 and <https://doi.org/10.1002/9781118704417.ch6>

27. Jones Jr., M., J. M. Forbes, , M. E. Hagan , and A. Maute (2013), Non-migrating tides in the ionosphere-thermosphere: in-situ versus tropospheric sources, *J. Geophys. Res. Space Physics*, 118, 2438-2451. doi:10.1002/jgra.50257
28. Oberheide, J., M.G. Mlynczak, C. Mosso, B. Schroeder, B. Funke, A. Maute (2013), Impact of tropospheric tides on the nitric oxide  $5.3 \mu\text{m}$  infrared cooling of the low-latitude thermosphere during solar minimum conditions, *J. Geophys. Res. Space Physics*, 118. doi:10.1002/2013JA019278
29. Maute, A., M.E. Hagan, A.D. Richmond, R.G. Roble (2014), TIME-GCM study of the ionospheric equatorial vertical drift changes during the 2006 Stratospheric Sudden Warming, *J. Geophys. Res. Space Physics*, 119, 1287-1305. doi:10.1002/2013JA019490
30. Jones Jr., M., J.M. Forbes, M.E. Hagan, A. Maute (2014), Impacts of vertically propagating tides on the mean state of the ionosphere-thermosphere system, *J. Geophys. Res. Space Physics*, 119, 2197-2213. doi:10.1002/2013JA019744
31. Yamazaki, Y., A. D. Richmond, A. Maute, H.-L. Liu, N. Pedatella, and F. Sassi (2014), On the day-to-day variation of the equatorial electrojet during quiet periods, *J. Geophys. Res. Space Physics*, 119, 6966-6980. doi:10.1002/2014JA020243
32. Yamazaki, Y., A. D. Richmond, A. Maute, Q. Wu, D. A. Ortland, A. Yoshikawa, I. A. Adimula, B. Rabiou, M. Kunitake, and T. Tsugawa (2014), Ground magnetic effects of the equatorial electrojet simulated by the TIE-GCM driven by TIMED satellite data, *J. Geophys. Res. Space Physics*, 119, 3150-3161. doi:10.1002/2013JA019487
33. Häusler, K., M. E. Hagan, A. J. G. Baumgaertner, A. Maute, G. Lu, E. Doornbos, S. Bruinsma, J. M. Forbes, and F. Gasperini (2014), Improved short-term variability in the thermosphere-ionosphere-mesosphere-electrodynamics general circulation model, *J. Geophys. Res. Space Physics*, 119, 6623-6630. doi:10.1002/2014JA020006
34. Richmond, A.D, T-W. Fang, A. Maute (2015), Electrodynamics of the equatorial evening ionosphere, I. Importance of winds in different regions, *J. Geophys. Res.-Space Physics*, 120, 2118-2132. doi: 10.1002/2014JA020934
35. Maute, A., M.E. Hagan, V. Yudin, H. Liu, and E. Yizengaw (2015), Causes of the longitudinal differences in the equatorial vertical  $E \times B$  drift during the 2013 SSW period as simulated by the TIME-GCM. *Journal of Geophysical Research-Space Physics*, 120, 5117-5136. doi: 10.1002/2015JA021126
36. Pedatella, N. M. and Maute, A. (2015), Impact of the semidiurnal lunar tide on the mid latitude thermospheric wind and ionosphere during sudden stratosphere warmings, *J. of Geophys. Res.: Space Physics*. doi:10.1002/2015JA021986
37. Maute, A., B.G. Fejer, J.M. Forbes, X. Zhang, V. Yudin (2016), Equatorial vertical drift modulation by the lunar and solar semidiurnal tides during the 2013 Sudden Stratospheric Warming, *J. of Geophys. Res.: Space Physics*, 121, 1658–1668. doi:10.1002/2015JA022056
38. Evonosky, W., A. D. Richmond, T.-W. Fang, and A. Maute (2016), Ion-neutral coupling effects on low-latitude thermospheric evening winds, *J. Geophys. Res. Space Physics*, 121. doi:10.1002/2016JA022382

39. Alken, P., A. Maute, A.D. Richmond (2016), The F-Region Gravity and Pressure Gradient Current Systems: A Review, *Space Sci. Rev.*.. doi:10.1007/s11214-016-0266-z
40. Maute, A., A.D. Richmond (2016), F -Region Dynamo Simulations at Low and Mid-Latitude, *Space Sci. Rev.*.. doi:10.1007/s11214-016-0262-3
41. Yamazaki, Y. and Maute, A. (2016), Sq and EEJ—A Review on the Daily Variation of the Geomagnetic Field Caused by Ionospheric Dynamo Currents, *Space Science Review*. doi:10.1007/s11214-016-0282-z
42. Wu, Q., A. Maute, V. Yudin, L. Goncharenko, J. Noto, R. Kerr, and C. Jacobi (2016), Observations and simulations of midlatitude ionospheric and thermospheric response to the January 2013 stratospheric sudden warming event, *J. Geophys. Res. Space Physics*, 121. doi:10.1002/2016JA023043
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### 7.3 Other Refereed Publications

