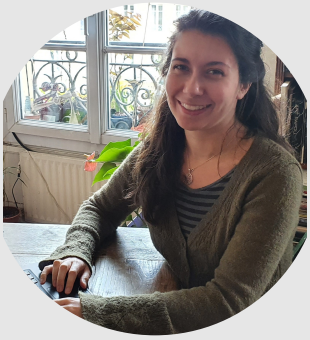
Milena **Corcos**

Research Scientist



About me

I am interested in cirrus clouds microphysics, atmospheric dynamics, and its impact on clouds in the tropical band. I have participated to balloon campaigns that have given me a taste for research and teamwork, and I have been combining modeling and observations in my work since my PhD in France.

Contact

milena@nwra.com

milenacorcos@gmail.com

+33 6 61 45 57 47

+1 720 448 6648

NWRA, Boulder
Colorado, USA

Linkedin/Milena-Corcos

ORCID/Milena-Corcos

Diplomas

2019-2023 — Paris, France
PhD
Sorbonne University, CNES, Ecole Polytechnique
Laboratoire de Météorologie Dynamique (LMD)
Processes impacting le cirrus clouds life cycleat the tropical tropopause, contributions of Stratéole-2 observations.

2017-2019 — Paris, France
Master
Sorbonne University
In collaboration with ENS and Ecole Polytechnique
Ocean Atmosphere, Climate and Remote Sensing : Fluid dynamics applied to climate sciences.

2016-2017 — Paris, France
Bachelor
Sorbonne University
Applied Physics
Fluid dynamics, electromagnetism, coding, quantum physics

2013-2016 — Paris, France
Bachelor
Sorbonne University
Geosciences, specialty in physics
Field campaigns, fluid dynamics

Academic background

2024-today — Boulder, CO, USA
Research Scientist
NorthWest Research Associates
funded by NSF
Tropical cirrus clouds: Cirrus cloud and gravity wave interactions: modeling using CARMA and balloon born lidar observations.

2019-2024 — Boulder, CO, USA
Post-doc
NorthWest Research Associates
mentor Joan Alexander, funded by NSF
Gravity waves modeling/obs: Calculation of gravity wave phase speeds from balloon observations, comparison of momentum fluxes between observations and high-resolution models.

2019-2023 — Paris, France
PhD
Laboratoire de Météorologie Dynamique
Sorbonne, CNES, IPSL, Ecole Polytechnique
Tropical cirrus clouds: Study of the impact of gravity waves on in-situ cirrus formed clouds at the tropical tropopause, using observations from Stratéole-2 super-pressure balloons.

2019 — Paris, France
Intership, 5 months
Laboratoire de Météorologie Dynamique
IPSL, Ecole Polytechnique
Tropical cirrus clouds: Using observations from super-pressure balloons to study the impact of gravity wave temperature variability on cirrus clouds in a 1D microphysics model.

2018 — Paris, France
Internship, 4 months
Laboratoire de Météorologie Dynamique
IPSL, Ecole Polytechnique
Tropical circulation: Characteristics of the QBO using ERA-INTERIM.

Languages

English - Fluent

French - Native

Numerical background

- **Python**, **Matlab**, **R**
- **Fortran**, **C/C++**
- **GitHub**, **LaTeX**
- **Unix**

Types of data:

- balloon observations
- satellite observations
- cloud models (CARMA, ICLAM)

I developped **I**ce **C**loud **LA**grangian **M**odel during my PhD.

Editorial activities:

Reviewer in peer-reviewed journals

- Journal of Geophysical Research : Atmospheres
- Atmospheric Chemistry and Physics

Balloon Campaigns:

- **2019** Participation in the Stratéole-2 technical campaign, as an introduction to doctoral studies.
- **2021** Participated in the first Stratéole-2 campaign to help monitor the activities of each instrument team.
- ***2026*** *Will participate to the last Stratéole-2 campaign to help the RATS (vertical profiles) instrument team.*
- ***2027*** *Will participate to the Deep-Convec (Deep convEctive influEnce on the uPper troposphericC and lOwer stratospheric compositioN Variability using multiplE platforms in the tropiCal Tropopause) campaign to study cirrus cloud waves interactions*

Research Responsibilities and Activities

Science grants

2025-2028

Collaborative research, NSF, still in review
P.I : Milena Corcos, Co-I: Eric J. Jensen
A realistic and multi-scale dynamical study to understand thin tropical cirrus life cycle and quantify their climate impacts

2023-2026

Collaborative Research : NSF
P.I : Milena Corcos, Co-I: Joan A. Alexander
Stratéole-2 : Atmospheric Wave Influences on Cirrus, Water Vapor, and Global Circulation Near the Tropical Tropopause.

