

# Daniele Vioni

## Curriculum Vitae

### Education and Training

- Ongoing **Postdoc Leadership Program**, *Cornell University*, Ithaca.
- Nov 2015-Oct 2018 **PhD with Honours in Atmospheric Physics and Chemistry**, *University of L'Aquila*, L'Aquila.  
Thesis: A climate engineering technique for a warming planet: stratospheric sulfur injection as a temporary solution to greenhouse gases increase.
- 2013-2015 **Master Degree in Physics**, *University of L'Aquila*, Under a two-year GSSI Excellence Scholarship, 110/110, Curriculum in Atmospheric Physics.
- 2009-2013 **Bachelor Degree in Physics**, *University of L'Aquila*, L'Aquila, 102/110.

### Professional appointments

- Nov 2018-Current **Post-doctoral Associate**, *Cornell University - Sibley School of Mechanical and Aerospace Engineering*, Ithaca (NY), USA, Supervisor: prof. Douglas MacMartin.
- Nov 2015-Oct 2018 **Ph.D. Fellow in Atmospheric Physics and Chemistry**, *University of L'Aquila*, Italy, Supervisor: prof. Giovanni Pitari.
- Jan-Mar 2018 **Visiting Scientist**, *NCAR*, Boulder (CO), USA, Supervisor: dr. Simone Tilmes.
- June-Sep 2017 **Visiting Scientist**, *NASA GSFC - Earth Science Division*, Greenbelt (MD), USA, Supervisor: prof. Valentina Aquila.

### Teaching and mentoring activities

- Sept 2020-Current **LeadTheFuture STEM Mentorship Program**, *LeadTheFuture*.  
Mentoring Italian Bachelor and Master students in STEM programs
- Aug 2019-Current **GSMU Mentorship Program**, *Cornell University*.  
Mentoring first generation college students with an interest in pursuing a PhD
- March-July 2017, 2018 **Assistant professor - Magnetism and Electricity Lab**, *BD in Physics - II year*, Department of Physical and Chemical Sciences, *University of L'Aquila*.
- Sept-Dec 2017 **Assistant professor - General physics**, *BD in Biology - I year*, Department of Medicine and Life Sciences, *University of L'Aquila*.

### Research Support Grants

- 2020 **SilverLining Safe Climate Research Initiative**, *GAUSS: Geoengineering Assessment across Uncertainty, Scenarios, and Strategies*, PI: D.G. MacMartin.  
I performed most of the preliminary research that lead to the award and helped with presenting the results to interested donors. (video)
- 2020 **NSF Award CBET-2038246**, *Fundamental limits and trade-offs of stratospheric aerosol geo-engineering*, PI: D.G. MacMartin; co-PI: B. Kravitz.  
I performed most of the preliminary research that lead to the award and helped with the writing of the grant.

### Scholarships and Awards

Nov 2015-Oct 2018 **Ph.D. scholarship from the Italian Ministry of Education, University, and Research**, First ranked among the candidates in Physics and Chemistry at the University of L'Aquila.

## Professional Activities and Scientific Leadership

- Feb 2021- Ongoing **NCAR HPC User Group Advisor**, *National Center for Atmospheric Research*, <https://www2.cisl.ucar.edu/user-support/ncar-hpc-user-group>.  
High Performance Computing User Group Advisor at the Computational and Information Systems Lab
- Dec 2020- Ongoing **EGUsphere Moderator**, *European Geophysical Union*, [www.egusphere.net/](http://www.egusphere.net/).  
Moderator for the not-for-profit scientific repository of the EGU, bringing together all preprints submitted to EGU journals.
- Aug 2020- Ongoing **Project leader**, *Geoengineering Model Intercomparison Project*, [geomip.org](http://geomip.org).  
Coordinating modeling groups, devising modeling experiments, organizing GeoMIP meetings, liaising with WCRP and CMIP, as well as other external groups.
- June 27-28, 2020\* **Gordon Research Seminar on Climate Engineering**, *Co-chair*, Sunday River-Newry, ME, USA,  
\*postponed to 2022 due to COVID-19.
- 9-13 Dec 2019 **AGU Fall Meeting 2019**, *Session convener - Solar Geoengineering Benefits and Risks: Modeling, Impacts, Analogs, Engineering, Ethics, and Governance*, San Francisco, USA, Program [here](#).
- Aug 28-Sept 2, 2016 **ISSAOS 2016-Advanced Programming Techniques for the Earth System Science**, *Organising committee*, L'Aquila.
- 2017- Ongoing **Reviewer for Scientific Journals**, I am an active reviewer for various journals in the field of atmospheric physics and chemistry: *Advances in Atmospheric Sciences* (1), *Atmosphere* (10), *Atmospheric Chemistry and Physics* (7), *Climate* (2), *Earth's Future* (1), *Earth-Science Reviews* (1), *Earth System Dynamics* (1), *Nature Communications* (2), *Journal of Geophysical Research: Atmosphere* (8).

