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Richard Eckman

Nationality: American | **Phone number:** (+1) 7578502928 (Mobile) | **Email address:** Richard.S.Eckman@nasa.gov | **Email address:** richard.eckman@outlook.com |

Address: 910 Tabb Lakes Dr., 23693, Yorktown, VA, United States (Home)

WORK EXPERIENCE

21 JAN 2025 – CURRENT Hampton, VA, United States

DISTINGUISHED RESEARCH ASSOCIATE NASA LANGLEY RESEARCH CENTER

Following 37 years at NASA Langley and NASA Headquarters, I was appointed as a Distinguished Research Associate (DRA) at NASA Langley Research Center. Langley selects researchers as DRAs (an emeritus position) who are internationally recognized as a result of distinguished contributions to their scientific community.

In this role, I initially will carry out ongoing leadership and coordination activities of my World Meteorological Organization Global Atmosphere Watch (GAW) Expert Team and related WMO Expert Teams and Standing Committees. My duties in the International Ozone Commission (IO3C) will also be maintained.

30 JUL 2009 – 20 JAN 2025 Washington, DC, United States

PROGRAM MANAGER, ATMOSPHERIC COMPOSITION MODELING AND ANALYSIS PROGRAM NASA HEADQUARTERS

The Atmospheric Composition Modeling and Analysis Program (ACMAP) solicits research investigations addressing air quality and oxidation efficiency in the troposphere; how pollution sourced aerosols impact cloud properties, stratospheric chemistry and ozone depletion, and interactions between atmospheric chemistry and the climate. I define and implement the activities of ACMAP through biannual competitive solicitations and extensive community interaction. I also lead a Program to enable U.S. scientists to support foreign Earth science space missions in their development phase (Earth Science U.S. Participating Investigator Program).

Closely related to my program management tasks, I co-chair the World Meteorological Organization (WMO) Global Atmosphere Watch (GAW) Expert Team on Atmospheric Composition Network Design and Evolution (ET-ACNDE) which is assessing the needs of WMO programs for atmospheric composition-related measurements. I also serve as the NASA representative on two other WMO teams. The WMO Expert Team on Satellite Systems and Utilization (ET-SSU) provides advice and support to the development and implementation of the WMO Integrated Global Observing System, while the Standing Committee on Earth Observing Systems and Monitoring Networks (SC-ON) facilitates worldwide cooperation in the establishment and evolution of surface- and space-based observing networks for making available Earth System data to WMO Applications

30 AUG 2010 – 20 JAN 2025 Washington, DC, United States

PROGRAM SCIENTIST, SAGE III ON ISS AND DSCOVR NASA HEADQUARTERS

The Stratospheric Aerosol and Gas Experiment (SAGE) III on the International Space Station (ISS), launched on 19 February 2017, will maintain the long-term record of ozone profile measurements begun by SAGE I in 1979. Solar and lunar occultation products have been released and are publicly available from the NASA Langley Atmospheric Science Data Center.

I'm also the Program Scientist for the NOAA/NASA/USAF Deep Space Climate Observatory (DSCOVR) Earth science instruments. DSCOVR, launched in February 2015, is observing both the Sun and the Earth from the L1 Lagrange point, about 1.5 million km from Earth. Its principal mission is to obtain critical, accurate, and timely forecasts of space weather by observing energetic particles from the Sun. Its Earth science instruments are providing unique full-disk views of the Earth, complementing low-Earth orbit measurements of ozone, aerosols, volcanic ash, and vegetation.

In my program scientist role for these two missions, I am responsible for the solicitation and selection of their science teams and keep NASA management aware of their scientific accomplishments.

