

## Curriculum Vitae

Froila M. Palmeiro Núñez, Ph.D [froila.palmeiro@cmcc.it](mailto:froila.palmeiro@cmcc.it)

Postdoctoral Researcher at Climate Simulations and Predictions (CSP) division, Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Bologna, Italy.

### Education

- PhD in Physics (01/10/2013 - 15/01/2018)  
Universidad Complutense de Madrid, Madrid, Spain  
Thesis: Sudden stratospheric warmings and the Brewer-Dobson circulation: diagnostics and interactions  
Supervisors: Dr. David Barriopedro (CSIC-IGEO) and Prof. Natalia Calvo (UCM)  
Successfully defended: 15/01/2018 – Sobresaliente Cum Laude
- MSc in Renewable Energies (01/10/2012- 15/07/2013; 60ects)  
Universidad CEU San Pablo, Madrid, Spain
- MSc in Geophysics and Meteorology (01/10/2010- 15/09/2012; 120ects)  
Universidad Complutense de Madrid, Madrid, Spain  
Dissertation title: Stratosphere-troposphere coupling
- Degree in Physics (01/10/2003- 12/01/2010; 300ects)  
Universidad de Santiago de Compostela, Santiago de Compostela, Spain

### Employment record and participation in projects

03/04/2023-present: **Postdoctoral Contract** in Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, CMCC, Climate Simulations and Predictions (CSP) division, Bologna, Italy.

SD4SP: Stratospheric Dynamics for Seasonal Prediction. Marie Scklodowska-Curie Actions, European Commission, PI: Dr. Froila M. Palmeiro. GA no. 101065820.

01/01/2022-30/09/2022: Postdoctoral Contract at Universidad Complutense de Madrid, Dpto: Física de la Tierra y Astrofísica.

JeDiS: Jet Dynamics and Extremes. Ministerio de Ciencia, Innovación y Universidades, PIs: B. Ayarzagüena & R. García-Herrera. RTI2018-096402-B-I00.

01/07/2019-31/12/2021: **Postdoctoral Contract** at Universitat de Barcelona, Dpto: Física Aplicada. Meteorology Group, Barcelona, Spain.

ATLANTE: Tropical Atlantic teleconnections to the Euro-Atlantic sector. Ministerio de Ciencia e Innovación Acciones de Dinamización, PI: Dr. García-Serrano and Dr. Ileana Bladé Mendoza (Universitat de Barcelona).

GRAVITO-CAST: Impact of non-orographic gravity wave parameterizations in seasonal forecast, Ministerio de Ciencia e Innovación Acciones de Dinamización, PI: Dr. García-Serrano (Universitat de Barcelona). ERC2018-092835

16/01/2018-30/06/2019: **Postdoctoral Contract** in Earth Sciences Department. Climate Prediction Group, Barcelona Supercomputing Center (BSC), Barcelona, Spain. ERC2018-092835

ERA4CS-MEDSCOPE: Mediterranean services chain based on climate predictions ERA4CS, PI: Dr. Silvio Gualdi (Centro Euro-Mediterraneo sui Cambiamenti Climatici), **Task Leader** -T.2.2: (Teleconnections with low-latitudes). GA no. 690462

DANAE: Dynamics and predictability of the ENSO teleconnection in the North Atlantic-European region, MINECO CGL2015-68342-R, PI: Dr. García-Serrano (BSC)

H2020 PRIMAVERA: Process-based climate simulation: advances in high resolution modelling and European climate risk assessment. GA no. 641727

01/01/2014 – 31/12/2017: **Fellowship** in the framework of the “Contratos Predoctorales para la Formación de Doctores (FPI)” funded by the Spanish Ministry of Economy and Competitiveness. Advisor: David Barriopedro Cepero. Dpto: Física de la Tierra y Astrofísica. Universidad Complutense de Madrid.

15/07/2013-31/12/2013: **Research Assistant**. Project: Mecanismos y Variabilidad del Acoplamiento Troposfera-Estratosfera. Advisor: David Barriopedro Cepero. Dpto: Física de la Tierra y Astrofísica. Universidad Complutense de Madrid.

