

Stergios Misios

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Personal

Born: 31 January 1980, Ptolemaida, Greece

Synopsis of research interests

My research blends modelling and observations to help articulate the role of external forcings in the climate system. I have contributed to both understanding and modelling the role of solar cycle and volcanic forcing in the upper atmosphere and surface by analyzing results from different hierarchy of models: from toy-models to comprehensive chemistry climate models. Likewise, I have used chemistry climate models to understand effects of particles of solar and cosmic origin to the chemistry of the atmosphere and to understand ozone changes in the past and future. I have conceived and co-led SolarMIP an international programme for the first ever intercomparison of the CMIP5 model simulations in regards to the solar cycle availability. I am serving as a science discipline representative of the SCOSTEP (Scientific Committee on Solar-Terrestrial Physics), a working group co-leader of the PRESTO (Variability and Predictability of the Solar-Terrestrial Coupling) and SPARC SOLARIS-HEPPA (Solar Influences and High Energy Particle Precipitation in the Atmosphere) and have been a member of the COST actions ES1005-Towards a more complete assessment of the impact of solar variability on the Earth's climate, CA15211-Atmospheric Electricity Network and VolMIP (Model Intercomparison Project on the climatic response to Volcanic forcing).

Education

2012: Doctor of Philosophy in Natural Sciences, Max-Planck Institute for Meteorology/University of Hamburg, Germany. *Advisers:* Dr. H. Schmidt, Dr. M. Giorgetta, and Prof. B. Stevens, *Dissertation: Influences of the 11-yr solar cycle on the tropical atmosphere and oceans*

2007: Master of Science, Laboratory of Atmospheric Physics/Aristotle University of Thessaloniki, Greece. *Adviser:* Prof. K. Tourpali, *Thesis: Influence of the solar activity on the stratospheric climate and circulation.*

2004: Diploma in Physics, Aristotle University of Thessaloniki, School of Physics, Greece. *Adviser:* Prof. A. Bais *Thesis: Error estimation of narrow-band UV instruments for monochromatic radiation measurements.*

Professional Positions

June 2021- National Observatory of Athens, Greece, Marie Curie Fellow of "ElectricVolcano"

2019-May 2021: Department of Geoscience, Aarhus University, Denmark, Post-doctoral research associate funded by the Villum Experiment "Environmental consequences of solar cosmic rays"

2016-2019: Atmospheric, Oceanic and Planetary Physics, University of Oxford, UK, Post-doctoral research associate funded by the NERC, UK project "Decadal influence of Solar cycle"

2016-2017: Department of Geoscience, Aarhus University, Denmark, Post-doctoral assistant (part-time) funded by the Villum Young Investigator Grant, "Solar variability and North Atlantic climate during the last 1500 years"

2013-2015: Laboratory of Atmospheric Physics, Aristotle University of Thessaloniki, Greece, Post-doctoral research associate funded by the FP7-SOLID project.

2008-2012: International Max Planck Research School on Earth System Modelling, Max Planck Institute for Meteorology, Germany, PhD student and research assistant funded by the CAWSES-ARTOS (The Atmospheric Response to Solar Variability)

Unemployment: April 2012 till Dec 2013 and December 2015 till May 2016

Research projects (personal funding in bold)

2020 H2020 MSCA-IF: Electric Volcano (PI, 165.085 EUR)

2020 Short term mission grant by the COST Action ELECTRONET (2800 EUR)

2019 Cosmic and electric influences on aerosols and clouds, (co-PI, 42.000 EUR, 15 months)

2018-2021 Villum Experiment: Environmental consequences of solar cosmic rays, (PI, 1900000 DKK)

2019-2020 Member of the COST action "Atmospheric Electricity Network-ELECTRONET"

2016-2019 Decadal influence of Solar cycle, NERC, UK

2016-2018 Investigator and co-author of the SPARC project LOTUS (Long-term Ozone Trends and Uncertainties in the Stratosphere), in support of the WMO/UNEP 2018 Ozone Assessment, responsible for the analysis of ozone trends in the CCMI (Chemistry-Climate Model Initiative) simulations.

2015 Research grant by DAAD to visit GEOMAR (7200 EUR)

2013-2016 Coordinating scientific interaction with the user communities under the FP7-SOLID project.

2013 Short term mission grant by COST Action ES1005 TOSCA (2900 EUR)

2013-2016 Lead investigator of WCRP Solar Model Intercomparison Project (SolarMIP)

2013-2015 National representative for the COST Action ES1005 TOSCA

2008-2012 The Atmospheric Response to Solar Variability, CAWSES-ARTOS, DFG

Supervision

2 Bachelor, 3 Masters and 2 PhDs

International Collaborations

2020- SCOSTEP-PRESTO core-team member

2017-present Aarhus contribution to VolMIP (Model Intercomparison Project on the climatic response to Volcanic forcing) simulations within the EMAC/MESSy.