## Publications

### Climate Engineering

1. 2021 **Is Turning Down the Sun a Good Proxy for Stratospheric Sulfate Geoengineering?**, **Visioni, D.**, MacMartin, D. G., Kravitz, B., *Journal of Geophysical Research: Atmospheres*, 126, e2020JD033952. <https://doi.org/10.1029/2020JD033952>.
2. 2020 **Reduced poleward transport due to stratospheric heating under stratospheric aerosols geoengineering**, **Visioni, D.**, MacMartin, D. G., Kravitz, B., Lee, W., Simpson, I. R., and Richter, J. H., *Geophysical Research Letters*, 47, e2020GL088 337, doi:10.1029/2020GL089470, <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2020GL089470>.
3. 2020 **Seasonally Modulated Stratospheric Aerosol Geoengineering Alters the Climate Outcomes**, **Visioni, D.**, MacMartin, D. G., Kravitz, B., Richter, J. H., Tilmes, S., and Mills, M. J., *Geophysical Research Letters*, 47, e2020GL088 337, doi:10.1029/2020GL088337, <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2020GL088337>.
4. 2020 **What goes up must come down: impacts of deposition in a sulfate geoengineering scenario**, **Visioni, D.**, Slessarev, E., MacMartin, D., Mahowald, N. M., Goodale, C. L., and Xia, L., *Environmental Research Letters*, 15(9), <http://iopscience.iop.org/10.1088/1748-9326/ab94eb>.
5. 2020 **Expanding the Design Space of Stratospheric Aerosol Geoengineering to Include Precipitation-Based Objectives and Explore Trade-offs**, Lee, W., MacMartin, D. G., **Visioni, D.**, Kravitz, B., *Earth Syst. Dynam.*, 11, 1051–1072, <https://doi.org/10.5194/esd-11-1051-2020>.
6. 2019 **Seasonal Injection Strategies for Stratospheric Aerosol Geoengineering**, **Visioni, D.**, MacMartin, D. G., Kravitz, B., Tilmes, S., Mills, M. J., Richter, J. H., Boudreau, M., *Geophysical Research Letters*, 46, 7790-7799. <https://doi.org/10.1029/2019GL083680>.

