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👤 NOAA CSL & CU CIRES

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RESEARCHER IN ATMOSPHERIC SCIENCES

Research Interests

- Aerosols optical and microphysical properties
- Stratospheric composition
- Aerosol - water vapor - cloud interactions
- Innovative instrumentation for atmospheric sciences
- Remote sensing / *In-situ* synergies

Higher Education

2017 - 2020 **PhD in atmospheric physics at LSCE-IPSL**, *Laboratoire des Sciences du Climat et de l'Environnement - Institut Pierre-Simon Laplace, CEA - CNRS - UVSQ - Paris-Saclay University*, Gif-sur-Yvette, France

Subject: *Meteorological Raman Lidar dedicated to the study of aerosols and water vapor coupled cycles*, funded by CEA: CFR grant.

Additional courses in:

- Boundary layer meteorology;
- Aerosols and clouds interactions;
- Signal processing.

2016 - 2017 **Master 2 in Physics, Environment and Processes**, *Paris-Saclay University*, Orsay, France. Ranked first

Atmospheric dynamics, pollutant dispersion, aerosols physics, data processing and analysis.

2015 - 2016 **Master 1 in Fundamental Physics**, *Paris-Saclay University*, Orsay, France

Fluid dynamics, plasma physics (ϕ), particle ϕ , nuclear ϕ , laser ϕ , solid state ϕ , material engineering, neutronics, heat-transfer.

Research and Teaching Experience

Research

2022 - Present **CIRES Research scientist I at NOAA CSL**, *Cooperative Institute for Research in Environmental Sciences (CIRES) - University of Colorado & NOAA Chemical Sciences Laboratory*, Boulder, CO, USA

NOAA funding from the Balloon Baseline Stratospheric Aerosol Profiles B²SAP project.

- Deployment of more than 40 POPS throughout the B²SAP network;
- Intensive Operation Periods (IOPs) and Field campaigns;
- Data analysis to study aerosol properties in the stratosphere;
- Results dissemination through talks at AMS and AGU 2023 and publications;

2021 - 2022 **CNES Post-doctoral fellow in atmospheric sciences**, *Laboratoire de l'Atmosphère et des Cyclones (LACy) - Université de la Réunion - CNRS - Météo-France*, Saint-Denis, La Réunion, France, Post-doctoral fellowship from the French space agency (CNES)

Origins, specification and radiative forcing of aerosols transported across the south-western Indian Ocean basin in connection with the Indian summer monsoon dynamics

- Weather patterns leading to atmospheric aerosol rivers in the Indian Ocean;
- Aerosol optical properties associated with atmospheric river transport;
- Lidar instruments and database management at the observatory;
- Results dissemination through talks, posters and peer-reviewed articles.

2017 – 2020 **PhD Student in atmospheric physics and lidar remote-sensing**, *Laboratoire des Sciences du Climat et de l'Environnement - Institut Pierre-Simon Laplace, CEA - CNRS - UVSQ - Paris-Saclay University*, Gif-sur-Yvette, France

- Meteorology, aerosol microphysics and inverse problems in atmospheric physics;
- Rayleigh, Mie, vibrational and rotational Raman scattering processes for lidar;
- Algorithm development and end-to-end simulator;
- Scientific valorization through talks, posters and peer-reviewed articles.

Teaching

2018 – 2019 **Practical physics work supervision**, *30 hours*, Paris-Saclay University
Optics and Electricity at bachelor level.

2015 – 2017 **Private lessons and student mentoring**, *3h/week*, Mathematics, Physics, English
Students from highschool and bachelor levels.

Field Campaigns

2023 **SABRE campaign**, *Balloon launches from Utqiagvik, AK (71°N)*, Support of the SABRE high altitude aircraft flights out Fairbanks with concomitant instrumented balloon launches. Measurements of ozone, water vapor and aerosol size distribution in the stratosphere, in particular in the polar vortex.

2022 **TR²Ex campaign**, *Tonga Rapid Response Experiment*, International campaign involving in-situ balloonborne and remote-sensing measurements of the stratospheric aerosol volcanic plume from the Hunga-Tonga plinian eruption, at the Maïdo station of the Reunion Island Observatory for Atmospheric Physics (OPAR)
Instrument operation, signal processing, analysis and scientific valorization of lidar data

2020 **EIUCidate the Role of Clouds-Circulation Coupling in ClimAte**, *EUREC⁴A*, International airborne measurement campaign in Barbados
Horizontal lidar measurements from the ATR-42 aircraft.