MATRES: Mechanisms and Variability of the troposphere-stratosphere coupling, MINECO CGL2012-34221, PI: Dr. David Barriopedro (UCM)

Peer-reviewed publications

- 1) **Palmeiro, F.M.**, J. García-Serrano, P. Ruggieri, L. Batté, S. Gualdi (2023). On the influence of ENSO on sudden stratospheric warmings. *JGR: Atmospheres*. <https://doi.org/10.1029/2022JD037607>.
- 2) **Palmeiro, F.M.**, J. García-Serrano, M. Rodrigo, M. Abalos, B. Christiansen, S. Yang (2022) Boreal winter stratospheric climatology: CMIP6 version. *Climate Dynamics*, 60, 883–898.
- 3) Lawrence, Z.D., Abalos, M., Ayarzagüena, B., Barriopedro, D., Butler, A.H., Calvo, N., de la Cámara, A., Charlton-Perez, A., Domeisen, D.I., Dunn-Sigouin, E. and García-Serrano, J., 2022. Quantifying stratospheric biases and identifying their potential sources in subseasonal forecast systems. *Weather and Climate Dynamics*, 3(3), pp.977-1001.
- 4) Mezzina, B., **F. M. Palmeiro**, J. García-Serrano, I. Bladé, L. Batté, M. Benassi (2021): Multi-model assessment of the late-winter stratospheric response to El Niño and La Niña. *Climate Dynamics* (in press).
- 5) Gerber, E P., P. Martineau, B. Ayarzagüena, D. Barriopedro, T.J. Bracegirdle, A.H. Butler, N. Calvo, S.C. Hardiman, P. Hitchcock, M. Iza, U. Langematz, H. Lua, G. Marshall, A. Orr, **F. M. Palmeiro**, S.W. Son, M. Taguchi (2021): Extratropical stratosphere-troposphere coupling. *Stratosphere-troposphere processes and their role in climate (SPARC) reanalysis intercomparison project (S-RIP)*, edited by: Fujiwara, M., Manney, GL, Gray, L., and Wright, JS. (in press).
- 6) Benassi, M., G. Conti, S. Gualdi, P. Ruggeri, J. Garcia-Serrano, **F. M. Palmeiro**, L. Batté and C. Ardilouze (2021): ENSO teleconnection over the Euro-Mediterranean sector: the role of extratropical Pacific modulation. *Climate Dynamics*. <https://doi.org/10.1007/s00382-021-05768-y>
- 7) Portal, A., P. Ruggieri, **F.M. Palmeiro**, J. García-Serrano and S. Gualdi (2021): Seasonal prediction of the boreal winter stratosphere. *Climate Dynamics* <https://doi.org/10.1007/s00382-021-05787-9>
- 8) Stockdale, T., Y. H. Kim, J. Anstey, **F.M. Palmeiro**, N. Butchart, A. Scaife, M. Andrews, A. Bushell (2020): Prediction of the quasi-biennial oscillation with a multi-model ensemble of QBO-resolving models. *Quarterly Journal of the Royal Meteorological Society* <https://doi.org/10.1002/qj.3919>
- 9) Haarsma, R.J., M Acosta, R Bakhshi, P-A Bretonnière, L-P Caron, M Castrillo, S Corti, P Davini, E Exarchou, F Fabiano, U Fladrich, R Fuentes, J García-Serrano, J von Hardenberg, T Koenigk, X Levine, V Meccia, T van Noije, G van den Oord, **F. M. Palmeiro**, M Rodrigo, Y Ruprich-Robert, P Le Sager, E Tourigny, S Wang, M van Weele, K Wyser (2020): HighResMIP versions of EC-Earth: EC-Earth3P and EC-Earth3P-HR. Description, model performance, data handling and validation. *Geoscience Model Development*, 13, 3507–3527.
- 10) Mezzina, B., J. García-Serrano, I. Bladé, **F.M. Palmeiro**, C. Ardilouze, L. Batté, M. Benassi and S. Gualdi (2020): Multi-model assessment of the late-winter extra-tropical response to El Niño and La Niña. *Climate Dynamics*. <https://doi.org/10.1007/s00382-020-05415-y>
- 11) **Palmeiro, F. M.**, J. García-Serrano, O. Bellprat, P. A. Bretonnière and F.J. Doblas-Reyes (2020): Boreal winter stratospheric variability in EC-EARTH: High-Top versus Low-Top. *Climate Dynamics*, 54, 3135–3150. <https://doi.org/10.1007/s00382-020-05162-0>.
- 12) Ayarzagüena, B., **F.M. Palmeiro**, D. Barriopedro and N. Calvo, U. Langematz and K. Shibata (2019): On the representation of major stratospheric warmings in reanalyses, *Atmospheric Chemistry and Physics*, 19, 9469-9484, <https://doi.org/10.5194/acp-19-9469-2019>.
- 13) **Palmeiro, F.M.**, M. Iza, D. Barriopedro, N. Calvo and R. García-Herrera (2017): The complex behaviour of El Niño winter 2015-2016. *Geophysical Research Letters*, doi:10.1002/2017GL072920.
- 14) **Palmeiro, F.M.**, Barriopedro D., García-Herrera R. and Calvo N. (2015): Comparing Sudden Stratospheric Warming Definitions in Reanalysis Data. *Journal of Climate*, 28, 6823-6840, doi:10.1175/JCLI-D-15-0004.1.
- 15) **Palmeiro, F.M.**, Calvo N. and Garcia R.R. (2014): Future changes in the Brewer Dobson circulation under different greenhouse gas concentrations. *Journal of Atmospheric Sciences*, 71(8), 2962-2975, doi:10.1175/JAS-D-3-0289.1.

