Liying Qian
Geospace Frontiers
Email: lqian@ucar.edu



Research interests

Dr. Qian's research focuses on the physics, dynamics, and electrodynamics of the ionosphere, thermosphere, and mesosphere (ITM), with an emphasis on understanding their variability and coupling processes. This includes investigations of space weather and space climate, as well as the coupling between the lower and upper atmosphere. She has extensive experience in numerical modeling and has worked with several state-of-the-art models, including the Thermosphere-Ionosphere Electrodynamics General Circulation Model (TIE-GCM), the Thermosphere-Ionosphere-Mesosphere Electrodynamics General Circulation Model (TIME-GCM), and the Whole Atmosphere Community Climate Model with thermosphere and ionosphere extension (WACCM-X).

Qualifications

Physics, MS, Chinese Academy of Sciences

Physics, BS, Nanjing University

Physics, PhD, Pennsylvania State University-Main Campus

Computer and Information Science, MS, Pennsylvania State University-Main Campus

Employment

Senior Scientist

Geospace Frontiers

University Corporation for Atmospheric Research

Oct 1 2002 → present

Research outputs

Long-Term Increase in Equatorial Rayleigh-Taylor Instability: Synergistic Effects of Greenhouse Gas Cooling and Geomagnetic Field Secular Variation
Qian, L., Hsu, C.-T., Wang, W., Zhang, S. R. & McInerney, J., Oct 28 2026, In: Geophysical Research Letters. 53, 20, e2026GL124993.

How Do Changes of Geomagnetic Field and Greenhouse Gas Concentration Affect the Upper Ionosphere in the Long Term?
Hsu, C. T., Wang, W., Zhang, S. R., Qian, L. & McInerney, J., Sep 18 2026, In: Journal of Geophysical Research: Space Physics. 131, 9, 12 p., e2026JA035435.

Statistical Study of Geoeffective Fe XV 28.4 nm Emission Bursts and Their Influence on Ionospheric Total Electron Content During the Late Phase of Solar Flares
Bekker, S. Z., O'Hare, A. N., Greatorex, H. J., Hayes, L. A., Janitzek, N., Kerr, G. S., Milligan, R. O., Qian, L. & Watanabe, K., Jul 2026, In: Journal of Geophysical Research: Space Physics. 131, 7, e2026JA035779.

Sudden Ionospheric Disturbances Generated by Solar Flares—Not so Sudden?
Maletckii, B., Astafyeva, E., Pedatella, N. M. & Qian, L., Apr 16 2026, In: Geophysical Research Letters. 53, 7, e2025GL120816.

Revealing Flare Energetics and Dynamics with SDO EVE Solar Extreme Ultraviolet Spectral Irradiance Observations
Woods, T. N., Chamberlin, P. C., Jones, A., Mason, J. P., Qian, L., Warren, H. P., Woodraska, D., Borelli, R., Eparvier, F. G. & Gonzalez, G., Apr 2026, In: Solar Physics. 301, 4, 63.

Impact of Solar Irradiance on Storm-Time Thermospheric Mass Density Response
Zhang, S., Qian, L., Pedatella, N., Sutton, E., Peterson, N. & Berger, T., Mar 28 2026, In: Geophysical Research Letters. 53, 6, e2025GL120471.

Responses of Ionospheric Peak Density and Height to Magnetospheric Forcing During a 30-Day Quiet Period in Solar Minimum
Cai, X., Wang, W., McInerney, J. M., Liu, H. L., Qian, L., Eastes, R. W. & Wu, H., Mar 2026, In: Journal of Geophysical Research: Space Physics. 131, 3, e2025JA035012.

Quantifying Ionospheric and Thermospheric Day-to-Day Variability Due To the Upward Propagating Migrating Diurnal and Semidiurnal Tides
Hu, T., Qian, L., Pedatella, N. M., Wang, W. & Gan, Q., Feb 2026, In: Journal of Geophysical Research: Space Physics. 131, 2, e2025JA034805.

Scenario of global climate change in the Stratosphere-Mesosphere-Thermosphere-Ionosphere system
Lastovicka, J., Qian, L., Añel, J. A., Brown, M. K., Cnossen, I., Elias, A. G., Jacobi, C., Li, T., Lübken, F. J., Mlynczak, M. G., Šácha, P., Sofieva, V. & Zhang, S. R., Feb 2026, In: PLOS Climate. 5, 2, e0000836.

Northern Crest Weakening Induces Large-Scale Hemispheric EIA Disappearance in GOLD Observations During a Storm
Wu, K., Qian, L., Xiao, F., Liu, S., Luo, J., Cai, X. & Shi, G., Oct 2025, In: Journal of Geophysical Research: Space Physics. 130, 10, e2025JA034385.

The Long-Term Trend of Thermospheric Compositions From Whole Atmospheric Simulation and Satellite Observation
Hsu, C. T., Wang, W., Qian, L., Aa, E., McInerney, J. M., Zhang, S. R., Zhang, Y., Newheart, A. & Lin, D., Oct 2025, In: Journal of Geophysical Research: Space Physics. 130, 10, e2025JA034285.

The NCAR-TIEGCM Version 3.0
Wu, H., Wang, W., Pham, K. H., Lin, D., Rao, N., Wiltberger, M. J., Lu, G., Wu, Q., Liu, H., Qian, L., Hsu, C. T., Pedatella, N. M., Vila-Pérez, J., McInerney, J. M., Richmond, A. D., Burns, A. G., Solomon, S. C., Maute, A., Sutton, E. K. & Lu, X. & 4 others, Cai, X., Sheng, C., Wang, J. C. & Yue, J., Sep 2025, In: Journal of Geophysical Research: Space Physics. 130, 9, e2025JA034219.

Formation of the Ionospheric G-Condition Following the 2017 Great American Eclipse
Chakraborty, S., Qian, L., Mrak, S., Mabie, J., Goncharenko, L., McInerney, J. M. & Bullett, T., Aug 2025, In: Earth and Space Science. 12, 8, e2024EA004007.

The Role of Downward Plasma Diffusion in the Ionospheric Nighttime Weddell Sea Anomaly
Li, Q. H., He, M., Wang, W., Zhang, S. R., Qian, L., Aa, E. & Wang, D., Jun 16 2025, In: Geophysical Research Letters. 52 , 11, e2025GL115318.

Modulation of Thermospheric Circulation by Lower-Thermospheric Winter-to-Summer Circulation: The Atmosphere Gear Effect
Wang, J. C., Yue, J., Wang, W. & Qian, L., May 28 2025, In: Geophysical Research Letters. 52, 10, e2024GL113414.