2019 **Lacustrine - Water vApor Isotope InVentory Experiment - L-WAIVE**, Airborne measurement campaign using ultra-light aircraft in Lathuile, South-extremity of the Annecy lake in French Alps
Instrumental synergy between airborne and ground-based lidars with airborne cavity ring-down spectroscope, meteorological probes and aerosol granulometer.

Peer-reviewed Publications

Published or accepted

2023 **Early Evolution of the Stratospheric Aerosol Plume Following the 2022 Hunga Tonga-Hunga Ha'apai Eruption: Lidar Observations From Reunion (21°S, 55°E)**, *A. Baron, P. Chazette, S. Khaykin, G. Payen, N. Marquestaut, N. Bègue and, V. Dufлот*
Published in Geophysical Research Letters, DOI: 10.1029/2022GL101751

2023 **Aerosol Optical Properties and Types over Southern Africa and Reunion Island Determined from Ground-Based and Satellite Observations over a 13-Year Period (2008–2021)**, *M. Ranaivombola, N. Bègue, H. Bencherif, T. Millet, V. Sivakumar, V. Dufлот, A. Baron, N. Mbatha, S. Piketh, P. Formenti and, P. Goloub*
Published in Remote Sensing, DOI: 10.3390/rs15061581

2022 **Global perturbation of stratospheric water and aerosol burden by Hunga eruption**, *S. Khaykin, A. Podglajen, F. Ploeger, J.-U. Grooß, F. Tencé, S. Bekki, K. Khlopenkov, K. Bedka, L. Rieger, A. Baron, S. Godin Beekmann, B. Legras, P. Sellitto, T. Sakai, J. Barnes, O. Uchino, I. Morino, T. Nagai, R. Wing, G. Baumgarten, M. Gerding, V. Dufлот, G. Payen, J. Jumelet, R. Querel, B. Liley, A. Bourassa, A. Hauchecorne, F. Ravetta, B. Clouser, and A. Feofilov*
Published in Nature Communication Earth & Environment, DOI: 10.1038/s43247-022-00652-x