In preparation / under review

16) **Palmeiro, F.M.**, R.R. Garcia, N. Calvo and D. Barriopedro: How Turbulent Mountain Stress Influences the Sudden Stratospheric Warming Frequency in WACCM. *Geophysical Research Letters* (to be submitted).

17) Volpi, D., J. García-Serrano, **F.M. Palmeiro**, L. Gil-Reyes, R. J. Haarsma (2023): Tropical Atlantic variability in EC-EARTH: impact of the radiative forcing, *Climate Dynamics*, (under review).

18) **Palmeiro F.M.**, P. Hitchcock and J. Garcia-Serrano (2023): Separating Multi-decadal and Interannual dynamics in the Tropical Pacific Ocean and their stratospheric teleconnections, *Geophysical Research Letters*, (to be submitted).

Contribution to conferences

1) 07/09/2021: Palmeiro F.M., J. García-Serrano, P. Ruggieri, L. Batté and S. Gualdi: Intraseasonal modulation of Sudden Stratospheric Warmings by ENSO. EMS-2021, lightning talk, online.

2) 04 – 08/05/2020: Palmeiro F. M., R.R. Garcia, N. Calvo, D. Barriopedro and B. Jiménez-Esteve: How turbulent mountain stress influences sudden stratospheric warming occurrence in WACCM. EGU-2020, online.

3) 22 - 25/10/2019: Palmeiro F. M., J. García Serrano, et al. Climatological heat flux in the lower stratosphere and sudden stratospheric warmings: seasonality and modulations. DynVar-2019, Madrid, Spain. Oral

4) 09 - 13/12/2019: Palmeiro F. M., J. García Serrano, C. Ardilouze, L. Batté, M. Benassi, and S. Gualdi. Modulation of sudden stratospheric warmings by ENSO and the PDO. AGU-2019, San Francisco, CA USA. Poster

5) 01 - 05/10/2018: Palmeiro F. M., J. García Serrano, O. Bellprat, P. A. Bretonnière. Assessing sudden stratospheric warming variability in the EC-EARTH climate model. SPARC GA-2018, Kyoto, Japan. Poster

6) 01 - 05/10/2018: Palmeiro F. M., J. García Serrano, M. Abalos. Dynamics of the ENSO impact on the tropical upwelling. SPARC GA-2018, Kyoto, Japan. Poster

7) 01 - 05/10/2018: Palmeiro F. M., R.R. Garcia, N. Calvo and D. Barriopedro: On How Turbulent Mountain Stress Influences the Sudden Stratospheric Warming Frequency in WACCM. SPARC GA-2018, Kyoto, Japan. Poster