2016-present Working group co-leader (with Prof. K. Tourpali) of the SPARC SOLARIS-HEPPA Dr. Vassilis Amiridis (NOA, GR), Prof. Joanna Haigh (Imperial College, UK), Dr. Hauke Schmidt (MPI-Meteorology, DE), Prof Ilya Usoskin (Uni. of Oulu, FI), Prof. Lesley Gray, (Uni. Oxford, UK)

Honors

Science Discipline Representative of SCOSTEP

Publication List

I have contributed to 18 refereed publications (4 first author) to the scientific literature, including four book chapters and one conference proceeding. These have resulted in an h-index of 9 and 317 citations according to the Scopus metrics (10/06/20). I have given more than 30 talks in international conferences and projects meetings, while I have communicated physics- and climate-related topics to secondary and high schools in national science events. **A research highlight is the recent publication on the Proceedings of the National Academy of Sciences of the United States of America**, in which I describe a physical mechanism by which the 11-yr solar cycle affects the Walker circulation in the tropical Pacific.

In preparation

- Stergios Misios, Ioannis Logothetis, Mads F. Knudsen, Christoffer Karoff, and Kleareti Tourpali, Weaker etesian winds after major volcanic eruptions, Int. J. Climate (in preparation)
- **Stergios Misios**, Matthew Kasoar, Elliott Kasoar, Joanna Haigh, Lesley Gray, + PDRMIP: Similar patterns of relative precipitation changes under solar and greenhouse gas forcing, Environmental Research Letters (to be submitted Jun 2020)

Peer-reviewed

1. Logothetis I., Dafka S., Tourpali K., **Misios S.**, Zanis P., Xoplaki E., Luterbacher J., Papagianoulis E., Influence of the Indian Summer Monsoon and ENSO on the Eastern Mediterranean atmospheric circulation in CMIP5 simulations over the 20th century, Int. J. Climate (under review)
2. Martin B. Andrews, Jeff K. Ridley, Jeff R. Knight, Edward W. Blockley, Ben Booth,, Eleanor Burke, Lesley J. Gray, Leon Hermanson, Dan Hodson, Gareth S. Jones, Till Kuhlbrodt, **Stergios Misios**, Jon Robson, Rowan T. Sutton: Historical simulations with HadGEM3-GC3.1 for CMIP6, JAMES, 2020 cited:-
3. Logothetis I., Tourpali K., **Misios S.**, Zanis P., Etesians and the Summer Circulation over East Mediterranean in CMIP5 Simulations: Connections to the West Indian Summer Monsoon, 2019, Int. J. Climate, cited:2
4. **S. Misios**, L.J. Gray, M.F. Knudsen, C. Karoff, H. Schmidt and J.D. Haigh, Slowdown of the Walker circulation at Solar Cycle Maximum, Proceedings of the National Academy of Sciences of the United States of America, 2019, cited:3
5. Gray, L.J. , Ball, W., **Misios, S.**, Solar influences on climate over the Atlantic / European sector, AIP Conference Proceedings, 2017, cited:6
6. M. Haberreiter, M. Schoell, T. Dudok de Wit, M. Kretzschmar, **S. Misios**, K. Tourpali, and W. Schmutz: A new observational solar irradiance composite, Journal of Geophysical Research-Space Physics, 2017, cited:18
7. K. Matthes, et al., Solar Forcing for CMIP6 (v3.2), Geoscientific Model Development, 2017, cited: 85
8. **S. Misios**, D.M. Mitchell, L.J. Gray, K. Tourpali, K. Matthes, L. Hood, H. Schmidt, G. Chiodo, R. Thieblemont, E. Rozanov, D. Shindell, A. Krivolutsky: Solar Signals in CMIP-5 Simulations: Effects of Atmosphere-Ocean Coupling, Quarterly Journal of Royal Meteorological Society, 2016, cited:21

