

Scientific Publications (Refereed)

M.-T. Walach, A. Grocott, F. Staples, and E. Thomas [in prep], *SuperDARN map comparability: Statistical comparisons of radar network expansions*, **J. Geophys. Res.: Space Physics**.

A. Grocott and **M.-T. Walach** [in prep], *Modelling the time-variability of the ionospheric electric field (TIVIE)*, **Journal of Space Weather and Climate**.

J. K. Sandhu, I. J. Rae, J. R. Wygant, A. W. Breneman, S. Tian, C. E. J. Watt, R. B. Horne, L. G. Ozeke, M. Georgiou, and **M.-T. Walach** [accepted, 17th March 2021], *ULF Wave Driven Radial Diffusion During Geomagnetic Storms: A statistical analysis of Van Allen Probes observations*, **Journal of Geophysical Research: Space Physics**.

M.-T. Walach, A. Grocott, and S. E. Milan [accepted, 16th March 2021], *Average Ionospheric Electric Field Morphologies during Geomagnetic Storm Phases*, **Journal of Geophysical Research: Space Physics**.

J. K. Sandhu, I. J. Rae, and **M.-T. Walach** (2021), *Challenging the use of ring current indices during geomagnetic storms*, **Journal of Geophysical Research: Space Physics**, 126, e2020JA028423. doi:10.1029/2020JA028423.

S. J. Wharton, I. J. Rae, J. K. Sandhu, **M.-T. Walach**, D. M. Wright, and T. K. Yeoman, (2020) *The changing eigenfrequency continuum during geomagnetic storms: Implications for plasma mass dynamics and ULF wave coupling*, **Journal of Geophysical Research: Space Physics**, 125, e2019JA027648, doi: 10.1029/2019JA027648.

M.-T. Walach, and A. Grocott (2019), *SuperDARN scatter during geomagnetic storms and geomagnetically active times*, **J. Geophys. Res.: Space Physics**, 124, 5828-5847, doi: 10.1029/2019JA026816.

D.R. Jackson, T. J. Fuller-Rowell, D. J. Griffin, M. J. Griffith, C. W. Kelly, D. R. Marsh, and **M.-T. Walach** (2019). *Future directions for whole atmosphere modeling: Developments in the context of space weather*. **Space Weather**, 17, doi: 10.1029/2019SW002267.

J. K. Sandhu, I. J. Rae, M. P. Freeman, M. Gkioulidou, C. Forsyth, G. D. Reeves, K. R. Murphy, and **M.-T. Walach**, (2019). *Substorm-Ring Current Coupling: A comparison of isolated and compound substorms*, **J. Geophys. Res.: Space Physics**, 124, 6776– 6791, doi:10.1029/2019JA026766.

D. D. Billett, A. Grocott, J. A. Wild, A. Aruliah, A. Ronksley, **M.-T. Walach**, and M. Lester, (2019). *Spatially resolved neutral wind responses during high geomagnetically active times above Svalbard*, **J. Geophys. Res.: Space Physics**, 124, 6950-6960. doi: 10.1029/2019JA026627.

S. E. Milan, **M.-T. Walach**, J. A. Carter, H. Sangha, B. J. Anderson (2019). *Substorm onset latitude and the steadiness of magnetospheric*

convection, **J. Geophys. Res.: Space Physics**, 124, 1738–1752, doi: 10.1029/2018JA025969.

D. D. Billett, A. Grocott, J. A. Wild, **M.-T. Walach**, and M. J. Kosch (2018). *Diurnal variations in global Joule heating morphology and magnitude due to neutral winds.*, **J. Geophys. Res.: Space Physics**, 123, 2398–2411, doi: 10.1002/2017JA025141.

M.-T. Walach, S. E. Milan, K. R. Murphy, J. A. Carter, B. A. Hubert, and A. Grocott (2017), *Comparative study of large-scale auroral signatures of substorms, steady magnetospheric convection events, and sawtooth events*, **J. Geophys. Res.: Space Physics**, 122, 6357–6373, doi: 10.1002/2017JA023991.