Research Networks and collaborators

2023-today

International Research Team
Datawave
Virtual Earth System Research Institute
Collaboration focused on improving our ability to model gravity waves and their impact on large-scale circulation. Development of new parameterizations using high-resolution data and observations.

2022-today

International Research Team
Synthetic Gravity Wave Analyses for New Exploitation of Satellite data (SWANS)
International Space Science Institute
Combining satellite and balloon observations with high-resolution simulations to improve the representation of gravity waves and their effects in next-generation models.

2019-today

International Balloon Born Observation Campaigns
Stratéole-2
LMD (France), LATMOS (France), LASP (US, CO), NWRA (US, CO)
Strateole-2 is a French-US project to study climate processes in the Tropical Tropopause Layer (TTL) and in the lower stratosphere using CNES superpressure balloons, capable of drifting for several months between 18 and 20 km altitude. Instruments include lidar, particles counter, profiles of temperature and wind observations.

2025-today

International Balloon Born Observation Campaigns
DEEP CONVECT
GSMA (France), LPC2E (France), LATMOS (France) NOAA (US), NASA (US), USP (Brazil), INPE (Brazil), FZ-Julich (Germany)
Deep-Convect is a French-German-US-Brazil project focusing on the TTL and especially the processes driving the variability of its composition with a strong focus on water vapor and clouds. This includes overshooting deep convection, atmospheric gravity waves and cirrus clouds, which are related.

Mentorship

2021

Intership mentoring
2 months
Bachelor intern mentor
The internship was focused on deriving gravity waves properties from the Strateole-2 balloon observations.

Awards

- **Best Poster early career scientists days CNES** November 2021.

Potential recommendations

- **Eric J. Jensen**: Collaborator; ericjj50@gmail.com
- **Bernd Kärcher**: Collaborator; Bernd.Kaercher@dlr.de
- **Riwal Plougonven**: PhD advisor; riwal.plougonven@lmd.ipsl.fr
- **Albert Hertzog**: PhD advisor; albert.hertzog@lmd.ipsl.fr
- **M. Joan Alexander**: Post-doc mentor; alexand@nwra.com

Publications

Article 2025 — **Characterization of short-vertical wavelength gravity waves using stratospheric balloon-borne observations**, Cao, B., Alexander, M. J., **Corcos, M.**, Haase, J. S., Bramberger, M., Lesigne, T., Ravetta, F., Ortland, D. A., Hindley, N., *Journal of Geophysical Research: Atmospheres*, (to be submitted)

Article 2025 — **An intercomparison of stratospheric gravity waves in three high-resolution models and AIRS satellite observation**, Noble, P., Holt, L., van Niekerk, A., Plougonven, R., Polichtchouk, I., Stephan, C., Bramberger, M., **Corcos, M.**, Putnam, W., Wright, C., *Journal of Geophysical Research: Atmospheres*, (to be submitted)

Article 2025 — **On the lifetimes of persistent contrails and contrail cirrus**, Kärcher, B., **Corcos, M.**, *Journal of Geophysical Research: Atmospheres*, (in review)

Article 2025 — **Influence of variations in gravity wave properties on cirrus ice number concentrations produced by homogeneous freezing in the Tropical Tropopause Layer**, Jensen, E. J., **Corcos, M.**, Kärcher, B. , *Journal of Geophysical Research: Atmospheres* , (in review)

Article 2024 — **Dissecting cirrus clouds: Navigating effects of turbulence on homogeneous ice formation**, Kärcher, B., Hoffman, F., Sokol, A.B., Gasparini, B., **Corcos, M.**, Jensen, E.J., Atlas, R., Podglajen, A., Morrison, H., Hertzog, A., Plougonven, R., Chandrakhar, K.K., Grabowski, W.W. , *Nature journals: Climate and Atmospheric Science*, 10.1038/s41612-025-01024-w