The NCAR-TIEGCM Version 3.0
Wu, H., Wang, W., Pham, K. H., Lin, D., Rao, N., Wiltberger, M., Lu, G., Wu, Q., Liu, H.-L., Qian, L., Hsu, C.-T., Pedatella, N. M., Vila-Pérez, J., McInerney, J. M., Richmond, A. D., Burns, A. G., Solomon, S. C., Maute, A., Sutton, E. K. & Lu, X. & 4 others, Cai, X., Sheng, C., Wang, J. C. & Yue, J., May 1 2025, (Accepted/In press) In: Journal of Geophysical Research-Space Physics.

Concurrent GOLD and SABER Observations of Thermosphere Composition and Temperature Responses to the April 23–24, 2023 Geomagnetic Storm
Cai, X., Wang, W., Eastes, R. W., Qian, L., Mlynczak, M. G., Evans, J. S., Wang, N., Nowak, N., Pedatella, N. & Wu, K., Apr 2025, In: Journal of Geophysical Research: Space Physics. 130, 4, e2025JA033912.

Penetrating Electric Field With/Without Disturbed Electric Fields During the 7–8 July 2022 Geomagnetic Storm Simulated by MAGE and Observed by ICON MIGHTI
Wu, Q., Lin, D., Wang, W., Pham, K., Qian, L., Wu, H., Immel, T. J. & Yigit, E., Apr 2025, In: Journal of Geophysical Research: Space Physics. 130, 4, e2024JA033240.

Strong thermospheric response to the almost undetectable substorm on May 29, 2023
Zhang, Y., Wu, Q., Wang, W., Paxton, L., Schaefer, R., Lin, D., Qian, L., Wu, H., Wu, K., Zou, Y. & Connors, M., Mar 2025 , In: Journal of Atmospheric and Solar-Terrestrial Physics. 268, 106430.

Evaluating F10.7 and F30 radio fluxes as long-term solar proxies of energy deposition in the thermosphere
Qian, L. & Mursula, K., Feb 25 2025, In: Annales Geophysicae. 43, 1, p. 175-182 8 p.

Quantifying Geomagnetic Activity's Contribution to the Global E-Region Electron Density's Day-To-Day Variability Using Spire Radio Occultation Observations
Salinas, C. C. J. H., Wu, D. L. & Qian, L., Feb 16 2025, In: Geophysical Research Letters. 52, 3, e2024GL112874.

The Formation Mechanism of Merged EIA During a Storm on 4 November 2021
Wu, K., Qian, L., Wang, W., Cai, X. & Mclnerney, J. M., Jan 2025, In: Journal of Geophysical Research: Space Physics. 130, 1, e2024JA032896.

Equinox Transitions of Thermosphere O/N_2 and Meridional Circulation in the Northern Hemisphere as Observed by NASA's GOLD and ICON Missions
Gan, Q., Qian, L., Pedatella, N. M. & Eastes, R. W., Dec 28 2024, In: Geophysical Research Letters. 51, 24, e2024GL111810.

Global Distribution of Ionospheric Topside Diffusive Flux and Midlatitude Electron Density Enhancement in Winter Nighttime
Li, Q. H., Hao, Y. Q., Wang, W., Zhang, S. R., Qian, L., Aa, E., Zhang, D. H., Xiao, Z. & He, M., Dec 28 2024, In: Geophysical Research Letters. 51, 24, e2024GL111091.

Impact of Upward Propagating Migrating Diurnal and Semidiurnal Tides on the Ionosphere-Thermosphere Seasonal Variation
Pedatella, N. M., Wu, K., Qian, L. & Gan, Q., Dec 2024, In: Journal of Geophysical Research: Space Physics. 129, 12, e2024JA032855.

Data-driven Simulation of Effects of a Solar Flare with Extreme-ultraviolet Late Phase on Ionospheric Electron Density
Liu, X., Qian, L., Chamberlin, P. C., Chen, Y., Kong, X., Zhang, Q. H., Li, S. & Liu, J., Oct 1 2024, In: Astrophysical Journal. 974, 2, 157.

Impacts of Extreme Ultraviolet Late Phase of the Solar Flare on Ionospheric Electrodynamics
Liu, X., Liu, J., Chen, J., Qian, L., Chamberlin, P. C., Chen, Y., Kong, X. & Li, S., Oct 1 2024, In: Astrophysical Journal Letters. 974, 1, L19.

Development of the Ionospheric E-Region Prompt Radio Occultation Based Electron Density (E-PROBED) Model
Salinas, C. C. J. H., Wu, D. L., Swarnalingam, N., Emmons, D. & Qian, L., Sep 2024, In: Space Weather. 22, 9, e2024SW004037.

Comparing the Upper Mesospheric Temperature Trend and the Response to Solar Activity Derived From the Daily Mean and Nocturnal Na Lidar Observations
Yuan, T., Pena, M., Hsu, C. T. & Qian, L., Aug 28 2024, In: Journal of Geophysical Research: Atmospheres. 129, 16, e2024JD041422.

Interactions between MSTIDs and Ionospheric Irregularities in the Equatorial Region Observed on 13–14 May 2013
Wu, K. & Qian, L., Jul 2024, In: Remote Sensing. 16, 13, 2413.

HIWIND Balloon and Antarctica Jang Bogo FPI High Latitude Conjugate Thermospheric Wind Observations and Simulations
Wu, Q., Lin, D., Wang, W., Qian, L., Jee, G., Lee, C. & Kim, J. H., Jun 2024, In: Journal of Geophysical Research: Space Physics. 129, 6, e2023JA032400.

MAGE Model Simulation of the Pre-Reversal Enhancement and Comparison With ICON and Jicamarca ISR Observations
Wu, Q., Wang, W., Lin, D., Qian, L., Huang, C. & Zhang, Y., Jun 2024, In: Journal of Geophysical Research: Space Physics. 129, 6, e2023JA032038.

Occurrence Characteristics of Nighttime Merged EIA Based on NASA GOLD Observations from 2018 to 2023
Wu, K. & Qian, L., May 2024, In: Remote Sensing. 16, 9, 1575.

Energy Deposition into the Ionosphere during a Solar Flare with Extreme-ultraviolet Late Phase
Liu, J., Qian, L., Wang, W., Pham, K., Kong, X., Chen, Y., Liu, W., Liu, L. & Liu, X., Mar 1 2024, In: Astrophysical Journal Letters. 963, 1, L8.

Climate Change in the Thermosphere and Ionosphere From the Early Twentieth Century to Early Twenty-First Century Simulated by the Whole Atmosphere Community Climate Model—eXtended
McInerney, J. M., Qian, L., Liu, H. L., Solomon, S. C. & Nossal, S. M., Feb 16 2024, In: Journal of Geophysical Research: Atmospheres. 129, 3, e2023JD039397.

Thermospheric Responses to the 3 and 4 November 2021 Geomagnetic Storm During the Main and Recovery Phases as Observed by NASA's GOLD and ICON Missions
Gan, Q., Eastes, R. W., Wu, Y. J., Qian, L., Cai, X., Wang, W., England, S. L. & McClintock, W. E., Jan 16 2024, In: Geophysical Research Letters. 51, 1, e2023GL106529.