14 FEB 1988 – 20 JAN 2025 Hampton, VA, United States

SENIOR RESEARCH SCIENTIST, SCIENCE DIRECTORATE NASA LANGLEY RESEARCH CENTER

I was a member of the Langley 3-D atmospheric modeling group which investigates the interaction between chemical, radiative, and dynamical processes. I maintained and enhanced the chemistry module of a state-of-the-art three-dimensional numerical atmospheric simulation model. I served as principal investigator for a NASA Global Modeling Initiative-funded effort (1999) and as co-investigator for NASA UARS, EOS Interdisciplinary Science, and ACMAP theory programs, publishing results of model studies of atmospheric ozone and the analysis of satellite measurements of trace gases. I utilized the 3-D model to assess the potential impact of a fleet of high speed civil transport aircraft on the stratospheric ozone layer. I participated in the United Nations/Intergovernmental Panel on Climate Change (IPCC) and was a contributing author to the IPCC Special Report "Aviation and the Global Atmosphere" and the NASA High Speed Research Program 1998 stratospheric assessment.

27 FEB 2015 – 30 DEC 2016 Washington, DC, United States

FEDERAL CHAIR, STRATEGIC PLAN UPDATE INTEGRATION TEAM UNITED STATES GLOBAL CHANGE RESEARCH PROGRAM

I chaired an Interagency Team tasked with developing the update to the US Global Change Research Program (USGCRP) Strategic Plan that responds to new priorities and changes in the research landscape since the release of the 2012 Plan. I worked closely with members of the USGCRP National Coordination Office in the process, chairing bi-weekly Team meetings and providing regular briefings to agency principals on the Team's progress. The updated Plan was released in January 2017.

During 2021 and 2022, I also served as the NASA representative on the Interagency Team which developed the latest USGCRP Strategic Plan, which was released at the end of 2022.

30 DEC 2014 – CURRENT

ASSOCIATE EDITOR, ADVANCES IN SPACE RESEARCH COMMITTEE ON SPACE RESEARCH (COSPAR)

The COSPAR publication Advances in Space Research (ASR) is an open journal covering all areas of space research including: space studies of the Earth's surface, meteorology, climate, the Earth-Moon system, planets and small bodies of the solar system, upper atmospheres, ionospheres and magnetospheres of the Earth and planets including reference atmospheres, space plasmas in the solar system, astrophysics from space, materials sciences in space, fundamental physics in space, space debris, space weather, earth observations of space phenomena, etc. I handle manuscripts related to atmospheric composition, ensure their timely peer review, and make decisions on publication fitness.

30 DEC 2009 – 13 MAY 2015

CO-CHAIR, ATMOSPHERIC COMPOSITION VIRTUAL CONSTELLATION COMMITTEE ON EARTH OBSERVATION SATELLITES

The goal of the CEOS Atmospheric Composition Virtual Composition (AC-VC) is to collect and deliver data to improve monitoring, assessment and predictive capabilities for changes in the ozone layer, air quality and climate forcing associated with changes in the environment through coordination of existing and future international space assets. The AC-VC directly addresses the Societal Benefit Areas of Disasters, Health, Energy, Climate, and Ecosystems.

AC-VC activities under my leadership have improved the creation of critical ozone climate data records, enhanced the coordination of a constellation of geostationary air-quality measurement satellites (with two presently in orbit), educated the community on the looming gap of limb-sounding measurements that are critical for the elucidation of chemistry/climate interactions, and had begun the coordination of an emerging constellation of greenhouse gas measuring satellites.

While I have stepped down as the AC-VC co-chair after more than 5 years, I continue to be an active contributor to its tasks and participate in its annual meetings.

EDUCATION AND TRAINING

29 AUG 1980 – 29 JUL 1985 Boulder, CO, United States

PHD, ASTROPHYSICAL, PLANETARY, AND ATMOSPHERIC SCIENCES University of Colorado

29 AUG 1976 – 29 MAY 1980 Philadelphia, PA, United States

BA, PHYSICS AND ASTRONOMY University of Pennsylvania

LANGUAGE SKILLS

Mother tongue(s): **ENGLISH**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
FRENCH	A2	A2	A2	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

Selected Publications

1. Rusch, D. W., C. H. Mount, C. A. Barth, C. J. Rottman, R. I. Thomas, R. J. Sanders, G. M. Lawrence, and R. S. Eckman: Ozone Densities in the Lower Mesosphere Measured by a Limb Scanning Ultraviolet Spectrometer, Geophys. Res. Lett., 10, 241-244, 1983.