M.-T. Walach, (2017), *Ionospheric Convection and Auroral Responses to Solar Wind Driving*, **PhD Thesis**, University of Leicester, <http://hdl.handle.net/2381/39717>.

M.-T. Walach, S. E. Milan, T. K. Yeoman, B. A. Hubert, and M. R. Hairston (2017), *Testing nowcasts of the ionospheric convection from the expanding and contracting polar cap model*, **Space Weather**, 15, 623–636, doi:10.1002/2017SW001615.

J. A. Carter, S. E. Milan, R. C. Fear, **M.-T. Walach**, Z. A. Harrison, L. J. Paxton, and B. Hubert (2017), *Transpolar arcs observed simultaneously in both hemispheres.*, **J. Geophys. Res. Space Physics**, 122, 6107–6120, doi: 10.1002/2016JA023830.

S. E. Milan, L. B. N. Clausen, J. C. Coxon, J. A. Carter, **M.-T. Walach**, K. Laundal, N. Østgaard, P. Tenfjord, J. Reistad, K. Snekvik, H. Korth, and B. J. Anderson (2017), *Overview of Solar Wind–Magnetosphere–Ionosphere–Atmosphere Coupling and the Generation of Magnetospheric Currents.*, **Space Sci. Rev.**, 206: 547, doi: 10.1007/s11214-017-0333-0.

J. A. Carter, S. E. Milan, J. C. Coxon, **M.-T. Walach**, and B. J. Anderson (2016), *Average field-aligned current configuration parameterized by solar wind conditions*, **J. Geophys. Res.: Space Physics**, 121, 1294–1307, doi: 10.1002/2015JA021567.

S. E. Milan, S. M. Imber, J. A. Carter, **M.-T. Walach**, and B. Hubert (2016), *What controls the local time extent of flux transfer events?*, **J. Geophys. Res.: Space Physics**, 121, 1391–1401, doi: 10.1002/2015JA022012.

M.-T. Walach, and S. E. Milan (2015), *Are Steady Magnetospheric Convection Events Prolonged Substorms?*. **J. Geophys. Res.: Space Physics**, 120, 1751–1758, doi: 10.1002/2014JA020631.

Software (Refereed)

SuperDARN Radar Software Toolkit (RST) 4.5.: SuperDARN Data Analysis Working Group; E.G. Thomas, M.T. Schmidt, E.C. Bland, A.G. Burrell, P. V. Ponomarenko, A.S. Reimer, K.T. Sterne, **M.-T. Walach**, 2021, doi: 10.5281/zenodo.4435297.

SuperDARN Radar Software Toolkit (RST) 4.4.1.: D.D. Billett, E.C. Bland, A.G. Burrell, K. Kotyk, P. V Ponomarenko, ..., **M.-T. Walach**, **2020**, doi: 10.5281/zenodo.3994968.

SuperDARN Radar Software Toolkit (RST) 4.4.: D.D. Billett, E.C. Bland, A.G. Burrell, K. Kotyk, P. V Ponomarenko, ..., **M.-T. Walach**, **2020**, doi: 10.5281/zenodo.3934368.

SuperDARN Radar Software Toolkit (RST) 4.3.2.: E.G. Thomas, K. T. Sterne, S. Shepherd, K. Kotyk, M. Schmidt, P. V. Ponomarenko, E. C. Bland, **M.-T. Walach**, A. S. Reimer, and A. G. Burrell, **2020**. doi: 10.5281/zenodo.3775981.

SuperDARN Radar Software Toolkit (RST) 4.3.1.: E.G. Thomas, K.T. Sterne, S. Shepherd, K. Kotyk, M. Schmidt, P.V. Ponomarenko, A. J. Ribeiro, E.C. Bland, **M.-T. Walach**, A.S. Reimer, A.G. Burrell, D. Billett, W.A. Bristow, B. Tim, S. Marple, M. Rafiq, M. Krysztofowicz. **2019**. doi: 10.5281/zenodo.3634732.