Investigation of Different ΣO/N_2 Variations Observed by GOLD During a Minor Geomagnetic Storm From 2 to 4 August 2021
Cai, X., Wang, W., Eastes, R. W., Qian, L., Correira, J. & McClintock, W. E., Jan 2024, In: Journal of Geophysical Research: Space Physics. 129, 1, e2023JA031782.

Storm-time variability of terrestrial hydrogen exosphere: kinetic simulation results
Connor, H. K., Jung, J., Qian, L., Sutton, E. K., Cucho-Padin, G., Crow, M. & Lee, S. Y., 2024, In: Frontiers in Astronomy and Space Sciences. 11, 1421196.

Investigation of the Physical Mechanisms of the Formation and Evolution of Equatorial Plasma Bubbles During a Moderate Storm on 17 September 2021
Wu, K., Qian, L., Wang, W., Cai, X. & McInerney, J. M., Dec 2023, In: Space Weather. 21, 12, e2023SW003673.

The Lower Thermospheric Winter-To-Summer Meridional Circulation: 2. Impact on Atomic Oxygen
Wang, J. C., Yue, J., Wang, W., Qian, L., Jones, M. & Wang, N., Nov 2023, In: Journal of Geophysical Research: Space Physics. 128, 11, e2023JA031684.

Intensification and Weakening of Equatorial Plasma Bubble Development Observed by GOLD During Different Phases of a Geomagnetic Storm
Amadi, B. C., Qian, L., de Paula, E. R., McINerney, J. M., Kherani, E. A., Santos, A. M. & Sanchez, S. A., Oct 2023, In: Journal of Geophysical Research: Space Physics. 128, 10, e2022JA031262.

Significant Mid- and Low-Latitude Ionospheric Disturbances Characterized by Dynamic EIA, EPBs, and SED Variations During the 13–14 March 2022 Geomagnetic Storm
Aa, E., Zhang, S. R., Erickson, P. J., Wang, W., Qian, L., Cai, X., Coster, A. J. & Goncharenko, L. P., Aug 2023, In: Journal of Geophysical Research: Space Physics. 128, 8, e2023JA031375.

Investigation of the GOLD Observed Merged Nighttime EIA With WACCM-X Simulations During the Storm of 3 and 4 November 2021
Wu, K., Qian, L., Wang, W., Cai, X. & Mclnerney, J. M., Jul 16 2023, In: Geophysical Research Letters. 50, 13, e2023GL103603.

GOLD Synoptic Observations of Quasi-6-Day Wave Modulations of Post-Sunset Equatorial Ionization Anomaly During the September 2019 Antarctic Sudden Stratospheric Warming
Gan, Q., Oberheide, J., Goncharenko, L., Qian, L., Yue, J., Wang, W., McClintock, W. E. & Eastes, R. W., Jun 28 2023, In: Geophysical Research Letters. 50, 12, e2023GL103386.

A Mosaic of the Inner Heliosphere: Three Carrington Rotations During the Whole Heliosphere and Planetary Interactions Interval
Allen, R. C., Gibson, S. E., Hewins, I., Vines, S. K., Qian, L., de Toma, G., Thompson, B. J., Hudson, M., Lee, C. O., Filwett, R. J., Mostafavi, P., Mo, W. & Hill, M. E., Jun 2023, In: Journal of Geophysical Research: Space Physics. 128, 6, e2023JA031361.

Whole Heliosphere and Planetary Interactions (WHPI): The Big Picture on Solar Cycle Minima
Gibson, S. E., Allen, R. C., de Toma, G., Emery, B., Gasperini, F., Hewins, I., Hudson, M., Qian, L. & Thompson, B., Jun 2023, In: Journal of Geophysical Research: Space Physics. 128, 6, e2023JA031550.

Equatorial Ionization Anomaly Discontinuity Observed by GOLD, COSMIC-2, and Ground-Based GPS Receivers' Network
Cai, X., Wang, W., Eastes, R. W., Qian, L., Pedatella, N. M., Aa, E., Zhang, S., Coster, A., Daniell, R. E. & McClintock, W. E., May 28 2023, In: Geophysical Research Letters. 50, 10, e2023GL102994.

Hemispheric Asymmetry of the Annual and Semiannual Variation of Thermospheric Composition
Qian, L., Yu, W., Pedatella, N., Yue, J. & Wang, W., May 2023, In: Journal of Geophysical Research: Space Physics. 128, 5, e2022JA031077.

Statistical Analysis of Equatorial Plasma Bubbles Climatology and Multi-Day Periodicity Using GOLD Observations
Aa, E., Zhang, S. R., Liu, G., Eastes, R. W., Wang, W., Karan, D. K., Qian, L., Coster, A. J., Erickson, P. J. & Derghazarian, S., Apr 28 2023, In: Geophysical Research Letters. 50, 8, e2023GL103510.

Investigation of the Southern Hemisphere Mid-High Latitude Thermospheric $\sum O/N_2$ Responses to the Space-X Storm
Cai, X., Wang, W., Lin, D., Eastes, R. W., Qian, L., Zhu, Q., Correira, J., McClintock, W. E., Gan, Q., Aryal, S., Laskar, F. I. & Karan, D. K., Mar 2023, In: Journal of Geophysical Research: Space Physics. 128, 3, e2022JA031002.

GOLD Synoptic Observations of Thermospheric Annual and Semiannual Variations in Composition During Solar Minimum Years
Gan, Q., Qian, L., Pedatella, N. M., Wu, Y. J., Correira, J., Wang, W., McClintock, W. E. & Eastes, R. W., Feb 28 2023, In: Geophysical Research Letters. 50, 4, e2022GL101215.

Impacts of Ionospheric Conductance on Magnetosphere-Ionosphere Coupling
Liu, J., Wang, W., Qian, L., Pham, K., Liu, L., Li, Q., Li, S. & Liu, X., Feb 2023, In: Journal of Geophysical Research: Space Physics. 128, 2, e2022JA030864.

Seasonality of the Migrating Semidiurnal Tide in the Tropical Upper Mesosphere and Lower Thermosphere and Its Thermodynamic and Momentum Budget
Salinas, C. C. J. H., Wu, D. L., Lee, J. N., Chang, L. C., Qian, L. & Liu, H., Feb 2023, In: Journal of Geophysical Research: Space Physics. 128, 2, e2022JA031035.

Aura/MLS observes and SD-WACCM-X simulates the seasonality, quasi-biennial oscillation and El Niño-Southern Oscillation of the migrating diurnal tide driving upper mesospheric CO primarily through vertical advection
Salinas, C. C. J. H., Wu, D. L., Lee, J. N., Chang, L. C., Qian, L. & Liu, H., Jan 31 2023, In: Atmospheric Chemistry and Physics. 23, 2, p. 1705-1730 26 p.