2. Solomon, S., D. W. Rusch, R. J. Thomas, and R. S. Eckman: Comparison of Mesospheric Ozone Abundances Measured by the Solar Mesosphere Explorer and Model Calculations, Geophys. Res. Lett., 10, 249-252, 1983.

3. Fortune, H. T., and R. S. Eckman: $^{14}N(^{7}Li,p)^{20}F$: Ex = 4.5-9.0 MeV, Phys. Rev. C, 31, 2076-2081, 1985.

4. Eckman, R. S.: A Theoretical and Observational Investigation of the Response of Ozone to Short-Term Variations in the Solar Ultraviolet Irradiance, Ph.D. thesis, University of Colorado, Boulder, 1985.

5. Rusch, D. W. and R. S. Eckman: Implications of the Comparison of Ozone Abundances Measured by Solar Mesosphere Explorer to Model Calculations, J. Geophys. Res., 90, 12,991-12,998, 1985.

6. Eckman, R. S.: Response of Ozone to Short-Term Variations in the Solar Ultraviolet Irradiance, 1, A Theoretical Model, J. Geophys. Res., 91, 6695-6704, 1986.

7. Eckman, R. S.: Response of Ozone to Short-Term Variations in the Solar Ultraviolet Irradiance, 2, Observations and Interpretation, J. Geophys. Res., 91, 6705-6721, 1986.

8. Clancy, R. T., D. W. Ruse, R. J. Thomas, M. Allen, and R. S. Eckman: Model Ozone Photochemistry on the Basis of Solar Mesosphere Explorer Mesospheric Observations, J. Geophys. Res., 92, 3067-3080, 1987.

9. Eckman, R. S., J. D. Haigh, and J. A. Pyle: An Important Uncertainty in coupled Chlorine-Carbon Dioxide Studies of Possible Atmospheric Ozone Modification, Nature, 329, 616-618, 1987.

10. Eckman, R. S. and J. A. Pyle: Numerical Modelling of Ozone Perturbations, in Ozone Depletion: Health and Environmental Consequences, edited by R. R. Jones and T. Wigley, pp. 27-42, J. Wiley, New York, 1989.

11. Turner, R. E., W. L. Grose, W. T. Blackshear, and R. S. Eckman: A Three-Dimensional Model Simulation of Ozone in the Stratosphere, in Ozone in the Atmosphere, edited by R. D. Bojkov and P. Fabian, pp. 630-633, A Deepak Publishing, Hampton, VA, 1989.

12. Grose, W. L., R. S. Eckman, R. E. Turner, and W. T. Blackshear: Global Modeling of Ozone and Trace Gases, in Atmospheric Ozone Research and its Policy Implications, edited by T. Schneider et al., pp. 1021-1035, Elsevier Science Publishers, Amsterdam, 1989.

13. Chipperfield, M. P., R. S. Eckman, L. J. Gray, J. D. Haigh, and J. A. Pyle: On the Two-Dimensional Modelling of the Stratosphere, in Ozone in the Atmosphere, edited by R. D. Bojkov and P. Fabian, pp. 585-588, A. Deepak Publishing, Hampton, VA, 1989.

14. Eckman, R. S., R. E. Turner, W. T. Blackshear, T. D. A. Fairlie, and W. L. Grose: Some Aspects of the Interaction Between Chemical and Dynamical Processes Relating to the Antarctic Ozone Hole, Adv. Space Research, 13, 311-319, 1992.

15. Siskind, D. E., K. Minschwaner, and R. S. Eckman, Photodissociation of O2 and H2O in the middle atmosphere: Comparison of numerical methods and impact on model O3 and OH, Geophys. Res. Lett., 21, 863-866, 1994.