SuperDARN Radar Software Toolkit (RST) 4.3.: E.G. Thomas, K.T. Sterne, S. Shepherd, K. Kotyk, M. Schmidt, P.V. Ponomarenko, A. J. Ribeiro, E.C. Bland, **M.-T. Walach**, A.S. Reimer, A.G. Burrell, D. Billett, W.A. Bristow, B. Tim, S. Marple, M. Rafiq, M. Krysztofowicz. **2019**. doi: 10.5281/zenodo.3401622.

SuperDARN Radar Software Toolkit (RST) 4.2.: E.G. Thomas, P.V. Ponomarenko, D.D. Billett, E.C. Bland, A. G. Burrell, K. Kotyk, A. S. Reimer, M. Schmidt, S.G. Shepherd, K. T. Sterne, **M.-T. Walach**. **2018**. doi: 10.5281/zenodo.1403226.

SuperDARN Radar Software Toolkit (RST) 4.1.: E.G. Thomas, P.V. Ponomarenko, E.C. Bland, A. G. Burrell, K. Kotyk, K. T. Sterne, **M.-T. Walach**. **2018**. doi:10.5281/zenodo.1143675.

Scientific Publications (Non-Refereed)

M.-T. Walach, G. Hunt, A. R. Fogg, A. Bader (**2020**), *Autumn MIST 2019*, **Astronomy & Geophysics**, 61 (4), 4.26–4.28, editor: S. Bowler, publisher: Oxford University Press on behalf of the Royal Astronomical Society, doi: 10.1093/astrogeo/ataa056.

J. K. Sandhu, **M.-T. Walach**, H. Allison, C. Watt (**2019**), *A global view of storms and substorms*, **Astronomy & Geophysics**, Vol. 60 (3), 3.13–3.19, editor: S. Bowler, publisher: Oxford University Press on behalf of the Royal Astronomical Society, doi: 10.1093/astrogeo/atz144.

M.-T. Walach (**2018**), *Changing the Perspective: Looking at the Aurora from Space*, AuroraWatch UK Blog post, <http://wp.lancs.ac.uk/aurorawatchuk/2018/02/09/changing-the-perspective-looking-at-the-aurora-from-space/>.

M.-T. Walach, S. E. Milan (**2016**), *The Irregular Pulse of the Magnetosphere*, **Astronomy & Geophysics**, vol. 57 (1): 1.34-1.36, editor: S. Bowler, publisher: Oxford

University Press on behalf of the Royal Astronomical Society, doi: 10.1093/astrogeo/atw041.

Invited Talks

Virtual Seminar: *High-latitude ionospheric convection during geomagnetic storms*, 02/03/2021, **Dartmouth College**, US.

Virtual Seminar: *Average Ionospheric Electric Field Morphologies during Geomagnetic Storm Phases*, 05/05/2020, Modelling GICs in the US project group, **Fairbanks**, Alaska, US.

Invited Conference Talk: *Large scale analysis of sawtooth events, and isolated substorms*, **14th International Conference on Substorms**, 03/10/2019, Tromsø, Norway.

Seminar: *Time variability in high-latitude ionospheric convection at Earth*, **University of Southampton**, 30/04/2019, Southampton, UK.

Seminar: *Time variability in high-latitude ionospheric convection at Earth*, **Mullard Space Science Laboratory (UCL)**, 19/03/2019, Surrey, UK.

Seminar: *Ionospheric Convection and Auroral Responses to Solar Wind Driving*, **University of Leicester**, 16/01/2019, Leicester, UK.

Seminar: *Tracking Irregular Pulses of Earth's Magnetosphere: Auroral Dynamics, Convection and Magnetospheric Modes*, **Lancaster University**, 18/03/2017, Lancaster, UK.

Seminar: *Magnetic Flux Transport and Plasma Flow in the Earth's Magnetosphere*, **IRF Uppsala**, 03/02/2016, Uppsala, Sweden.