8) 01 - 05/10/2018: B. Ayarzagüena, F.M. Palmeiro, U. Langematz, D. Barriopedro and N. Calvo: Reanalyses performance in representing major sudden stratospheric warmings. SPARC GA-2018, Kyoto, Japan. Poster

9) 01 - 05/10/2018: B. Mezzina, J. García Serrano, F. M. Palmeiro, and I. Bladé: Separating ENSO and NAO Signatures in the North Atlantic. SPARC GA-2018, Kyoto, Japan. Poster

10) 03 - 07/09/2018: Palmeiro F. M., J. García Serrano, O. Bellprat and F.J. Doblas-Reyes: Sudden stratospheric warming variability in EC-EARTH. EMS, Budapest, Hungary. Poster

11) 17 - 21/07/2017: Palmeiro, F.M., M. Iza, D. Barriopedro, N. Calvo and R. García-Herrera: The complex behaviour of El Niño winter 2015-2016. Real Sociedad Española de Física, Santiago de Compostela, Spain. Poster

12) 26 - 30/07/2017: Palmeiro, F.M., M. Iza, D. Barriopedro, N. Calvo and R. García-Herrera: The complex behaviour of El Niño winter 2015-2016. AMS, Portland, US. Oral

13) 28 - 30/06/2016: Palmeiro, F.M., R.R. Garcia, D. Barriopedro, N. Calvo and R. García-Herrera: The influence of Turbulent Mountain Stress Parametrization on Sudden Stratospheric Warming Frequency in the WACCM climate model. 9th AHPGG, Madrid, Spain. Oral

14) 22/06 - 02/07/2015: Palmeiro, F.M., Barriopedro D., García-Herrera R. and Calvo N.: Does the definition of Sudden Stratospheric Warmings matter? 26th IUGG GA, Prague, Czech Republic. Oral

15) 12 - 14/04/2015: Palmeiro, F.M., Barriopedro D., García-Herrera R. and Calvo N.: Comparison of Sudden Stratospheric Warming Definitions in Reanalysis Data. EGU-2015, Vienna, Austria. Oral

16) 12 - 13/01/2015: Palmeiro, F.M., Barriopedro D., García-Herrera R. and Calvo N.: Comparing Sudden Stratospheric Warming Definitions in Reanalysis Data. SPARC- Regional Workshop, Granada, Spain. Oral

17) 27/04 - 01/05/2014: Palmeiro, F.M., Barriopedro D., García-Herrera R. and Calvo N.: Comparison of Sudden Stratospheric Warming Definitions in Reanalysis Data. EGU-2014, Vienna, Austria. Poster

18) 22 - 26/04/2013: Palmeiro F. M., N. Calvo and R.R. Garcia: Future Changes in the Brewer- Dobson Circulation under Different Greenhouse Gas Concentrations in WACCM4. 3rd Dynvar Workshop, Reading, UK. Poster

### Contribution to workshops / invited seminars

- 19) 09/2022- On the Influence of ENSO on Sudden Stratospheric Warmings". CCCma Coffee Talks.
- 20) 04/2021- Climate and Climate Change Course. University of the Experience (for seniors), University of Barcelona, Spain. Online.
- 21) 03 - 05/03/2020: Palmeiro F. M. and J. García-Serrano. Climatology and variability of EC-EARTH in the stratosphere. EC-EARTH meeting. Online.
- 22) 11/02/2020: Palmeiro F.M.: Climate and Supercomputers. Milà i Fontanals primary school, Barcelona, Spain. Oral.
- 23) 22/05/2019: Palmeiro F. M. and J. García-Serrano Seasonal Modulation of Sudden Stratospheric Warmings in EC-EARTH, CMCC invited seminar, Bologna, Italy. Oral
- 24) 15 - 17/05/2019: Palmeiro F. M.: Analysis of the stratospheric variability in the ENSO/PDO sensitivity experiments. MEDSCOPE Mid-Term Conference, Milan, Italy. Oral
- 25) 30/03/2019: Introduction to Climate. Crazy About Science. (Fundació Catalunya-La Pedrera). BSC, Barcelona, Spain. Oral
- 26) 21 - 22/01/2019: Palmeiro F. M. and J. García-Serrano: ENSO and PDO modulation of sudden stratospheric warmings. MEDSCOPE WP2 sensitivity experiments workshop, Toulouse, France. Oral
- 27) 22 - 24/10/2018: Palmeiro F. M.: Assessing stratospheric variability in EC-EARTH: high-top versus low-top resolution. Lisbon, Portugal. Oral
- 28) 23/01/2018: Palmeiro F.M. Stratosphere-troposphere Interactions: EN2015/2016- a case of study. Barcelona Supercomputing Center (BSC) internal seminar, Barcelona, Spain. Oral
- 29) 13/12/2016: Palmeiro, F.M., M. Iza, D. Barriopedro, N. Calvo and R. García-Herrera: The hybrid behaviour of El Niño winter 2015-2016. GEOMAR invited seminar, Kiel, Germany. Oral

