

Jean-Paul Vernier (Research Associate)
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HIGHLIGHTS

- ❖ 62 peer-reviewed publications since 2009 (h-index=32, citations=5000) and 64 oral communications
- ❖ Principal Investigator of 6 NASA-funded airborne missions since 2014
- ❖ Awarded 7 times through the NASA Group achievement award program since 2015
- ❖ Contributing author of the Intergovernmental of Climate Change Report; AR5 climate report
- ❖ WMO-APARC-SSiRC Volcano Response co-lead
- ❖ Frequent reviewer of international journals (ACP, Science, Nature)
- ❖ Co-guide for 2 PhD students and main guide of 2 Postdocs since 2016
- ❖ Working with multiple institutions in Brazil, India, France and the USA.
- ❖ Discovery of the Asian Tropopause Aerosol Layer

Research experiences and educations

- National Institute of Aerospace at NASA Langley (2016-now)

Researcher, Senior Researcher, Research Associate positions. Balloon-borne instruments developments, campaign deployments in India, Brazil, USA and France and cooperations with multiple institutes. Satellite expert in aerosol remote sensing. Founder of the Balloon Network for stratospheric aerosol Observation project. Recognized through multiple NASA awards.

- Science System and Applications, Inc. at NASA Langley (2012-2016)

Junior Researcher working on algorithm development to retrieve optical properties of stratospheric aerosols using satellite observations (CALIPSO, SAGE III/ISS). Principal Investigator of the Balloon measurement campaign of the Asian Tropopause Layer since 2014. Organized multiple balloon deployments in Australia and India to study volcanic plume properties and Asian pollution transport in the stratosphere.

- NASA Postdoctoral Fellowship at Langley Research Center (2010-2012)

Algorithm development for stratospheric aerosol detection with the CALIPSO space-borne lidar. Trend analysis of stratospheric aerosol using multiple satellite observations. First discovery of the Asian Tropopause Aerosol Layer using the CALIPSO satellite later confirmed with airborne measurements. First papers shows that moderate volcanic eruptions can impact significantly the climate system and significantly contributed to global warming apparent plateau in early 2000's.

- University of Versailles, France, 2006-2010, Ph.D. in Atmospheric Sciences

Analysis of balloon data obtained during the international SCOUT-AMMA campaign. Algorithm development for stratospheric aerosol detection with the CALIPSO space-borne lidar. Satellite calibration improvement using new techniques.

- University of Toulon, France, 2003-2006

M.S. in Coastal Meteorology and Oceanography at University of Toulon

Engineering Diploma from ISITV (Toulon)

Master training at AtmoSud. (Marseille) to study the effect of sea-land breeze interaction on atmospheric pollutants. Master Training at the National Institute of Oceanography/India/Goa to study moisture flux across the Bay of Bengal and precipitation along the Indian West Coast.

Research publications

Co-author of 62 peer review papers: h-index=32; i-10=49 and 5000 citations on google scholar
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source: <https://scholar.google.com/citations?user=szsAY4YAAAAJ&hl=en>

- Selected major papers published in 3 main research activities

➤ Volcanic eruptions, stratospheric aerosols and climate:

Vernier, J-P, Thomason, L. W., Pommereau, J.-P., Bourassa, A., Pelon, J., Garnier, A., ... Others. (2011). Major influence of tropical volcanic eruptions on the stratospheric aerosol layer during the last decade. *Geophysical Research Letters*, 38. **399 citations. Best NASA Langley paper in 2013.**

Solomon, S., Daniel, J. S., Iii, R. R. N., Vernier, J.-P., Dutton, E. G., & Thomason, L. W. (2011). The persistently variable “background” stratospheric aerosol layer and global climate change. *Science*, 333, 866–870. **645 citations**

Vernier, Jean-Paul, Aubry, T. J., Timmreck, C., Schmidt, A., Clarisse, L., Prata, F., ... Others. (2023). The 2019 Raikoke eruption as a testbed used by the Volcano Response group for rapid assessment of volcanic atmospheric impacts. *Atmospheric Chemistry and Physics*, 24, 5765–5782. **Summary paper of the VolRes activity involving more than 200 researchers.**

Kremser, S., Thomason, L. W., von Hobe, M., Hermann, M., Deshler, T., Timmreck, C., ... Vernier, J.-P. and Others. (2016). Stratospheric aerosol—Observations, processes, and impact on climate. *Reviews of Geophysics*, 54, 278–335. **404 citations. Co-lead and co-founder of SSiRC.**

➤ Asian Pollution transport in the stratosphere: ATAL

Vernier, J.-P., Thomason, L. W., & Kar, J. (2011). CALIPSO detection of an Asian tropopause aerosol layer. *Geophysical Research Letters*, 38. doi:10.1029/2010GL046614. **227 citations. Discovery and naming of the ATAL**

Vernier, J-P, Fairlie, T. D., Natarajan, M., Wienhold, F. G., Bian, J., Martinsson, B. G., ... Bedka, K. M. (2015). Increase in upper tropospheric and lower stratospheric aerosol levels and its potential connection with Asian pollution. *Journal of Geophysical Research: Atmospheres*, 120, 1608–1619. **Study of the ATAL, trend analysis, estimated climate impacts. 173 citations.**