7. 2019 **Stratospheric Sulfate Aerosol Geoengineering Could Alter the High Latitude Seasonal Cycle**, Jiang, J., Cao, L., MacMartin, D. G., Simpson, I. R., Kravitz, B., Cheng, W., **Visioni, D.**, Tilmes, S., Richter, J. H., Mills, M. J., *Geophysical Research Letters*, 46, 7790-7799. <https://doi.org/10.1029/2019GL083680>.
  8. 2018 **Upper tropospheric ice sensitivity to sulfate geoengineering**, **Visioni, D.**, Pitari, G., di Genova, G., Tilmes, S., and Cionni, I., *Atmospheric Chemistry and Physics*, 18, 14867-14887, <https://doi.org/10.5194/acp-18-14867-2018>.
  9. 2018 **Sulfur deposition changes under sulfate geoengineering conditions: quasi-biennial oscillation effects on the transport and lifetime of stratospheric aerosols**, **Visioni, D.**, Pitari, G., Tuccella, P., and Curci, G., *Atmospheric Chemistry and Physics*, 18, 2787-2808, doi:10.5194/acp-18-2787-2018, <https://www.atmos-chem-phys.net/18/2787/2018/>.
  10. 2017 **Sulfate Geoengineering Impact on Methane Transport and Lifetime: Results from the Geoengineering Model Intercomparison Project (GeoMIP)**, **Visioni, D.**, Pitari, G., Aquila, V., Tilmes, S., Cionni, I., Di Genova, G., and Mancini, E., *Atmospheric Chemistry and Physics*, 17, 11 209-11 226, doi:10.5194/acp-17-11209-2017, <https://www.atmos-chem-phys.net/17/11209/2017/>.
  11. 2017 **Sulfate geoengineering: a review of the factors controlling the needed injection of sulfur dioxide**, **Visioni, D.**, Pitari, G., and Aquila, V., *Atmospheric Chemistry and Physics*, 17, 3879-3889, doi:10.5194/acp-17-3879-2017, 2017.
- Effect of Volcanic Eruptions on Climate
12. 2016 **Sulfate aerosols from non-explosive volcanoes: Chemical- radiative effects in the troposphere and lower stratosphere**, Pitari, G., **Visioni, D.**, Mancini, E., Cionni, I., Di Genova, G., and Gandolfi, I., *Atmosphere*, 7, doi:10.3390/atmos7070085.
  13. 2016 **Stratospheric aerosols from major volcanic eruptions: A composition-climate model study of the aerosol cloud dispersal and e-folding time**, Pitari, G., Genova, G. D. G., Mancini, E., **Visioni, D.**, Gandolfi, I., and Cionni, I., *Atmosphere*, 7, doi:10.3390/atmos7060075, 20.
  14. 2016 **Impact of stratospheric volcanic aerosols on age-of-air and transport of long-lived species**, Pitari, G., Cionni, I., Di Genova, G., **Visioni, D.**, Gandolfi, I., and Mancini, E., *Atmosphere* 2016, 7(11), 149; <https://doi.org/10.3390/atmos7110149>.
- Atmospheric dynamics and composition
15. 2019 **Clear-sky ultraviolet radiation modelling using output from the Chemistry Climate Model Initiative**, Lamy, K., Portafaix, T., Josse, B., Brogniez, C., Godin-Beekmann, S., Bencherif, H., Revell, L., Akiyoshi, H., Bekki, S., Hegglin, M. I., Jockel, P., Kirner, O., Liley, B., Marecal, V., Morgenstern, O., Stenke, A., Zeng, G., Abraham, N. L., Archibald, A. T., Butchart, N., Chipperfield, M. P., Di Genova, G., Deushi, M., Dhomse, S. S., Hu, R.-M., Kinnison, D., Kotkamp, M., McKenzie, R., Michou, M., O'Connor, F. M., Oman, L. D., Pitari, G., Plummer, D. A., Pyle, J. A., Rozanov, E., Saint-Martin, D., Sudo, K., Tanaka, T. Y., **Visioni, D.**, and Yoshida, K., *Atmospheric Chemistry and Physics*, 19, 10 087-10 110, doi:10.5194/acp-19-10087-2019, <https://www.atmos-chem-phys.net/19/10087/2019/>.
  16. 2019 **The effect of atmospheric nudging on the stratospheric residual circulation in chemistry-climate models**, Chrysanthou, A., Maycock, A. C., Chipperfield, M. P., Dhomse, S., Garny, H., Kinnison, D., Akiyoshi, H., Deushi, M., Garcia, R. R., Jockel, P., Kirner, O., Pitari, G., Plummer, D. A., Revell, L., Rozanov, E., Stenke, A., Tanaka, T. Y., **Visioni, D.**, and Yamashita, Y., *Atmospheric Chemistry and Physics*, 19, 11 559-11 586, doi:10.5194/acp-19-11559-2019.