- 2022 **Extreme temperature events monitored by Raman lidar – consistency and complementarity with spaceborne observations and modelling**, [A. Baron](#), *P. Chazette and J. Totems*
Published in *Meteorological Application*, DOI: 10.1002/met.2062
- 2022 **Aerosol characterization of the stratospheric plume from the volcanic eruption at Hunga Tonga January 15th 2022**, *C. Kloss, P. Sellitto, J.-B. Renard, [A. Baron](#), N. Bègue, B. Legras, G. Berthet, E. Briaud, E. Carboni, C. Duchamp, V. Duflot, P. Jacquet, N. Marquestaut, J.-M. Metzger, G. Payen, M. Ranaivombola, T. Roberts, R. Siddans and F. Jégou*
Published in *Geophysical Research Letters*, DOI: 10.1029/2022GL099394
- 2022 **EUREC⁴A observations from the SAFIRE ATR42 aircraft**, *S. Bony, M. Lothon, J. Delanoë, P. Coutris, J.-C. Etienne, F. Aemisegger, A. L. Albright, T. André, H. Bellec, [A. Baron](#), J.-F. Bourdinot, P.-E. Brilouet, A. Bourdon, J.-C. Canonici, C. Caudoux, P. Chazette, M. Cluzeau, C. Cornet, J.-P. Desbios, D. Duchanoy, C. Flamant, B. Fildier, C. Goubeyre, L. Guiraud, T. Jiang, C. Lainard, C. Le Gac, C. Lendroit, J. Lernoùld, T. Perrin, F. Pouvesle, P. Richard, N. Rochetin, K. Salaün, A. Schwarzenboeck, G. Seurat, B. Stevens, J. Totems, L. Touzé-Peiffer, G. Vergez, J. Vial, L. Villiger, R. Vogel*
Published in *Earth System Science Data*, DOI: 10.5194/essd-14-2021-2022
- 2022 **Mesoscale spatio-temporal variability of airborne lidar-derived aerosol properties in the Barbados region during EUREC⁴A**, *P. Chazette, [A. Baron](#), and C. Flamant*
Published in *Atmospheric Chemistry and Physics*, DOI: 10.5194/acp-22-1271-2022
- 2021 **Tropospheric ozone variability over Oceania and Southern Pacific during the 2019-20 Australian bushfires**, *N. Bègue, H. Bencherif, F. Jégou, H. Véremes, S. Khaykin, G. Krysztofiak, T. Portafaix, V. Duflot, [A. Baron](#), G. Berthet, C. Kloss, G. Payen, P. Keckhut, P.-F. Coheur, C. Clerbaux, D. Smale, J. Robinson, R. Querel, and P. Smale*
Published in *Remote Sensing*, DOI: 10.3390/rs13163092
- 2021 **Mitigation of bias sources for atmospheric temperature and humidity as retrieved from the mobile weather & aerosol Raman lidar**, *J. Totems, P. Chazette and [A. Baron](#)*
Published in *Atmospheric Measurement Techniques*, DOI: 10.5194/amt-14-7525-2021
- 2021 **A network of water vapor Raman lidars for improving heavy precipitation forecasting in southern France – Introducing the WaLiNeAs initiative**, *C. Flamant, P. Chazette, O. Caumont, P. Di Girolamo, A. Behrendt, M. Sicard, J. Totems, D. Lange, N. Fourrié, P. Brousseau, C. Augros, [A. Baron](#), M. Cacciani, A. Comerón, B. De Rosa, V. Ducrocq, P. Genau, L. Labatut, C. Muñoz-Porcar, A. Rodríguez-Gómez, D. Summa, R. Thundathil and V. Wulfmeyer*
Published in *Bulletin of Atmospheric Science and Technology*, DOI: 10.1007/s42865-021-00037-6
- 2021 **The lacustrine-water vapor isotope inventory experiment L-WAIVE**, *P. Chazette, C. Flamant, H. Sodemann, J. Totems, A. Monod, E. Dieudonné, [A. Baron](#), A. Seidl, H. C. Steen-Larsen, P. Doira, A. Durand and S. Ravier*
Published in *Atmospheric Chemistry and Physics*, DOI: 10.5194/acp-21-10911-2021
- 2021 **EUREC⁴A**, *B. Stevens, S. Bony, D. Farrell, [...], [A. Baron](#), [...], +100 co-authors*
Published in *Earth System Science Data*, DOI: 10.5194/essd-13-4067-2021
- 2020 **Trade-wind clouds and aerosols characterized by airborne horizontal lidar measurements during the EUREC⁴A field campaign**, *P. Chazette, J. Totems, [A. Baron](#), Cyril Flamant and Sandrine Bony*
Published in *Earth System Science Data*, DOI: 10.5194/essd-12-2919-2020
- 2020 **Remote sensing of two exceptional winter aerosol pollution events and representativeness of ground-based measurements**, *[A. Baron](#), P. Chazette and J. Totems*
Published in *Atmospheric Chemistry and Physics*, DOI: 10.5194/acp-2019-464

