Stephen S. Leroy, PhD

Climate, Atmospheric, and Remote Sensing Scientist
Manager, Modeling and Advanced Remote Sensing Group
Research and Development Division

Dr. Stephen Leroy is a Principal Scientist in the Research and Development Division of AER since 2017. He leads the Modeling and Advanced Remote Sensing group. His primary research interests are climate monitoring and prediction, remote sensing in the thermal infrared and with the Global Navigation Satellite Systems, and atmospheric processes. He has published on the following topics:

- Propagation of internal gravity waves in Venus's atmosphere
- GNSS radio occultation
- Climate monitoring and inference studies
- Creation of Earth science data sets

He was fundamental in the design and establishment of the Climate Absolute Radiance and Refractivity Observatory (CLARREO), which would have been NASA's first climate monitoring mission. He developed climate and spectral fingerprinting as a means to constrain Earth's equilibrium climate sensitivity. Finally, he is one of the forefathers of the development of the GNSS radio occultation remote sensing technique.

Education

- PhD and MSc, Planetary Science, California Institute of Technology
- BA, Physics, Cornell University

Memberships

- Phi Beta Kappa
- Sigma Xi
- American Geophysical Union (AGU)
- American Meteorological Society (AMS)

For a list of publications, see: https://orcid.org/0000-0003-4862-4755

Dr. Leroy's current projects, and their primary objectives, include:

- Spectral fingerprinting using thermal infrared and passive microwave sounding.
- "GNSS Radio Occultation in the AWS Cloud".
- "Retrieving Water Vapor in the Planetary Boundary Layer by Fusing GNSS Radio Occultation and Nadir Microwave Radiance".
- The commercialization of GNSS radio occultation.

Dr. Leroy obtained his Ph.D. in planetary science of the California Institute of Technology, where he developed a theory for the generation of internal gravity waves in Venus's atmosphere and how they could redistribute momentum to possibly drive Venus's atmospheric super-rotation. As a postdoc and scientist at the NASA Jet Propulsion Laboratory for 10 years, he helped develop GPS radio occultation as a remote sensing technique, he supported the implementation and deployment of the Atmospheric Infrared Sounder (AIRS) as a member of its science integration team, and he developed the theory of optimal detection for the sake of detecting climate change and ascribing it to various causes. As a project scientist at Harvard for 13 years, he developed the mission concept for CLARREO and participated in its design. He is an active member of several communities with NASA, presently the Decadal Survey Incubator and the Sounder Science teams.