Oral Conference Presentations

M.-T. Walach, A. Grocott, *SuperDARN observations of the September 2017 storm*, **Royal Astronomical Society Discussion Meeting** on Space Weather Energy Pathways and Implications for Impacts, 08/01/2021, Virtual.

M.-T. Walach, A. Grocott, *Modelling the Time-Variability of the Ionospheric Electric Field: Introducing the TiVIE model*, **European Space Weather Symposium**, 5/11/2020, Virtual.

M.-T. Walach, A. Grocott, S. E. Milan, *Average Ionospheric Electric Field Morphologies during Geomagnetic Storm Phases*, **Virtual SuperDARN Workshop 2020**, 01/06/2020 -05/06/2020, Virtual.

M.-T. Walach, A. Grocott, S. E. Milan, *Average Ionospheric Electric Field Morphologies during Geomagnetic Storms*, **AGU Fall Meeting**, 12/12/2019, San Francisco, USA.

M.-T. Walach, A. Grocott, S. E. Milan, *Average Ionospheric Electric Field Morphologies during Geomagnetic Storms*, **European Space Weather Week**, 22/11/2019, Liège, Belgium.

M.-T. Walach, *Outreach via existing platforms: "I'm a Scientist, Get me out of here"*, **National Astronomy Meeting**, 02/07/2019, Lancaster, UK.

M.-T. Walach, A. Grocott, *SuperDARN observations during geomagnetic storms, geomagnetically active times and enhanced solar wind driving*, **National Astronomy Meeting**, 01/07/2019, Lancaster, UK.

M.-T. Walach, A. Grocott, *High latitude ionospheric convection during storm times: TiVIE & SuperDARN*, **Extended Unified Model Workshop**, 27/06/2019, MetOffice, Exeter, UK.

M.-T. Walach, A. Grocott, F. Staples, E. G. Thomas, *Influences of the equatorial expansion on data coverage and measured parameters*, **SuperDARN Workshop**, 07/06/2019, Fujiyoshida, Japan.

M.-T. Walach, A. Grocott, *SuperDARN observations during geomagnetic storms, geomagnetically active times and enhanced solar wind driving*, **SuperDARN Workshop**, 06/06/2019, Fujiyoshida, Japan.

M.-T. Walach, A. Grocott, and D. D. Billett, *Improving Joule Heating and Electric Field Models of the High-latitude Ionosphere*, **Extended Unified Model Workshop**, 02/07/2018, University College London, UK.

M.-T. Walach, A. Grocott, *Characterising and understanding temporal variability in ionospheric flows using SuperDARN data*, **Whole Atmospheric Modelling Workshop**, 14/06/2018, Deimos Space, Tres-Cantos, Spain.

M.-T. Walach, A. Grocott, S. E. Milan and D. D. Billett, *Characterising and understanding temporal variability in ionospheric flows using SuperDARN data*, **SuperDARN Workshop**, 07/06/2018, Banyuls-sur-Mer, France.

M.-T. Walach, A. Grocott, S. E. Milan and D. D. Billett, *Comparison of ionospheric convection signatures of sawtooth events and substorms*, **SuperDARN Workshop**, 04/06/2018, Banyuls-sur-Mer, France.

M.-T. Walach, A. Grocott, and D. D. Billett, *Characterising temporal variability in ionospheric flows using SuperDARN data*, **RAS Specialist Discussion Meeting on Joule Heating**, 07/06/2018, British Antarctic Survey, Cambridge, UK.

M.-T. Walach, A. Grocott, *Characterising temporal variability in ionospheric flows using SuperDARN data*, **MIST Meeting**, 26/03/2018, Southampton, UK.

M.-T. Walach, D. D. Billett, A. Grocott, A. Aruliah, A. Ronksley, *Time Variability in the Ionospheric Electric Field*, **Extended Unified Model Workshop**, 24/07/2017, Bath, UK.