17. 2019 **The influence of mixing on the stratospheric age of air changes in the 21st century**, Eichinger, R., Dietmuller, S., Garny, H., Sacha, P., Birner, T., Bonisch, H., Pitari, G., **Visioni, D.**, Stenke, A., Rozanov, E., Revell, L., Plummer, D. A., Jockel, P., Oman, L., Deushi, M., Kinnison, D. E., Garcia, R., Morgenstern, O., Zeng, G., Stone, K. A., and Schofield, R., *Atmospheric Chemistry and Physics*, 19, 921-940, doi:10.5194/acp-19-921-2019, <https://www.atmos-chem-phys.net/19/921/2019/>.
18. 2018 **Stratospheric ozone loss over the Eurasian continent induced by the polar vortex shift**, Zhang, J., Tian, W., Xie, F., Chipperfield, M. P., Feng, W., Son, S.-W., Abraham, N. L., Archibald, A. T., Bekki, S., Butchart, N., Deushi, M., Dhomse, S., Han, Y., Jockel, P., Kinnison, D., Kirner, O., Michou, M., Morgenstern, O., O'Connor, F. M., Pitari, G., Plummer, D. A., Revell, L. E., Rozanov, E., **Visioni, D.**, Wang, W., and Zeng, G., *Nature Communications*, 9, 206, doi:10.1038/s41467-017-02565-2.
19. 2018 **Revisiting the Mystery of Recent Stratospheric Temperature Trends**, Maycock, A. C., Randel, W. J., Steiner, A. K., Karpechko, A. Y., Christy, J., Saunders, R., Thompson, D. W. J., Zou, C.-Z., Chrysanthou, A., Luke, A. N., Akiyoshi, H., Archibald, A. T., Butchart, N., Chipperfield, M., Dameris, M., Deushi, M., Dhomse, S., Genova, G. D., Jockel, P., Kinnison, D. E., Kirner, O., Ladstadter, F., Michou, M., Morgenstern, O., O'Connor, F., Oman, L., Pitari, G., Plummer, D. A., Revell, L. E., Rozanov, E., Stenke, A., **Visioni, D.**, Yamashita, Y., and Zeng, G., *Geophysical Research Letters*, 0, doi:10.1029/2018GL078035.
20. 2018 **Estimates of ozone return dates from Chemistry- Climate Model Initiative simulations**, Dhomse, S. S., Kinnison, D., Chipperfield, M. P., Salawitch, R. J., Cionni, I., Hegglin, M. I., Abraham, N. L., Akiyoshi, H., Archibald, A. T., Bednarz, E. M., Bekki, S., Braesicke, P., Butchart, N., Dameris, M., Deushi, M., Frith, S., Hardiman, S. C., Hassler, B., Horowitz, L. W., Hu, R.-M., Jockel, P., Josse, B., Kirner, O., Kremser, S., Langematz, U., Lewis, J., Marchand, M., Lin, M., Mancini, E., Marecal, V., Michou, M., Morgenstern, O., O'Connor, F. M., Oman, L., Pitari, G., Plummer, D. A., Pyle, J. A., Revell, L. E., Rozanov, E., Schofield, R., Stenke, A., Stone, K., Sudo, K., Tilmes, S., **Visioni, D.**, Yamashita, Y., and Zeng, G., *Atmospheric Chemistry and Physics*, 18, 8409-8438, doi:10.5194/acp-18-8409-2018, <https://www.atmos-chem-phys.net/18/8409/2018/>.
21. 2018 **Quantifying the effect of mixing on the mean age of air in CCMVal-2 and CCMI-1 models**, Dietmuller, S., Eichinger, R., Garny, H., Birner, T., Boenisch, H., Pitari, G., Mancini, E., **Visioni, D.**, Stenke, A., Revell, L., Rozanov, E., Plummer, D. A., Scinocca, J., Jockel, P., Oman, L., Deushi, M., Kiyotaka, S., Kinnison, D. E., Garcia, R., Morgenstern, O., Zeng, G., Stone, K. A., and Schofield, R., *Atmospheric Chemistry and Physics*, 18, 6699-6720, doi:10.5194/acp-18-6699-2018.
22. 2018 **Ozone sensitivity to varying greenhouse gases and ozone-depleting substances in CCMI-1 simulations**, Morgenstern, O., Stone, K. A., Schofield, R., Akiyoshi, H., Yamashita, Y., Kinnison, D. E., Garcia, R. R., Sudo, K., Plummer, D. A., Scinocca, J., Oman, L. D., Manyin, M. E., Zeng, G., Rozanov, E., Stenke, A., Revell, L. E., Pitari, G., Mancini, E., Di Genova, G., **Visioni, D.**, Dhomse, S. S., and Chipperfield, M. P., *Atmospheric Chemistry and Physics*, 18, 1091-1114, doi:10.5194/acp-18-1091-2018.
23. 2018 **Large-Scale Tropospheric Transport in the Chemistry Climate Model Initiative (CCMI) Simulations**, Orbe, C., Yang, H., Waugh, D. W., Zeng, G., Morgenstern, O., Kinnison, D. E., Lamarque, J.-F., Tilmes, S., Plummer, D. A., Scinocca, J. F., Josse, B., Marecal, V., Jockel, P., Oman, L. D., Strahan, S. E., Deushi, M., Tanaka, T. Y., Yoshida, K., Akiyoshi, H., Yamashita, Y., Stenke, A., Revell, L., Sukhodolov, T., Rozanov, E., Pitari, G., **Visioni, D.**, Stone, K. A., and Schofield, R., *Atmospheric Chemistry and Physics*, 18, <https://doi.org/10.5194/acp-18-7217-2018>.