### Official teaching experience

- 2020/21 Meteorología y Climatología. (Degree in Physics). Faculty of Physics, Barcelona, Spain (0.6ects)
- 2020/21 Análisis y Tratamiento de datos. (Masters in Meteorology). Faculty of Physics, Barcelona, Spain (2.5ects)
- 2019/20 Meteorología y Climatología. (Degree in Physics). Faculty of Physics, Barcelona, Spain (0.6ects)
- 2016/17 Física aplicada a la Biología. (Degree in Biology). Faculty of Physics, Madrid, Spain (0.6ects)
- 2015/16 Física aplicada a la Biología. (Degree in Biology). Faculty of Physics, Madrid, Spain (1.2ects)
- 2014/15 Laboratorio de Física I. (Degree in Physics). Faculty of Physics, Madrid, Spain (0.6ects)

### Organisation / Participation in R&D activities

- 2021-Present Volunteer at YOUNG IT GIRLS Association: scientific activities for children at schools. **Internal management, Speaker and Monitor.**
- 13/06/2021: Kahoot dones científiques, Festa de la ciència, Barcelona Spain. **Monitor.**
- 26/05/2021: Escape room for school students, Centre Obert Ubuntu, Barcelona Spain. **Monitor.**
- 15/03/2021: Women in Science, La Miranda secondary school, Barcelona Spain. **Roundtable Speaker.**
- 2020: 100tífiques, Women and girls in science. (Fundació Catalana per a la Recerca i la Investigació), Spain. **Speaker.**
- 2018/19: Crazy about Science. (Fundació Catalunya-La Pedrera). BSC, Barcelona, Spain. **Speaker and Monitor.**
- 12 -15/12/2017: First PhDay Physics -2017 (UCM-PhD School), Madrid, Spain. **Organiser**
- 22 -23/05/2017: Primer Foro Dignidad Investigadora (Dignidad Investigadora-UCM), Faculty of Physics, Madrid, Spain. **Organiser and Roundtable moderator**
- 2016 and 2017: "Science for Kids" La Casa Encendida socio-cultural centre activities: Home experiments to understand the Atmosphere and the Ocean. (Fundación Montemadrid). Madrid, Spain. **Monitor**
- 2012, 2013, 2014 and 2015 Science Week "Taller de Atmósfera y Océano". Faculty of Physics. Universidad Complutense de Madrid, Spain. **Monitor**
- 2014, 2015 and 2016: Ciclo de Seminarios en Física de la Atmósfera, Faculty of Physics, Madrid, Spain. **Organiser**
- 02 - 06/09/2013: 15th Annual Conference of the International Association for Mathematical Geoscience (Faculty of Mathematics), Madrid, Spain. **Organiser**

### International Stays

- 01/04/2022-31/12/2024: Canadian Centre for Climate Modelling and Analysis, Victoria, Canada. Advisor: Dr. James Anstey.
- 20/10/2021-20/12/2021: University of Cornell, NY, USA. Advisor: Prof. Peter Hitchcock
- 17-24/05/2019: Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Bologna Italy. Advisor: Dr. Silvio Gualdi
- 01/09/2016-15/12/2016: GEOMAR, Kiel, Germany. Advisor: Prof. Katja Matthes
- 08/07/2015-05/11/2015: National Center for Atmospheric Research (NCAR), Boulder, CO, USA. Advisor: Dr. Rolando Garcia

