Daniele Visioni

Curriculum Vitae

Education and Training

Ongoing **Postdoc Leadership Program**, *Cornell University*, Ithaca.

November 2015-October 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 gasses increase.

2013-2015 **Master Degree in Physics**, *University of L'Aquila*, L'Aquila, *Under a two-year GSSI Excellence Scolarship, 110/110*.
Curriculum in Atmospheric Physics

2009-2013 **Bachelor Degree in Physics**, *University of L'Aquila*, L'Aquila, *102/110*.

Professional appointments

November 2018-Current **Post-doctoral Associate**, *Cornell University - Sibley School of Mechanical and Aerospace Engineering*, Ithaca (NY), USA, Supervisor: prof. Douglas MacMartin.
Researching the design space of proposed Solar Radiation Management techniques, mostly focused on the physical aspect but with collaborations active in the possible socio-economical and ecological impacts.

November 2015-October 2018 **Ph.D. Fellow in Atmospheric Physics and Chemistry**, *University of L'Aquila*, Italy, Supervisor: prof. Giovanni Pitari.
Studied the effects of explosive volcanic eruptions on climate, possible dynamical and chemical side-effects of Sulfate Geoengineering, performed simulations and analyses for the Climate-Chemistry Model Intercomparison Projects with particular focus on stratospheric ozone.

January-March 2018 **Visiting Scientist**, *NCAR*, Boulder (CO), USA, Supervisor: dr. Simone Tilmes.
Performed analyses on the Geoengineering Large Ensemble with CESM1-WACCM.

June-September 2017 **Visiting Scientist**, *NASA GSFC - Earth Science Division*, Greenbelt (MD), USA, Supervisor: prof. Valentina Aquila.
Worked on the CARMA aerosol module on the climate model GEOS5.

Teaching and mentoring activities

September 2020-Current **LeadTheFuture STEM Mentorship Program**, *LeadTheFuture*.
Mentoring Italian Bachelor and Master students in STEM programs

August 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.

September-December 2017 **Assistant professor - General physics**, *BD in Biology - I year*, Department of Medicine and Life Sciences, University of L'Aquila.

Research Support Grants

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November 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)

October 2020 **NSF Award CBET-2038246**, *Fundamental limits and trade-offs of stratospheric aerosol geoengineering*, 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

November 2015-October 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

December 2020-Ongoing **EGUsphere Moderator**, *European Geophysical Union*, `www.egusphere.net/`.
Moderator for the not-for-profit scientific repository of the EGU, bringing together all preprints submitted to EGU journals. My task is to screen submitted preprints to verify they meet the basic standards of scientific quality.

August 2020-Ongoing **Project leader**, *Geoengineering Model Intercomparison Project*, `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 December 2019 **AGU Fall Meeting 2019**, *Session convener - Solar Geoengineering Benefits and Risks: Modeling, Impacts, Analogs, Engineering, Ethics, and Governance*, San Francisco, USA, Program available here.

August 28-September 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. 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.

2. 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.

3. 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.

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4. 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.

5. 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.

6. 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.

7. 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.

8. 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/.

9. 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/.

10. 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

11. 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.

12. 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.

13. 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

14. 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/.

15. 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.

16. 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/.

17. 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.

18. 2018 **Revisiting the Mystery of Recent Stratospheric Tem- perature 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.

19. 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/.

20. 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.

21. 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.

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22. 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., Scinnoca, 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.

23. 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.

24. 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.

25. 2017 **Deriving Global OH Abundance and Atmospheric Lifetimes for Long-Lived Gases: A Search for CH3CCl3 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, doi:10.1002/2017JD026926.

Exoplanetary Science

26. 2020 **Detection Of Pre-Industrial Societies On Exoplanets**, *Lockley, A. and* ***Visioni, D.****,* International Journal of Astrobiology, in press.

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.

January 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 September 2019 **Geoengineering Modeling Research Consortium, 2nd meeting**, *Invited talk on "Comparison of SO2 and H2SO4 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-17th, 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 scolarship.

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 clou dispersal and optical depth"*, Tenerife, Spain, Financed by a scholarship for Early Career Scientists founded by NASA.

October 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 scolarship.

April 24th, 2017 **EGU 2017**, *Poster presentation on: "Upper tropospheric ice sensitivity to sulfate geoengineering"*, Wien, Austria.

October 31st-November 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.

November 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.

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