Article 2024 — **Effects of turbulence on upper tropospheric ice supersaturation**, Kärcher, B. , Hoffmannb, F., Podglajen, A., Hertzog, A., Plougonven, R., **Corcos, M.**, Atlas, R., Grabowskid, W. W., Gasparini, B. , *Journal of Atmospheric Sciences*, 10.1175/JAS-D-23-0217.1

Article 2024 — **Observation of gravity waves generated by convection and the 'moving mountain' mechanism during Stratéole-2 campaigns and their impact on the QBO**, **Corcos, M.**, Bramberger, M., Alexander, M.J., Hertzog, A., Liu, Chuntao., Wright, C., *Journal of Geophysical Research: Atmospheres*, 10.1029/2024JD041804

Article 2024 — **Reconstructing balloon-observed gravity wave momentum fluxes using machine learning and input from ERA5**, Has, S., Plougonven, R., Fischer, A., Rani, R., Lott, F., Hertzog, A., Podglajen, A., **Corcos, M.**, *Journal of Geophysical Research: Atmospheres*, 10.1029/2023JD040281

Article 2023 — **A simple model to assess the impact of gravity waves on ice crystal populations in the tropical tropopause layer**, **Corcos, M.**, Hertzog, A., Plougonven, R., Podglajen, A., *Atmospheric Chemistry and Physics, 23*, 10.5194/acp-23-6923-2023

Article 2023 — **Detection of turbulence occurrences from temperature, pressure, and position measurements under superpressure balloons**, Wilson, R., Pitois, C., Podglajen, A., Hertzog, H., **Corcos, M.**, Plougonven, R., *Atmospheric Measurement Techniques, 16*, 10.5194/amt-16-311-2023

Article 2021 — **Observation of Gravity Waves at the Tropical Tropopause Using Superpressure Balloons**, **Corcos, M.**, Hertzog, A., PLougonven, R., Podglajen, A., *Journal of Geophysical Research: Atmospheres, 126*, 10.1029/2021JD035165

Communicating results: Conferences, workshops and seminars

Invited Seminars

NASA-GISS seminar series: Goddard Institute for Space Studies; 2025; New-York, USA
Observation of Tropical Gravity Waves and Their Effects on Cirrus Clouds.

MMM seminar series, NCAR; 2024; Boulder, USA
Observation of Gravity Waves in the Tropical Tropopause Layer using Superpressure Balloons.

Atmospheric Sciences seminar series, Bath University; 2024; Bath, UK
A simple model to assess the impact of gravity waves on ice crystal populations in the Tropical Tropopause Layer.

ICCP seminars series, Jülich Forschungszentrum, Institut für Energie- und Klimaforschung; 2023; Remote
A simple model to assess the impact of gravity waves on ice crystals populations in the Tropical Tropopause Layer.

Journal Club of Rice and Standford Univeristy; 2021; Remote
Observation of Tropical Gravity Waves : Use of superpressure balloons of Stratéole-2.

Max Planck Institute für Meteorologie; 2022; Hambourg, Allemagne
Observation of Gravity Waves at the Tropical Tropopause Using Superpressure Balloons

NOAA: National Oceanic and Atmospheric Administration ; 2022; Boulder, Colorado
A simple model to assess the impact of gravity waves on ice crystals populations in the Tropical Tropopause Layer.

AGU *: American Geoscience Union*; 2024; Washington DC, USA
Impacts of Gravity Waves on Ice Crystal Populations in the Tropical Tropopause Layer.

ESAPAC*: ESA balloons and rocket workshop*; 2024; Lucerne, Suisse
Observation of Gravity Waves at the Tropical Tropopause Using Superpressure Balloons

Talks

AGU : Invited Speaker; 2023; San Francisco, CA, USA
Balloon Borne Observation of Tropical Gravity Waves: Phase Speed and Vector Momentum Flux.

PIRE *: annual workshop of PIRE group*; 2023; Friday Harbor, WA, USA
An idealized model to assess the impact of gravity waves on ice crystals populations in the tropical tropopause layer

SPARC *: Gravity waves workshop*; 2022; Frankfurt, Germany
Observation of gravity waves at the Tropical Tropopause Layer using Stratéole-2 superpressure balloons

ESAPAC *: ESA workshop on balloons and rockets*; 2022; Biarritz, France
Observation of gravity waves at the Tropical Tropopause Layer using Stratéole-2 superpressure balloons

**A non exhaustive list of my poster presentations as well as some of my collaborators presentations is on my website.*