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### 7.5 Internally Refereed Publications

### 7.6 Non-refereed Publications

1. Cirac, F., A. Schleupen, E. Ramm, Error Estimates for local and global variables using duality principles, *In: Conference Proceedings of fourth WCCM*, E. Oñate, S.R. Idelsohn (eds.), Buenos Aires, Argentina, June 29 - July 2, 1998, CIMNE, Barcelona, Spain (CD-ROM), 1998.

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3. Maute, A., M.E. Hagan, and R.G. Roble, Dynamical coupling during the 2006 stratospheric sudden warming as simulated by TIME-GCM, *CAWSES-II TG4 Newsletter*, 8, pp. 6, 2012.
4. Maute, A., Views from the top, *International Innovation*, 172, pp. 122-124, *Research Media - Europe Research & Scientific Dissemination*, 2015.

## 7.6 Invited Talks

1. Maute, A., A.D. Richmond, R.G. Roble, M.E. Hagan, Longitudinal variation of upward ExB drift at low latitudes as simulated by TIMEGCM, *C/NOFS Science Workshop*, Breckenridge, Colorado USA, 18-20 May, 2010.
2. Maute, A. and A.D. Richmond, Aspects of modeling the high-latitude magnetosphere-ionosphere energy transfer, *EGU*, Vienna Austria, 3-8 April, 2011.
3. Maute, A. and A.D. Richmond, The Ionospheric Electrostatic Potential, *Chapman conference on Modeling the Ionosphere/Thermosphere System*, Charleston, SC USA, 9-12 May, 2011.
4. Maute, A., Earth's upper atmosphere and effects from space weather, *REU summer school at LASP*, Boulder, CO USA, June, 2012.
5. Maute, A., Earth's upper atmosphere and effects from space weather, *REU summer school at LASP*, Boulder, CO USA, June, 2013.
6. Maute, A., M.E. Hagan, A.D. Richmond, R.G. Roble, N.M. Pedatella, L.P. Goncharenko, Electrodynamic coupling of the atmosphere-ionosphere system during quiet time and SSW conditions, *IAGA meeting*, Merida, Mexico, August 2013.
7. Maute, A., S. Marsal, A. Richmond, B. Anderson, Modeling the high latitude energy transfer for GCMs, *GEM/CEDAR meeting*, Boulder CO, June 2013.
8. Maute, A., Effects of meteorological and geospace forcing on the thermosphere and ionosphere as simulated by numerical models, *EGU*, Vienna Austria, 28 April- 2 May, 2014.
9. Maute, A., M.E. Hagan, A.D. Richmond, R. Roble, V. Yudin, H.-L. Liu, Comparing the influence of the high latitude forcing and meteorological forcing on the low latitude ionospheric electrodynamics, *Technical Interchange Meeting on Scientific Challenges in Thermosphere-Ionosphere Forecasting*, Pasadena, 21-23 October, 2014.
10. Maute, A. and A.D. Richmond, Modeling the three-dimensional structure of ionospheric electrodynamics, *AGU Fall meeting*, San Francisco, 14-18 December 2015.
11. Maute, A., Geomagnetically quiescent low- and mid-latitude ionosphere, *Swarm 4D-ionosphere science meeting*, Noordwijk, Netherlands, 5 September 2017.
12. Maute, A., Low and middle latitude ionospheric current, *ESA workshop on ionospheric current*, Noordwijk, Netherlands, 8 September 2017.

13. Maute, A., Simulating the MI coupling in thermosphere-ionosphere GCMs, *CEDAR workshop: Polar session*, Santa Fe, New Mexico, United States of America, June 2019.
14. Maute, A., Aspects of modeling the ionospheric electrodynamic, *CEDAR workshop*, Santa Fe, New Mexico, United States of America, June 2019.
15. Maute, A., A three-dimensional ionospheric electrodynamic model A. Maute, A.D. Richmond Japan Geoscience Union Meeting, Chiba Japan, May 2019.
16. Maute, A., Simulating magnetosphere-ionosphere coupling via field-aligned current in a General Circulation Model, Seminar, Space Weather Prediction Center/NOAA Boulder Colorado, 11 November 2019.
17. Maute, A., Modeling interhemispheric differences in the ionospheric electrodynamic, CUSIA workshop, virtual, August 2020.