24. 2018 **Tropospheric ozone in CCMI models and Gaussian process emulation to understand biases in the SOCOLv3 chemistry-climate model**, Revell, L. E., Stenke, A., Tummon, F., Feinberg, A., Rozanov, E., Peter, T., Abraham, N. L., Akiyoshi, H., Archibald, A. T., Butchart, N., Deushi, M., Jockel, P., Kinnison, D., Michou, M., Morgenstern, O., O'Connor, F. M., Oman, L. D., Pitari, G., Plummer, D. A., Schofield, R., Stone, K., Tilmes, S., **Visioni, D.**, Yamashita, Y., and Zeng, G., *Atmospheric Chemistry and Physics*, 18, 16 155-16 172, doi:10.5194/acp-18-16155-2018.

25. 2018 **Stratospheric Injection of Brominated Very Short-Lived Substances: Aircraft Observations in the Western Pacific and Representation in Global Models**, Wales, P. A., Salawitch, R. J., Nicely, J. M., Anderson, D. C., Canty, T. P., Sunil, B., Dix, B., Koenig, T. K., Volkamer, R., Chen, D., Huey, G. L., Tanner, D. J., Cuevas, C. A., Fernandez, R. P., Kinnison, D. E., Lamarque, J. F., Lopez, A. S., Atlas, E. L., Hall, S. R., Navarro, M. A., Pan, L. L., Schauffler, S. M., Stell, M., Tilmes, S., Ullmann, K., Weinheimer, A. J., Akiyoshi, H., Chipperfield, M. P., Deushi, M., Dhomse, S. S., Feng, W., Graf, P., Hossaini, R., Jockel, P., Mancini, E., Michou, M., Morgenstern, O., Oman, L. D., Pitari, G., Plummer, D. A., Revell, L. E., Rozanov, E., Martin, D. S., Schofield, R., Stenke, A., Stone, K. A., **Visioni, D.**, Youshuke, Y., and Zeng, G., *Journal of Geophysical Research: Atmospheres*, 0, doi:10.1029/2017JD027978.

26. 2017 **Deriving Global OH Abundance and Atmospheric Lifetimes for Long-Lived Gases: A Search for CH<sub>3</sub>CCl<sub>3</sub> Alternatives**, Liang, Q., Chipperfield, M. P., Fleming, E. L., Abraham, N. L., Braesicke, P., Burkholder, J. B., Daniel, J. S., Dhomse, S., Fraser, P. J., Hardiman, S. C., Jackman, C. H., Kinnison, D. E., Krummel, P. B., Montzka, S. A., Morgenstern, O., McCulloch, A., Muhle, J., Newman, P. A., Orkin, V. L., Pitari, G., Prinn, R. G., Rigby, M., Rozanov, E., Stenke, A., Tummon, F., Velders, G. J. M., **Visioni, D.**, and Weiss, R. F., *Journal of Geophysical Research: Atmospheres*, <https://doi.org/10.1017/S1473550420000361>.