Fadnavis, S., Sabin, T. P., Roy, C., Rowlinson, M., Rap, A., Vernier, J.-P., & Sioris, C. E. (2019). Elevated aerosol layer over South Asia worsens the Indian droughts. *Scientific Reports*, 9, 10268. **The ATAL and its impact on precipitation. 36 citations**

➤ Satellite retrievals and Balloon deployments (to highlight measurement techniques)

Vernier, Jean-Paul, Pommereau, J.-P., Garnier, A., Pelon, J., Larsen, N., Nielsen, J., ... Others. (2009). Tropical stratospheric aerosol layer from CALIPSO lidar observations. *Journal of Geophysical Research: Atmospheres*, 114. **143 citations. First CALIPSO algorithm to detect stratospheric aerosol/Improve calibration.**

Vernier, J-P, Fairlie, T. D., Deshler, T., Ratnam, M. V., Gadhavi, H., Kumar, B. S., ... Others. (2018). BATAL: The balloon measurement campaigns of the Asian tropopause aerosol layer. *Bulletin of the American Meteorological Society*, 99, 955–973. **90 citations. Major effort with 13 institutes in US, France, India, Saudi-Arabia, Switzerland.**

Dumelié, N., Vernier, J.-P., Berthet, G., Vernier, H., Renard, J.-B., Rastogi, N., ... Others. (2024). Toward Rapid balloon Experiments for sudden Aerosol injection in the Stratosphere (REAS) by volcanic eruptions and wildfires. *Bulletin of the American Meteorological Society (BAMS)*.

- **Contributing author of the IPCC AR-5 report, 2014 WMO ozone assessment and reviewer of the 2022 WMO ozone assessment.**

Conference, Seminar and Education experiences

64 oral presentations/Posters (lead author/co-author) since 2009 in major conferences

➤ Seminars/Summer schools

- **Hampton University/USA**, Atmospheric & Planetary Science/November 2017: The Impact of the Summer Asian Monsoon on UTLS aerosols: Satellite observations, balloon measurements and Model simulations
- **ETH/Zurich/Switzerland**/May 2018: Stratospheric aerosol variabilities and climate impacts
- King Abdullah University of Science and Technology/Winter enrichment program/November 2016: the Asian Tropopause Aerosol Layer discovery and implications
- **Maido Observatory Summer School (MOSS) 2024**: Invited talks on history and perspective of satellite observations, 16 years of CALIPSO observations to unveil the 3D structure of the atmosphere
- **Community Climate Intervention Strategies** seminar/NCAR/USA, July 2020, Natural analogues to geoengineering
- **NASA Ames**, November 2022, Global Changes in Stratospheric Aerosols from Observations for staff members and students.

Awards and recognition

I received **7 NASA group achievement awards** and 1 publication award at NASA Langley

- CALIPSO (in 2012 and 2024); for producing the first long-term 3D dataset of cloud and aerosol layers using the Cloud-Aerosol Lidar and InfraRed Pathfinder (CALIPSO)
- SEAC4RS (2013); for providing satellite analysis and support to the Studies of Emissions, Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys.
- KLASH (2014); (Principal Investigator); for deploying rapidly to study the properties of the Kelud volcanic Ash cloud
- SAGE III/ISS (2017); for preparing the validation of the Stratospheric Aerosol and Gas Experiment III/ISS
- BATAL (2018); (Principal Investigator); for deploying and collaborating with multiple organizations in Asia to study pollution transport into the stratosphere during the Balloon measurement campaign of the Asian Tropopause Aerosol Layer
- Reid Award for best paper at NASA Langley: recipient of the H. J. E. Reid Award for an outstanding paper entitled “Major influence of tropical volcanic eruption on the stratospheric aerosol during the last decade.” <http://www.nasa.gov/larc/2013-honor-awards-speak-to-vitality-or-center/#.UoTtGxZIRR8>

Summary of education, research activities and publications

Dr. Vernier earned his PhD from the University of Versailles (France) in 2010 using balloon-borne measurements and satellite observations to investigate the distribution and properties of aerosols in the atmosphere. His research relied on developing retrieval algorithms to study volcanic aerosols using satellite sensors (Vernier et al., 2009). His work provided better understandings of the role of mid-size tropical volcanic eruptions on the stratospheric aerosol budget (Vernier et al.,

2011) which contributed to slow down global warming between 2000 and 2010. From 2010 to 2012, Dr. Vernier was awarded a NASA postdoctoral fellowship at NASA Langley Research Center (Hampton, VA). He discovered the Asian Tropopause Aerosol Layer, a new phenomenon linked to the transport of Asian Pollution into the stratosphere (Vernier et al., 2011, 2018). Since 2017, he is employed by the National Institute of Aerospace and study the impacts of Natural Disasters and Pollution on atmospheric composition, air quality and climate. He received the 2013 H.J.E. Reid award for the most significant paper at NASA Langley. He served as Science Principal Investigators of 6 NASA-funded international field missions since 2014 and he has been the Principal Investigator of 5 NASA Roses projects with a total budget of 3.7 million (\$). He led the NASA Disasters program responses after the 2018 Kilauea eruption (Vernier et al., 2020) and the 2019/2020 Australian Fires.