Ionospheric Oscillations With a Quasi-Period of ~6 hr During Intense Magnetic Storms
Huang, C. S., Zhang, Y., Wang, W., Wu, Q., Lin, D. & Qian, L., Jan 2023, In: Journal of Geophysical Research: Space Physics. 128, 1, e2022JA031117.

Mid-Latitude Ionospheric Response to a Weak Geomagnetic Activity Event During Solar Minimum
Zhai, C., Cai, X., Wang, W., Coster, A., Qian, L., Solomon, S. C., Yu, T. & He, M., Jan 2023, In: Journal of Geophysical Research: Space Physics. 128, 1, e2022JA030908.

Long-term geospace climate monitoring
Zhang, S. R., Cnossen, I., Laštovička, J., Elias, A. G., Yue, X., Jacobi, C., Yue, J., Wang, W., Qian, L. & Goncharenko, L., 2023, In: Frontiers in Astronomy and Space Sciences. 10, 1139230.

The Lower Thermospheric Winter-To-Summer Meridional Circulation: 1. Driving Mechanism
Wang, J. C., Yue, J., Wang, W., Qian, L., Wu, Q. & Wang, N., Dec 2022, In: Journal of Geophysical Research: Space Physics. 127, 12, e2022JA030948.

Thermospheric Nitric Oxide Cooling Responses to the 14 December 2020 Solar Eclipse
Wang, N., Yu, W., Yue, J., Wang, W., Qian, L., Mclnerney, J. M., Russell, J. M. & Mlynczak, M. G., Dec 2022, In: Journal of Geophysical Research: Space Physics. 127, 12, e2022JA030995.

Hemispherically Asymmetric Evolution of Nighttime Ionospheric Equatorial Ionization Anomaly in the American Longitude Sector
Cai, X., Qian, L., Wang, W., McInerney, J. M., Liu, H. L. & Eastes, R. W., Nov 2022, In: Journal of Geophysical Research: Space Physics. 127, 11, e2022JA030706.

Estimating the Migrating Diurnal Tide Component of Mesospheric Water Vapor
Salinas, C. C. J. H., Chang, L. C., Yue, J., Qian, L., Gan, Q., Russell, J. & Mlynczak, M., Oct 2022, In: Journal of Geophysical Research: Space Physics. 127, 10, e2021JA030187.

Investigation of the Post-Sunset Extra Electron Density Peak Poleward of the Equatorial Ionization Anomaly Southern Crest
Cai, X., Qian, L., Wang, W., McInerney, J. M., Liu, H. L. & Eastes, R. W., Oct 2022, In: Journal of Geophysical Research: Space Physics. 127, 10, e2022JA030755.

Driving Influences of the Doppler Flash Observed by SuperDARN HF Radars in Response to Solar Flares
Chakraborty, S., Qian, L., Baker, J. B. H., Ruohoniemi, J. M., Kuyeng, K. & Mclnerney, J. M., Jun 2022, In: Journal of Geophysical Research: Space Physics. 127, 6, e2022JA030342.

Pronounced Suppression and X-Pattern Merging of Equatorial Ionization Anomalies After the 2022 Tonga Volcano Eruption
Aa, E., Zhang, S. R., Wang, W., Erickson, P. J., Qian, L., Eastes, R., Harding, B. J., Immel, T. J., Karan, D. K., Daniell, R. E., Coster, A. J., Goncharenko, L. P., Vierinen, J., Cai, X. & Spicher, A., Jun 2022, In: Journal of Geophysical Research: Space Physics. 127, 6, e2022JA030527.

Seasonal Variation of Thermospheric Composition Observed by NASA GOLD
Qian, L., Gan, Q., Wang, W., Cai, X., Eastes, R. & Yue, J., Jun 2022, In: Journal of Geophysical Research: Space Physics. 127, 6, e2022JA030496.

The Effects of IMF B_y on the Middle Thermosphere During a Geomagnetically "Quiet" Period at Solar Minimum
Cai, X., Wang, W., Burns, A., Qian, L. & Eastes, R. W., May 2022, In: Journal of Geophysical Research: Space Physics. 127, 5, e2021JA029816.

Climatology of Mesosphere and Lower Thermosphere Residual Circulations and Mesopause Height Derived From SABER Observations
Wang, N., Qian, L., Yue, J., Wang, W., Mlynczak, M. G. & Russell, J. M., Feb 27 2022, In: Journal of Geophysical Research: Atmospheres. 127, 4, e2021JD035666.

Ionospheric Electrodynamic Response to Solar Flares in September 2017
Chen, J., Lei, J., Wang, W., Liu, J., Maute, A., Qian, L., Zhang, R. & Dang, T., Nov 2021, In: Journal of Geophysical Research: Space Physics. 126, 11, e2021JA029745.

The Role of Flare-Driven Ionospheric Electron Density Changes on the Doppler Flash Observed by SuperDARN HF Radars
Chakraborty, S., Qian, L., Ruohoniemi, J. M., Baker, J. B. H., Mclnerney, J. M. & Nishitani, N., Aug 2021, In: Journal of Geophysical Research: Space Physics. 126, 8, e2021JA029300.

Solar flare effects in the Earth's magnetosphere
Liu, J., Wang, W., Qian, L., Lotko, W., Burns, A. G., Pham, K., Lu, G., Solomon, S. C., Liu, L., Wan, W., Anderson, B. J., Coster, A. & Wilder, F., Jul 2021, In: Nature Physics. 17, 7, p. 807-812 6 p.

Variations in Thermosphere Composition and Ionosphere Total Electron Content Under "Geomagnetically Quiet" Conditions at Solar-Minimum
Cai, X., Burns, A. G., Wang, W., Qian, L., Pedatella, N., Coster, A., Zhang, S., Solomon, S. C., Eastes, R. W., Daniell, R. E. & McClintock, W. E., Jun 16 2021, In: Geophysical Research Letters. 48, 11, e2021GL093300.

A Comparison of the CIR- and CME-Induced Geomagnetic Activity Effects on Mesosphere and Lower Thermospheric Temperature
Wang, N., Yue, J., Wang, W., Qian, L., Jian, L. & Zhang, J., Jun 2021, In: Journal of Geophysical Research: Space Physics. 126, 6, e2020JA029029.

Investigation of a Neutral "Tongue" Observed by GOLD During the Geomagnetic Storm on May 11, 2019
Cai, X., Burns, A. G., Wang, W., Qian, L., Solomon, S. C., Eastes, R. W., McClintock, W. E. & Laskar, F. I., Jun 2021, In: Journal of Geophysical Research: Space Physics. 126, 6, e2020JA028817.