## Exoplanetary Science

27. 2021 **Detection Of Pre-Industrial Societies On Exoplanets**, Lockley, A. and **Visioni, D.**, *International Journal of Astrobiology*, February 2021 , pp. 73 - 80. doi:10.1017/S1473550420000361.

## Books published

2019 **A climate engineering technique for a warming planet: stratospheric sulfur injection as a temporary solution to greenhouse gasses increase.**, **Visioni, D.**, Aracne editrice, ISBN:978-88-255-2042-2, 172 pp, available here.

## International conferences and workshops

### Attended as invited speaker

June 28-July 3, 2020\* **Gordon Research Conference on Climate Engineering**, *Invited talk on "Is Solar Dimming a good proxy for Sulfate geoengineering?"*, Sunday River-Newry, ME, USA, \*postponed to 2022 due to COVID-19.

August 1-7, 2021 **Ecological Society of America Annual Meeting 2021**, *Invited talk on "What goes up must come down: surface impacts of deposition in a sulfate geoengineering scenario"*, Ecological Society of America, Long Beach, California.

Jan 10-14, 2021 **American Meteorological Society Annual Meeting 2021**, *Invited talk on "Geoengineering with stratospheric aerosols - physical mechanisms and sources of uncertainty"*, American Meteorological Society, New Orleans, USA.

30 Sep 2019 **Geoengineering Modeling Research Consortium, 2nd meeting**, *Invited talk on "Comparison of SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> injection strategies using a model aerosol microphysics representation"*, Harvard University, Cambridge, MA, USA.

- 20-21 May 2019 **Geoengineering Modeling Research Consortium, 1st meeting**, Invited talk on "Changes in sulfate geoengineering efficacy due to uncertainties in model representations of high clouds", NCAR, Boulder, CO, USA.
- [Attended as speaker](#)
- April 16th, 2018 **8th GeoMIP Meeting**, Presentation on: "Upper tropospheric ice sensitivity to sulfate geoengineering", Zurich, Switzerland, Financed by a scholarship from Rutgers University.
- June 21-22, 2016 **6th GeoMIP Meeting**, Presentation on: "Direct and indirect radiative effects of stratospheric sulfate under geoengineering conditions", Oslo, Norway, Financed by NCAR scholarship.
- April 25-28, 2016 **SSiRC 2016 Workshop**, Presentation on: "Stratospheric aerosols from major volcanic eruptions: a model study of the aerosol cloud dispersal and e-folding time", Berlin, Germany, Financed by a WMO scholarship for young researcher.
- [Attended as poster presenter](#)
- March 18th-23rd, 2018 **Chapman Conference on Stratospheric Aerosol in the Post-Pinatubo Era**, Poster presentation on: "Stratospheric aerosols from major volcanic eruptions: QBO impact on the aerosol cloud dispersal and optical depth", Tenerife, Spain, Financed by a scholarship for Early Career Scientists founded by NASA.
- Oct 9th-12th, 2017 **Climate Engineering Conference 2017**, Poster presentation on: "Quantification of sulfur deposition under sulfate geoengineering conditions", Berlin, Germany.
- July 23rd-28th, 2017 **I Gordon Research Conference on Climate Engineering and 7th GeoMIP meeting**, Poster presentation on: "Upper tropospheric ice sensitivity to sulfate geoengineering", Sunday River-Newry, ME, USA, Financed by a GeoMIP scholarship.
- Apr 24th, 2017 **EGU 2017**, Poster presentation on: "Upper tropospheric ice sensitivity to sulfate geoengineering", Wien, Austria.
- Oct 31st-Nov 1st, 2016 **WCRP/SPARC workshop: "Challenges for Climate Science - Synergies between SPARC and the WCRP Grand Challenges"**, Poster presentation on: "Future trend of the lower stratospheric ozone column at tropical latitudes from SPARC-CCMI model simulations", Berlin, Germany.
- Nov 19-20, 2015 **Science Symposium on Climate**, Poster presentation on: "Sulfate Geoengineering Impact on Methane Transport and Lifetime: Results from the Geoengineering Model Intercomparison Project (GeoMIP)", Rome, Italy.