9. L. Hood, **S. Misios**, D.M. Mitchell, L.J. Gray, K. Tourpali, K. Matthes, H. Schmidt, G. Chiodo, R. Thieblemont, E. Rozanov, D. Shindell, A. Krivolutsky: Solar Signals in CMIP-5 Simulations: The Ozone Response, Quarterly Journal of Royal Meteorological Society, 2015, cited:37
10. D.M. Mitchell, **S. Misios**, L.J. Gray, K. Tourpali, K. Matthes, L. Hood, H. Schmidt, G. Chiodo, R. Thieblemont, E. Rozanov, D. Shindell, A. Krivolutsky: Solar Signals in CMIP-5 Simulations: The Stratospheric Pathway, Quarterly Journal of Royal Meteorological Society, 2015, cited:52
11. D.M. Mitchell, L.J. Gray, M. Fujiwara, T. Hibino, J. A. Anstey, W. Ebisuzaki, Y. Harada, C. Long, **S. Misios**, P. A. Stott, D. Tan: Signatures of Natural Variability in the Atmosphere using Multiple Reanalysis Datasets, Quarterly Journal of Royal Meteorological Society, 2014, cited:47
12. Fountoulakis I., Bais A., Tourpali K., Fragkos K., **Misios S.**: Projected changes in solar UV radiation over the Arctic and subarctic Ocean: Effects from changes in reflectivity, clouds and ozone, Journal of Geophysical Research, 2014, cited:14
13. **Misios, S.** and Schmidt, H.: The role of the oceans in shaping the tropospheric response to the 11-yr solar cycle, Geophysical Research Letters, 2013, cited:10
14. **Misios, S.**, and Schmidt, H.: Mechanisms involved in the amplification of the 11-yr solar cycle signal in the tropical Pacific Ocean, Journal of Climate, 2012, cited:22

Research monographs, book chapters and reports

1. Braesicke P., et al, Update on Global ozone: past, present, and future, in Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project — Report No. 58, World Meteorological Organization, Geneva, Switzerland, 2018
2. Petropavlovskikh I. et al., Report on Long-term Ozone Trends and Uncertainties in the Stratosphere, SPARC Report No. 9, WCRP-17/2018, GAW Report No. 241, doi:10.17874/f899e57a20b
3. Logothetis, I.; Tourpali, K.; **Misios, S.**, The Evolution of Etesians: Trends in 20th Century and Future Projections, in Perspectives on Atmospheric Sciences, Springer, 2017
4. Maycock, A. C., and **S. Misios**, Bottom-up versus top-down mechanisms for solar-climate coupling, in: Earth's climate response to a changing Sun, edited by: Jean Lilensten, EDP sciences, 2015
5. **Misios, S.** and Schmidt, H.: Stratospheric responses to the 11-year solar cycle in MAECHAM5 with and without ocean coupling, in: Advances in Meteorology, Climatology and Atmospheric Physics, Helmis, C.; Nastos, P. (Eds.), Springer, 2013
6. Schmidt, H., Kieser, J., **Misios, S.**, and Gruzdev, A. M.: The Atmospheric Response to Solar Variability: Simulations with a General Circulation and Chemistry Model for the Entire Atmosphere, in: Climate and Weather of the Sun Earth System, edited by: Lübken, F.-J., Springer, 2013
7. Weil, M. et al.: Pathways, Impacts, and Policies on Severe Aerosol Injections into the Atmosphere, Bulletin of American Meteorological Society, 2012

Selection of recent conferences/meetings (full list in www.misios.gr)

1. **S. Misios** (invited), international SOLARIS-HEPPA meeting, Bergen, Norway, 2020
2. **S. Misios**, I. Logothetis, MF Knudsen, C. Karoff, and K. Tourpali, Etesian winds after major volcanic eruptions, EGU 2020
3. **S. Misios**, V. Amiridis, MSCA-ElectricVolcano: An investigation of climatic impacts of volcanic ash electrification, International Workshop on Stratospheric Sulfur and its Role in Climate (SSiRC), Leeds, UK, 2020

4. **S. Misios**, Solar influences on Climate, COST-ElectroNet annual meeting, Sopron, HU, 2019
5. **S. Misios**, L. J. Gray, M.F. Knudsen, C. Karoff, H. Schmidt, J. Haigh. Solar signatures in the tropics, Swiss-SCOSTEP, Davos, 2019
6. Logothetis, K. Tourpali, **S. Misios**, and P. Zannis: Variability of Etesian Winds over the Aegean Sea and the link to west summer Indian Monsoon from CMIP5 Models, EGU 2018
7. K. Tourpali, **S. Misios** et al., Evolution of pre- and post 2000 changes and trends in the vertical distribution of ozone from CCM1 models, EGU 2018
8. **S. Misios**, L. Gray, M. F. Knudsen, C. Karoff, and H. Schmidt: Influences of the 11-yr solar cycle on the Walker Circulation, EGU 2018
9. M. Haberreiter, M. Schöll, T. Dudok de Wit, M. Kretzschmar, **S. Misios**, K. Tourpali, and W. Schmutz, A new observational solar spectral irradiance composite, EGU 2018