### Grants

- 2022: Postdoctoral Global Fellowship - Marie Skłodowska-Curie Actions, European Union/European Commission.
- 2020: RES Project. Past Present and Future of sudden stratospheric warmings (900Kh assigned)
- 2019: 2 months Mobility Grant (CASA) to University of Cornell, NY, USA.
- 01/01/2014 - 31/12/2017: Spanish "FPI" fellowship awardee (BES-2013-063906).
- 01/09/2016 - 15/12/2016: Mobility Grant (MINECO) to GEOMAR, Kiel, Germany.
- 08/07/2015 - 05/09/2015: Mobility Grant (MINECO) to NCAR, Boulder, CO, USA.
- 2015: IUGG travel grants for conference attendance.
- 2013: WMO travel grants for conference attendance.

### Mentoring and Revision experience

- 2020/21: Master Thesis advisor of V. Sempere, Title: Aplicació de la metodologia Self Organizing Maps.
- 2020/21: Master Thesis advisor of A. Lacima, Title: Variability of the Quasi-biennial oscillation.
- 2020/21: Master Thesis advisor of J. Ruiz, Title: Cloudiness impact on forecasting.
- 2020/21: Degree Thesis advisor of J. Sola, Title: Southern polar vortex variability.
- 2019/20: Master Thesis advisor of C. Pérez, Title: The influence of Sudden Stratospheric Warmings on European weather Extremes (<http://diposit.ub.edu/dspace/handle/2445/172758>).
- 09/2019: High school project advisor of N. Mayol, Title: Climate change in Global Climate Models, the role of Supercomputers. (<https://snow14.github.io/Annex/>).
- Master Thesis committee member: Master's in Meteorology, University of Barcelona, Spain.
- Expert Reviewer of the official group review of the Working Group I contribution to the IPCC Sixth Assessment Report. Reviewer for Journal of Climate, Atmospheric Chemistry and Physics, Journal of the Atmospheric Sciences, Atmospheric Science Letters, Journal of Geophysical Research, Nature Communications.

### Media appearances

- <https://elpais.com/ciencia/2023-03-21/los-rayos-mas-incendiaros-aumentaran-por-el-cambio-climatico-pero-no-en-toda-la-tierra.html>
- <https://www.larazon.es/medio-ambiente/20210115/luvfjg5mzcexfieuinxlamky34.html>
- [https://www.lavozdeg Galicia.es/noticia/lugo/lugo/2018/01/21/reconstruir-clima-pasado-esencial/0003\\_201801L21C12991.htm](https://www.lavozdeg Galicia.es/noticia/lugo/lugo/2018/01/21/reconstruir-clima-pasado-esencial/0003_201801L21C12991.htm)
- [https://www.lavozdeg Galicia.es/noticia/galicia/2018/02/23/extrano-recorrido-borrascas/0003\\_201802H23P59991.htm](https://www.lavozdeg Galicia.es/noticia/galicia/2018/02/23/extrano-recorrido-borrascas/0003_201802H23P59991.htm)
- <https://www.lavozdeg Galicia.es/noticia/galicia/2018/02/23/galicia-despierta-tiritando-minimas-7/00031519375989995420259.htm>
- [https://www.lavozdeg Galicia.es/noticia/historias-del-tiempo/2018/02/15/galicia-pendiente-vortice-polar/0003\\_201802H15P51991.htm](https://www.lavozdeg Galicia.es/noticia/historias-del-tiempo/2018/02/15/galicia-pendiente-vortice-polar/0003_201802H15P51991.htm)

### Computer Skills

- Experience running Global Climate Models at different Supercomputing facilities: WACCM (Eolo, UCM), EC-EARTH (Mare Nostrum, BSC), CanESM (ECCC), CMAM (ECCC) and CMCC, including extensive modification of input boundary conditions and using nudging techniques for sensitivity experiments.
- Data analysis tools: Python, IDL, CDO, NCO, MatLab.
- Unix utilities as Bash, Vim, GIT version control system; Inkscape, LaTeX.

### Languages

Spanish and Galician (native), English (fluent), Portuguese (intermediate), French (apprentice).