Climate Changes in the Upper Atmosphere: Contributions by the Changing Greenhouse Gas Concentrations and Earth's Magnetic Field From the 1960s to 2010s
Qian, L., McInerney, J. M., Solomon, S. S., Liu, H. & Burns, A. G., Mar 2021, In: Journal of Geophysical Research: Space Physics. 126, 3, e2020JA029067.

Observation of Postsunset OI 135.6 nm Radiance Enhancement Over South America by the GOLD Mission
Cai, X., Burns, A. G., Wang, W., Qian, L., Liu, J., Solomon, S. C., Eastes, R. W., Daniell, R. E., Martinis, C. R., McClintock, W. E. & Batista, I. S., Feb 2021, In: Journal of Geophysical Research: Space Physics. 126, 2, e2020JA028108.

Neutral Composition in the Upper Atmosphere
Burns, A. G., Wang, W. & Qian, L., Jan 1 2021, *Space Physics and Aeronomy, Upper Atmosphere Dynamics and Energetics.* wiley, p. 105-113 9 p.

Solar Flare Effects on the Thermosphere and Ionosphere
Qian, L. & Woods, T. N., Jan 1 2021, *Space Physics and Aeronomy, Upper Atmosphere Dynamics and Energetics.* wiley, p. 253-274 22 p.

Electrodynamical Coupling of the Geospace System During Solar Flares
Liu, J., Qian, L., Maute, A., Wang, W., Richmond, A. D., Chen, J., Lei, J., Zhang, Q. & Xing, Z., Jan 2021, In: Journal of Geophysical Research: Space Physics. 126, 1, e2020JA028569.

The Two-Dimensional Evolution of Thermospheric $\sum O/N_2$ Response to Weak Geomagnetic Activity During Solar-Minimum Observed by GOLD
Cai, X., Burns, A. G., Wang, W., Qian, L., Solomon, S. C., Eastes, R. W., Pedatella, N., Daniell, R. E. & McClintock, W. E., Sep 28 2020, In: Geophysical Research Letters. 47, 18, e2020GL088838.

Comparison of GOLD Nighttime Measurements With Total Electron Content: Preliminary Results
Cai, X., Burns, A. G., Wang, W., Coster, A., Qian, L., Liu, J., Solomon, S. C., Eastes, R. W., Daniell, R. E. & McClintock, W. E., Sep 1 2020, In: Journal of Geophysical Research: Space Physics. 125, 9, e2019JA027767.

New Observations of Large-Scale Waves Coupling With the Ionosphere Made by the GOLD Mission: Quasi-16-Day Wave Signatures in the F-Region OI 135.6-nm Nightglow During Sudden Stratospheric Warmings
Gan, Q., Eastes, R. W., Burns, A. G., Wang, W., Qian, L., Solomon, S. C., Codrescu, M. V. & McClintock, W. E., Apr 1 2020, In: Journal of Geophysical Research: Space Physics. 125, 4, e2020JA027880.

Responses of the Thermosphere and Ionosphere System to Concurrent Solar Flares and Geomagnetic Storms
Qian, L., Wang, W., Burns, A. G., Chamberlin, P. C. & Solomon, S. C., Mar 1 2020, In: Journal of Geophysical Research: Space Physics. 125, 3, e2019JA027431.

Local-Time Variabilities of March Equinox Daytime SABER CO_2 in the Upper Mesosphere and Lower Thermosphere Region
Salinas, C. C. J. H., Chang, L. C., Liang, M. C., Yue, J., Qian, L., Gan, Q., Chiu, Y. C., Russell, J. & Mlynczak, M., Mar 2020, In: Journal of Geophysical Research: Space Physics. 125, 3, e2019JA027039.

First Synoptic Observations of Geomagnetic Storm Effects on the Global-Scale OI 135.6-nm Dayglow in the Thermosphere by the GOLD Mission
Gan, Q., Eastes, R. W., Burns, A. G., Wang, W., Qian, L., Solomon, S. C., Codrescu, M. V., McInerney, J. & McClintock, W. E., Feb 16 2020, In: Geophysical Research Letters. 47, 3, e2019GL085400.

Introduction to Special Issue on "Long-Term Changes and Trends in the Middle and Upper Atmosphere"
Yue, J., Li, T., Qian, L., Lastovicka, J. & Zhang, S., Dec 1 2019, In: Journal of Geophysical Research: Space Physics. 124 , 12, p. 10360-10364 5 p.

Solar Flare Effects on 150-km Echoes Observed Over Jicamarca: WACCM-X Simulations
Pedatella, N. M., Chau, J. L., Vierinen, J., Qian, L., Reyes, P., Kudeki, E., Lehmacher, G. & Oppenheim, M., Oct 28 2019, In: Geophysical Research Letters. 46, 20, p. 10951-10958 8 p.

Long-Term Trends in the Low-Latitude Middle Atmosphere Temperature and Winds: Observations and WACCM-X Model Simulations
Venkat Ratnam, M., Akhil Raj, S. T. & Qian, L., Aug 1 2019, In: Journal of Geophysical Research: Space Physics. 124, 8, p. 7320-7331 12 p.

Signatures of Thermospheric-Exospheric Coupling of Hydrogen in Observed Seasonal Trends of H α Intensity
Gallant, M. A., Mierkiewicz, E. J., Nossal, S. M., Qian, L., Burns, A. G., Zacharias, A. R. & Roesler, F. L., Jun 2019, In: Journal of Geophysical Research: Space Physics. 124, 6, p. 4525-4538 14 p.

Whole Atmosphere Climate Change: Dependence on Solar Activity
Solomon, S. C., Liu, H. L., Marsh, D. R., McInerney, J. M., Qian, L. & Vitt, F. M., May 2019, In: Journal of Geophysical Research: Space Physics. 124, 5, p. 3799-3809 11 p.

Annual and Semiannual Oscillations of Thermospheric Composition in TIMED/GUVI Limb Measurements
Yue, J., Jian, Y., Wang, W., Meier, R. R., Burns, A., Qian, L., Jones, M., Wu, D. L. & Mlynczak, M., Apr 2019, In: Journal of Geophysical Research: Space Physics. 124, 4, p. 3067-3082 16 p.

Solar Flare and Geomagnetic Storm Effects on the Thermosphere and Ionosphere During 6–11 September 2017
Qian, L., Wang, W., Burns, A. G., Chamberlin, P. C., Coster, A., Zhang, S. R. & Solomon, S. C., Mar 2019, In: Journal of Geophysical Research: Space Physics. 124, 3, p. 2298-2311 14 p.

Trends and Solar Irradiance Effects in the Mesosphere
Qian, L., Jacobi, C. & McInerney, J., Feb 2019, In: Journal of Geophysical Research: Space Physics. 124, 2, p. 1343-1360 18 p.

A Comparison Study of NO Cooling Between TIMED/SABER Measurements and TIEGCM Simulations
Li, Z., Knipp, D., Wang, W., Sheng, C., Qian, L. & Flynn, S., Oct 2018, In: Journal of Geophysical Research: Space Physics. 123, 10, p. 8714-8729 16 p.