A. Grocott, **M.-T. Walach**, *Timescales of convection pattern reconfiguration following IMF transitions*, **SuperDARN Workshop**, 08/06/2017, San Quirico D'Orcia, Italy.

M.-T. Walach, S. E. Milan, K. R. Murphy, J. A. Carter, B. A. Hubert, *Large-Scale Auroral Responses During Magnetospheric Modes*, **RAS Specialist Discussion Meeting on Multi-Scale Auroral Dynamics**, 13/01/2017, London, UK.

M.-T. Walach, S. E. Milan, T. K. Yeoman, B. A. Hubert, M. R. Hairston, *Testing Predictions of the Ionospheric Convection from the Expanding/Contracting Polar Cap Paradigm*, **AGU Fall Meeting**, 13-18/12/2015, San Francisco, USA.

M.-T. Walach, S. E. Milan, T. K. Yeoman, *Testing Predictions of the Ionospheric Convection from the Expanding/Contracting Polar Cap Paradigm*, **National Astronomy Meeting**, 05-09/07/2015, Llandudno, Wales. **Rishbeth Prize Winner**

M.-T. Walach, S. E. Milan, T. K. Yeoman, *Testing Predictions of the Ionospheric Convection from the Expanding/Contracting Polar Cap Paradigm*, **SuperDARN Meeting**, 31/05 – 05/06/2015, Leicester, UK.

M.-T. Walach, S. E. Milan, *Are Steady Magnetospheric Convection Events Prolonged Substorms?*, **MIST Meeting**, 28/11/2015, London, UK.

M.-T. Walach, S. E. Milan, *Are Steady Magnetospheric Convection Events Prolonged Substorms?*, **International Conference on Substorms (ICS-12)**, 09-14/11/2015, Ise-Shima, Japan.

M.-T. Walach, S. E. Milan, *Are Steady Magnetospheric Convection Events just Prolonged Substorms?*, **MIST Meeting**, 23-25/04/2014, Bath, UK.

Poster Presentations

M.-T. Walach, A. Grocott, F. Staples, E. G. Thomas, *Two decades of SuperDARN convection mapping: effects of an ever evolving network*, **AGU Fall Meeting 2020**, 01/12/2020-17/12/2020, Virtual.

M.-T. Walach, A. Grocott, S. E. Milan, *Average Ionospheric Electric Field Morphologies during Geomagnetic Storms*, **MIST Meeting**, 24/01/2020, Royal Astronomical Society, London, UK.

M.-T. Walach, A. Grocott, F. Staples, E. Thomas, *Influences of the equatorward SuperDARN expansion on data coverage and measured parameters*, **National Astronomy Meeting**, 03/07/2019, Lancaster, UK.

M.-T. Walach, A. Grocott, *SuperDARN scatter during geomagnetic storms and geomagnetically active times*, **RAS Specialist Discussion Meeting: Global Response of the Terrestrial Magnetosphere during Storms and Substorms**, 08/02/2019, London, UK.

M.-T. Walach, A. Grocott, *Characterising temporal variability in ionospheric flows using SuperDARN data: How well do IMF conditions constrain the SuperDARN data?*, **MIST Meeting**, 24/11/2017, London, UK.

M.-T. Walach, S. E. Milan, T. K. Yeoman, B. A. Hubert, M. R. Hairston, *Testing Predictions of the Ionospheric Convection from the Expanding/Contracting Polar Cap Paradigm*, **MIST Meeting**, 27/11/2015, London, UK.

M.-T. Walach, S. E. Milan, *Are Steady Magnetospheric Convection Events Prolonged Substorms?*, **SuperDARN Meeting**, 31/05 – 05/06/2015, Leicester, UK.

I.C. Whittaker, S. Sembay, J. A. Carter, A. M. Read, **M.-T. Walach**, *Magnetospheric Solar Wind Charge Exchange – A Comparison Between the GUMICS-4 MHD Model and XMM-Newton*, **AGU Fall Meeting**, 13-18/12/2015, San Francisco, US.