16. Remsberg, E. E., P. P. Bhatt, R. S. Eckman, L. L. Gordley, J. M. Russell III, and D. E. Siskind: Effect of the HITRAN 92 Spectral Data on the Retrieval of NO2 Mixing Ratios from Nimbus 7 LIMS, J. Geophys. Res., 99, 22,965-22,973, 1994.

17. Siskind, D. E., B. J. Connor, R. S. Eckman, E. E. Remsberg, J. J. Tsou, A. Parrish: An Intercomparison of Model Ozone Deficits in the Upper Stratosphere and Mesosphere From Two Datasets, J. Geophys Res., 100, 11,191-11,201, 1995.

18. Eckman, R. S., W. L. Grose, R. E. Turner, W. T. Blackshear, J. M. Russell III, L. Froidevaux, J. W. Waters, J. B. Kumer and A. E. Roche: Stratospheric Trace Constituents Simulated by a Three-Dimensional General Circulation Model: Comparison with UARS Data, J. Geophys. Res., 100, 13,951-13,966, 1995.

19. Eckman, R. E., W. L. Grose, R. E. Turner, and W. T. Blackshear: Polar Ozone Depletion: A Three-dimensional Chemical Modeling Study of its Long-Term Global Impact, J. Geophys. Res., 101, 22,977-22,989, 1996.

20. Sandor, B. J., R. T. Clancy, D. W. Rusch, C. E. Randall, R. S. Eckman, D. S. Siskind, and D. O. Muhleman: Microwave Observations and Modeling of O2(1A) and O3 Diurnal Variation in the Mesosphere, J. Geophys. Res., 102, 9013-9028, 1997.

21. Fairlie, T. D., W. L. Grose, R. B. Pierce, and R. S. Eckman: A Three-Dimensional Simulation of Stratospheric Ozone Using a Coupled Dynamics, Chemistry and Radiation Model: Deactivation of Inorganic Chlorine Following Antarctic Ozone Depletion, in Atmospheric Ozone, Vol. 2, edited by R. D. Bojkov and G. Visconti, pp. 701-710, Edigrafital S.P.A., S. Atto, Italy, 1998.

22. Grose, W. L., T. D. Fairlie, R. B. Pierce, and R. S. Eckman: A Three-Dimensional Model Simulation of Ozone Transport in the Stratosphere, in Atmospheric Ozone, Vol. 2, edited by R. D. Bojkov and G. Visconti, pp. 731-734, Edigrafital S.P.A., S. Atto, Italy, 1998.

23. Pierce, R. B., J. A. Al-Saadi, T. D. Fairlie, J. R. Olson, R. S. Eckman, W. L. Grose, G. S. Lingenfelser, J. M. Russell III, Large-scale stratospheric ozone photochemistry and transport during the POLARIS campaign, J. Geophys. Res., 104, 26,525-26,545, 1999.

24. Pierce, R. B., J. A. Al-Saadi, R. S. Eckman, T. D. Fairlie, W. L. Grose, M. M. Kleb, M. Natarajan, J. R. Olson, Dynamical climatology of the NASA Langley Research Center Interactive Modeling Project for Atmospheric Chemistry and Transport (IMPACT) model, J. Geophys. Res., 105, 29,109-29,134, 2000.

25. Eckman, R. S. and P. W. Stackhouse, Jr.: Informing Decision Making in the Energy Sector Using NASA Spaceborne Observations and Model Predictions, in *The Full Picture*, edited by Group on Earth Observations Secretariat, pp. 195-197, Tudor Rose, UK, 2007.

26. Zell, E., J. Engel-Cox, R. Eckman, and P. Stackhouse, Jr.: Application of Satellite Sensor Data and Models for Energy Management, *IEEE J. Sel. Topics Appl. Earth Observ.*, 1, 5-17, 2008.

27. Eckman, R. S. and P. W. Stackhouse, Jr.: CEOS contributions to informing energy management and policy decision making using space-based Earth observations, Appl. Energy, doi:10.1016/j.apenergy.2011.03.001, 2011.