Solar Cycle Response of CO_2 Over the Austral Winter Mesosphere and Lower Thermosphere Region
Salinas, C. C. J. H., Chang, L. C., Liang, M. C., Qian, L., Yue, J., Lee, J. N., Russell, J., Mlynczak, M. & Wu, D. L., Sep 2018, In: Journal of Geophysical Research: Space Physics. 123, 9, p. 7581-7597 17 p.

Effects of the September 2005 Solar Flares and Solar Proton Events on the Middle Atmosphere in WACCM
Pettit, J., Randall, C. E., Marsh, D. R., Bardeen, C. G., Qian, L., Jackman, C. H., Woods, T. N., Coster, A. & Harvey, V. L., Jul 2018, In: Journal of Geophysical Research: Space Physics. 123, 7, p. 5747-5763 17 p.

Ionospheric Electron Content During Solar Cycle 23
Solomon, S. C., Qian, L. & Mannucci, A. J., Jun 2018, In: Journal of Geophysical Research: Space Physics. 123, 6, p. 5223-5231 9 p.

Whole Atmosphere Simulation of Anthropogenic Climate Change
Solomon, S. C., Liu, H. L., Marsh, D. R., McInerney, J. M., Qian, L. & Vitt, F. M., Feb 16 2018, In: Geophysical Research Letters. 45, 3, p. 1567-1576 10 p.

Development and Validation of the Whole Atmosphere Community Climate Model With Thermosphere and Ionosphere Extension (WACCM-X 2.0)
Liu, H. L., Bardeen, C. G., Foster, B. T., Lauritzen, P., Liu, J., Lu, G., Marsh, D. R., Maute, A., McInerney, J. M., Pedatella, N. M., Qian, L., Richmond, A. D., Roble, R. G., Solomon, S. C., Vitt, F. M. & Wang, W., Feb 2018, In: Journal of Advances in Modeling Earth Systems. 10, 2, p. 381-402 22 p.

First Results From the Ionospheric Extension of WACCM-X During the Deep Solar Minimum Year of 2008
Liu, J., Liu, H., Wang, W., Burns, A. G., Wu, Q., Gan, Q., Solomon, S. C., Marsh, D. R., Qian, L., Lu, G., Pedatella, N. M., McInerney, J. M., Russell, J. M. & Schreiner, W. S., Feb 2018, In: Journal of Geophysical Research: Space Physics. 123, 2, p. 1534-1553 20 p.

Temporal Variability of Atomic Hydrogen From the Mesopause to the Upper Thermosphere
Qian, L., Burns, A. G., Solomon, S. S., Smith, A. K., McInerney, J. M., Hunt, L. A., Marsh, D. R., Liu, H., Mlynczak, M. G. & Vitt, F. M., Jan 2018, In: Journal of Geophysical Research: Space Physics. 123, 1, p. 1006-1017 12 p.

Evidence of the Lower Thermospheric Winter-to-Summer Circulation From SABER CO_2 Observations
Qian, L., Burns, A. & Yue, J., Oct 28 2017, In: Geophysical Research Letters. 44, 20, p. 10,100-10,107

Observations and Simulations of Eddy Diffusion and Tidal Effects on the Semiannual Oscillation in the Ionosphere
Wu, Q., Schreiner, W. S., Ho, S. P., Liu, H. L. & Qian, L., Oct 2017, In: Journal of Geophysical Research: Space Physics. 122, 10, p. 10,502-10,510

Impact of the lower thermospheric winter-to-summer residual circulation on thermospheric composition
Qian, L. & Yue, J., May 16 2017, In: Geophysical Research Letters. 44, 9, p. 3971-3979 9 p.

Carbon dioxide trends in the mesosphere and lower thermosphere
Qian, L., Burns, A. G., Solomon, S. C. & Wang, W., Apr 1 2017, In: Journal of Geophysical Research: Space Physics. 122 , 4, p. 4474-4488 15 p.

Longitudinal variations of thermospheric composition at the solstices
Qian, L., Burns, A. G., Wang, W., Solomon, S. C. & Zhang, Y., Jul 1 2016, In: Journal of Geophysical Research: Space Physics. 121, 7, p. 6818-6829 12 p.

Solar cycle variations of thermospheric composition at the solstices
Qian, L., Burns, A. G., Solomon, S. C., Wang, W. & Zhang, Y., Apr 1 2016, In: Journal of Geophysical Research: Space Physics. 121, 4, p. 3740-3749 10 p.

Thermospheric hydrogen response to increases in greenhouse gases
Nossal, S. M., Qian, L., Solomon, S. C., Burns, A. G. & Wang, W., Apr 1 2016, In: Journal of Geophysical Research: Space Physics. 121, 4, p. 3545-3554 10 p.

Effects of the equatorial ionosphere anomaly on the interhemispheric circulation in the thermosphere
Qian, L., Burns, A. G., Wang, W., Solomon, S. C., Zhang, Y. & Hsu, V., Mar 1 2016, In: Journal of Geophysical Research: Space Physics. 121, 3, p. 2522-2530 9 p.

On the secular trend of CO_x and CO_2 in the lower thermosphere
Garcia, R. R., López-Puertas, M., Funke, B., Kinnison, D. E., Marsh, D. R. & Qian, L., 2016, In: Journal of Geophysical Research. 121, 7, p. 3634-3644 11 p.

Physics-based assimilative atmospheric modeling for satellite drag specification and forecasts
Pilinski, M. D., Crowley, G., Wolfe, J., Fuller-Rowell, T., Matsuo, T., Fedrizzi, M., Solomon, S., Qian, L., Thayer, J. & Codrescu, M., 2016, *Astrodynamics 2015.* Majji, M., Turner, J. D., Wawrzyniak, G. G. & Cerven, W. T. (eds.). Univelt Inc., p. 4405-4423 19 p. (Advances in the Astronautical Sciences; vol. 156).

Explaining solar cycle effects on composition as it relates to the winter anomaly
Burns, A. G., Solomon, S. C., Wang, W., Qian, L., Zhang, Y., Paxton, L. J., Yue, X., Thayer, J. P. & Liu, H. L., Jul 1 2015, In: Journal of Geophysical Research: Space Physics. 120, 7, p. 5890-5898 9 p.

New 3-D simulations of climate change in the thermosphere
Solomon, S. C., Qian, L. & Roble, R. G., Mar 1 2015, In: Journal of Geophysical Research: Space Physics. 120, 3, p. 2183-2193 11 p.

The winter helium bulge revisited
Liu, X., Wang, W., Thayer, J. P., Burns, A., Sutton, E., Solomon, S. C., Qian, L. & Lucas, G., Oct 16 2014, In: Geophysical Research Letters. 41, 19, p. 6603-6609 7 p.

Wavelength dependence of solar irradiance enhancement during X-class flares and its influence on the upper atmosphere
Huang, Y., Richmond, A. D., Deng, Y., Chamberlin, P. C., Qian, L., Solomon, S. C., Roble, R. G. & Xiao, Z., Aug 2014, In: Journal of Atmospheric and Solar-Terrestrial Physics. 115-116, p. 87-94 8 p.

On the solar cycle variation of the winter anomaly
Burns, A. G., Wang, W., Qian, L., Solomon, S. C., Zhang, Y., Paxton, L. J. & Yue, X., Jun 2014, In: Journal of Geophysical Research: Space Physics. 119, 6, p. 4938-4949 12 p.

Energetics and Composition in the Thermosphere
Burns, A. G., Wang, W., Solomon, S. C. & Qian, L., May 19 2014, *Modeling the Ionosphere-Thermosphere, Volume 201.* Wiley-Blackwell, Vol. 9780875904917. p. 39-48 10 p.

The NCAR TIE-GCM: A Community Model of the Coupled Thermosphere/Ionosphere System
Qian, L., Burns, A. G., Emery, B. A., Foster, B., Lu, G., Maute, A., Richmond, A. D., Roble, R. G., Solomon, S. C. & Wang, W., May 19 2014, *Modeling the Ionosphere-Thermosphere, Volume 201.* Wiley-Blackwell, Vol. 9780875904917. p. 73-83 11 p.

Secular changes in the thermosphere and ionosphere between two quiet Sun periods
Qian, L., Solomon, S. C. & Roble, R. G., Mar 2014, In: Journal of Geophysical Research: Space Physics. 119, 3, p. 2255-2262 8 p.

The anomalous ionosphere between solar cycles 23 and 24
Solomon, S. C., Qian, L. & Burns, A. G., Oct 2013, In: Journal of Geophysical Research: Space Physics. 118, 10, p. 6524-6535 12 p.

Effect of trends of middle atmosphere gases on the mesosphere and thermosphere
Qian, L., Marsh, D., Merkel, A., Solomon, S. C. & Roble, R. G., Jun 2013, In: Journal of Geophysical Research: Space Physics. 118, 6, p. 3846-3855 10 p.

Annual/semiannual variation of the ionosphere
Qian, L., Burns, A. G., Solomon, S. C. & Wang, W., May 28 2013, In: Geophysical Research Letters. 40, 10, p. 1928-1933 6 p.

Evidence of long-term change in zonal wind in the tropical lower mesosphere: Observations and model simulations
Venkat Ratnam, M., Kumar, G. K., Venkateswara Rao, N., Murthy, B. V. K., Laštovička, J. & Qian, L., Jan 28 2013, In: Geophysical Research Letters. 40, 2, p. 397-401 5 p.

Corrigendum to "CMIT study of CR2060 and CR2068 comparing L1 and MAS solar wind drivers"
Wiltberger, M., Qian, L., Huang, C. L., Wang, W., Lopez, R. E., Burns, A. G., Solomon, S. C., Deng, Y. & Huang, Y., Jan 2013, In: Journal of Atmospheric and Solar-Terrestrial Physics. 92, p. 178 1 p.

Energetics and composition in the thermosphere
Burns, A. G., Wang, W., Solomon, S. C. & Qian, L., 2013, In: Geophysical Monograph Series. 201, p. 39-48 10 p.

The NCAR TIE-GCM: A community model of the coupled thermosphere/ionosphere system
Qian, L., Burns, A. G., Emery, B. A., Foster, B., Lu, G., Maute, A., Richmond, A. D., Roble, R. G., Solomon, S. C. & Wang, W., 2013, In: Geophysical Monograph Series. 201, p. 73-83 11 p.

CMIT study of CR2060 and 2068 comparing L1 and MAS solar wind drivers
Wiltberger, M., Qian, L., Huang, C. L., Wang, W., Lopez, R. E., Burns, A. G., Solomon, S. C., Deng, Y. & Huang, Y., Jul 2012, In: Journal of Atmospheric and Solar-Terrestrial Physics. 83, p. 39-50 12 p.

The effects of Corotating interaction region/High speed stream storms on the thermosphere and ionosphere during the last solar minimum
Burns, A. G., Solomon, S. C., Qian, L., Wang, W., Emery, B. A., Wiltberger, M. & Weimer, D. R., Jul 2012, In: Journal of Atmospheric and Solar-Terrestrial Physics. 83, p. 79-87 9 p.

Thermospheric density: An overview of temporal and spatial variations
Qian, L. & Solomon, S. C., Jun 2012, In: Space Science Reviews. 168, 1-4, p. 147-173 27 p.

Trends in the neutral and ionized upper atmosphere
Laštovička, J., Solomon, S. C. & Qian, L., Jun 2012, In: Space Science Reviews. 168, 1-4, p. 113-145 33 p.

Solar flare impacts on ionospheric electrodyamics
Qian, L., Burns, A. G., Solomon, S. C. & Chamberlin, P. C., Mar 28 2012, In: Geophysical Research Letters. 39, 6, L06101.

Anomalously low geomagnetic energy inputs during 2008 solar minimum
Deng, Y., Huang, Y., Solomon, S., Qian, L., Knipp, D., Weimer, D. R. & Wang, J. S., 2012, In: Journal of Geophysical Research: Space Physics. 117, 9, A09307.

Daytime climatology of ionospheric N_mF_2 and h_mF_2 from COSMIC data
Burns, A. G., Solomon, S. C., Wang, W., Qian, L., Zhang, Y. & Paxton, L. J., 2012, In: Journal of Geophysical Research: Space Physics. 117, 9, A09315.

Effect of a solar flare on a traveling atmospheric disturbance
Qian, L., Burns, A. G., Liu, H. & Chamberlin, P. C., 2012, In: Journal of Geophysical Research: Space Physics. 117, 10, A10319.

Modeling studies of the impact of high-speed streams and co-rotating interaction regions on the thermosphere-ionosphere
Solomon, S. C., Burns, A. G., Emery, B. A., Mlynczak, M. G., Qian, L., Wang, W., Weimer, D. R. & Wiltberger, M., 2012, In: Journal of Geophysical Research: Space Physics. 117, 8, A00L11.

Thermospheric basis functions for improved dynamic calibration of semi-empirical models
Sutton, E. K., Cable, S. B., Lin, C. S., Qian, L. & Weimer, D. R., 2012, In: Space Weather. 10, 10, S10001.

A Snapshot of the Sun Near Solar Minimum: The Whole Heliosphere Interval
Thompson, B. J., Gibson, S. E., Schroeder, P. C., Webb, D. F., Arge, C. N., Bisi, M. M., de Toma, G., Emery, B. A., Galvin, A. B., Haber, D. A., Jackson, B. V., Jensen, E. A., Leamon, R. J., Lei, J., Manoharan, P. K., Mays, M. L., McIntosh, P. S., Petrie, G. J. D., Plunkett, S. P. & Qian, L. & 5 others, Riley, P., Suess, S. T., Tokumaru, M., Welsch, B. T. & Woods, T. N., Dec 2011, In: Solar Physics. 274, 1-2, p. 29-56 28 p.

Ionospheric Day-to-Day Variability Around the Whole Heliosphere Interval in 2008
Wang, W., Lei, J., Burns, A. G., Qian, L., Solomon, S. C., Wiltberger, M. & Xu, J., Dec 2011, In: Solar Physics. 274, 1-2, p. 457-472 16 p.

Causes of low thermospheric density during the 2007-2009 solar minimum
Solomon, S. C., Qian, L., Didkovsky, L. V., Viereck, R. A. & Woods, T. N., 2011, In: Journal of Geophysical Research: Space Physics. 116, 7, A00H07.

Progress in observations and simulations of global change in the upper atmosphere
Qian, L., Laštovička, J., Roble, R. G. & Solomon, S. C., 2011, In: Journal of Geophysical Research: Space Physics. 116, 4 , A00H03.

Variability of thermosphere and ionosphere responses to solar flares
Qian, L., Burns, A. G., Chamberlin, P. C. & Solomon, S. C., 2011, In: Journal of Geophysical Research: Space Physics. 116, 10, A10309.

Anomalously low solar extreme-ultraviolet irradiance and thermospheric density during solar minimum
Solomon, S. C., Woods, T. N., Didkovsky, L. V., Emmert, J. T. & Qian, L., Aug 1 2010, In: Geophysical Research Letters. 37, 16

Flare location on the solar disk: Modeling the thermosphere and ionosphere response
Qian, L., Burns, A. G., Chamberlin, P. C. & Solomon, S. C., 2010, In: Journal of Geophysical Research: Space Physics. 115, 9, A09311.

Model simulation of thermospheric response to recurrent geomagnetic forcing
Qian, L., Solomon, S. C. & Mlynczak, M. G., 2010, In: Journal of Geophysical Research: Space Physics. 115, 10, A10301.

Thermosphere extension of the Whole Atmosphere Community Climate Model
Liu, H. L., Foster, B. T., Hagan, M. E., McInerney, J. M., Maute, A., Qian, L., Richmond, A. D., Roble, R. G., Solomon, S. C., Garcia, R. R., Kinnison, D., Marsh, D. R., Smith, A. K., Richter, J., Sassi, F. & Oberheide, J., 2010, In: Journal of Geophysical Research: Space Physics. 115, 12, A12302.

The effect of carbon dioxide cooling on trends in the F2-layer ionosphere
Qian, L., Burns, A. G., Solomon, S. C. & Roble, R. G., Oct 2009, In: Journal of Atmospheric and Solar-Terrestrial Physics. 71, 14-15, p. 1592-1601 10 p.

Seasonal variation of thermospheric density and composition
Qian, L., Solomon, S. C. & Kane, T. J., Jan 1 2009, In: Journal of Geophysical Research: Space Physics. 114, 1, A01312.

Thermospheric neutral density response to solar forcing
Qian, L., Solomon, S. C., Roble, R. G., Bowman, B. R. & Marcos, F. A., Sep 1 2008, In: Advances in Space Research. 42 , 5, p. 926-932 7 p.

XUV Photometer System (XPS): Improved solar irradiance algorithm using CHIANTI spectral models
Woods, T. N., Chamberlin, P. C., Peterson, W. K., Meier, R. R., Richards, P. G., Strickland, D. J., Lu, G., Qian, L., Solomon, S. C., Iijima, B. A., Mannucci, A. J. & Tsurutani, B. T., Aug 2008, In: Solar Physics. 250, 2, p. 235-267 33 p.

Hydrodynamic planetary thermosphere model: 2. Coupling of an electron transport/energy deposition model
Tian, F., Solomon, S. C., Qian, L., Lei, J. & Roble, R. G., Jul 20 2008, In: Journal of Geophysical Research: Planets. 113, 7, E07005.

Ionospheric annual asymmetry observed by the COSMIC radio occultation measurements and simulated by the TIEGCM
Zeng, Z., Burns, A., Wang, W., Lei, J., Solomon, S., Syndergaard, S., Qian, L. & Kuo, Y. H., Jul 1 2008, In: Journal of Geophysical Research: Space Physics. 113, 7, A07305.

Model simulations of global change in the ionosphere
Qian, L., Solomon, S. C., Roble, R. G. & Kane, T. J., Apr 16 2008, In: Geophysical Research Letters. 35, 7, L07811.

Calculated and observed climate change in the thermosphere, and a prediction for solar cycle 24
Qian, L., Roble, R. G., Solomon, S. C. & Kane, T. J., Dec 16 2006, In: Geophysical Research Letters. 33, 23, L23705.

Solar extreme-ultraviolet irradiance for general circulation models
Solomon, S. C. & Qian, L., 2005, In: Journal of Geophysical Research: Space Physics. 110, A10, A10306.

Test of a convective wake parameterization in the single-column version of CCM3
Rozbicki, J. J., Young, G. S. & Qian, L., Jun 1999, In: Monthly Weather Review. 127, 6 II, p. 1347-1361 15 p.

A convective wake parameterization scheme for use in general circulation models
Qian, L., Young, G. S. & Frank, W. M., Feb 1998, In: Monthly Weather Review. 126, 2, p. 456-469 14 p.

Activities

Seasonal Changes in the Thermosphere from WACCM-X Future 21st Century Projections
McInerney, J. (Speaker), Nossal, S. M. (Speaker) & Qian, L. (Speaker)
Jun 25 2025

•NCAR/HAO John W. Firor Publication Award – 2024, 2012 •NASA Silver Achievement Medal (GOLD Science Team) – 2022 •UCAR Scientific and Technical Advancement Award – 2016 •Walter O. Roberts Scientific and Technical Advancement Award – 2015 •NASA Group Achievement Award (TIMED/SEE Science Team) – 2011 •Editors' Citation for Excellence in Refereeing – Space Weather, 2012

Projects

Collaborative Research: CEDAR--Upper Atmospheric Hydrogen Variability on Timescales from Dusk-Dawn to Multidecadal
Qian, L. (PI)

National Science Foundation
03/1/21 → 03/31/26

THERMOSPHERE-IONOSPHERE RESPONSE TO VARIABILITY OF SOLAR X-RAY AND EUV RADIATION DURING SOLAR FLARES
Qian, L. (PI)
NASA Headquarters
05/5/09 → 05/4/13

Curriculum Vitae Dr. Liying Qian Project Scientist IV High Altitude Observatory (HAO) National Center for Atmospheric Research (NCAR) 3080 Center Green Dr., Boulder, CO 80301 Email: lqian@ucar.edu