- 2019 **Evidence of the complexity of aerosol transport in the lower troposphere on the Namibian coast during AEROCLO-sA**, *P.Chazette, C.Flamant, J.Totems, M.Gaetani, G.Smith, A.Baron, X.Landsheere, K.Desboeufs, J.-F.Doussin, and P.Formenti*
Published in *Atmospheric Chemistry and Physics*, DOI: 10.5194/acp-19-14979-2019
[Preprinted or In progress](#)
- 2024 **Evidence of a dual African and Australian biomass burning influence on the vertical distribution of aerosol and carbon monoxide over the Southwest Indian Ocean basin in early 2020**, *N.Bègue, A.Baron, G.Krysztofiak, G.Berthet, H.Bencherif, C.Kloss, F.Jégou, S.Khaykin, M.Ranaivombola, T.Millet, T.Portafaix, V.Duflot, P.Keckhut, H.Vérèmes, G.Payen, M.K.Sha, P.-F.Coheur, C.Clerbaux, M.Sicard, T.Sakai, R.Querel, B.Liley, D.Smale, I.Morino, O.Ochino, T.Nagai, P.Smale, and J.Robinson*
Preprinted in *Atmospheric Chemistry and Physics*, DOI: 10.5194/egusphere-2023-1946
- 2024 **Radiative impact of the Hunga Tonga-Hunga Ha'apai stratospheric volcanic plume: role of aerosols and water vapor in the southern tropical Indian Ocean**, *M.Sicard, A.Baron, M.Ranaivombola, D.Gantois, T.Millet, P.Sellitto, N.Bègue, G.Payen, N.Marquestaut, V.Duflot*
Preprinted in *ESS Open Archive*, DOI: 10.22541/essoar.170231679.99186200/v1
- 2024 **Baseline Balloon Stratospheric Aerosol Profiles (B2SAP) — Perturbations in the Southern Hemisphere, 2019-2022**, *E.Asher, A.Baron, P.Yu, M.Todt, P.Smale, W.Dobson, B.Liley, R.Querel, T.Sakai, I.Morino, Y.Jin, T.Nagai, O.Uchino, E.Hall, P.Cullis, B.Johnson, G.Morris, R.S.Gao, T.Thornberry*
To be submitted to *JGR Atmospheres*
- 2024 **Evidence of an Ozone Mini-Hole Structure in the Early Hunga Tonga Plume Above the Indian Ocean**, *T.Millet, H.Bencherif, T.Portafaix, N.Bègue, A.Baron, V.Duflot, M.Sicard, J.-M.Metzger, G.Payen, N.Marquestaut, and S.Godin-Beekmann*
To be submitted to *Atmospheric Chemistry and Physics*

Communications

- 2023 **The Uncommon Optical and Microphysical Properties of Hunga Tonga Aerosols**, *A.Baron, E.Asher, V.Duflot, M.Todt, G.Payen, E.Hall, P.Cullis, B.Johnson, S.Evan, J.Brioude, J.-M.Metzger, J.Flynn, P.Walter, S.Alvarez, G.Morris, M.Martinsen, D.Kuniyuki, D.Nardini, P.Smale, B.Liley, R.Querel, T.Sakai, I.Morino, Y.Jin, T.Nagai, O.Uchino, R.S.Gao, K.Rosenlof, and T.Thornberry*
AGU 2023 - Talk
- 2023 **Properties of the Hunga-Tonga Stratospheric Aerosol Plume: Lidar and In Situ Observations from Reunion Island (21°S, 55°E)**, *A.Baron, E.Asher, V.Duflot, M.Todt, P.Chazette, S.Khaykin, G.Payen, N.Bègue, S.Evan, J.Brioude, J.Barnes, H.Telg, D.Hurst, E.Hall, K.Xiong, R.Gao and, T.Thornberry*
AMS 2023 - Talk
- 2022 **Monitoring of the Hunga-Tonga stratospheric plume optical properties at La Réunion Island**, *A.Baron, G.Payen, Y.Hello, J.-P.Cammas, N.Marquestaut, J.Brioude, S.Evan, N.Bègue, and V.Duflot*
ILRC 2022 - Virtual Poster
- 2022 **Early evolution of the Hunga – Tonga Volcanic Plume from Lidar Observations at Reunion Island (Indian Ocean, 21°S, 55°E)**, *A.Baron, G.Payen, V.Duflot, P.Chazette, S.Khaykin, Y.Hello, N.Marquestaut, M.Ranaivombola, N.Bègue, T.Portafaix, and J.-P.Cammas*
EGU 2022 - Talk

- 2022 **Early evolution of the Hunga – Tonga Volcanic Plume from Lidar Observations at Reunion Island (Indian Ocean, 21°S, 55°E)**, *A. Baron, P. Chazette, S. Khaykin, G. Payen, N. Marquestaut, N. Bègue, Thierry Portafaix, and V. Duflot*
SPARC - SSiRC workshop 2022 - Talk
- 2022 **Remote-sensing of aerosol atmospheric rivers over the southwest Indian Ocean in September 2017: origins, evolution and impacts**, *A. Baron, V. Duflot, P. Chazette, M. Gaetani, C. Flamant, J. Cuesta, G. Payen, P. Keckchut, and P. Goloub*
EGU 2022 - Talk
- 2021 **Remote-sensing of aerosol atmospheric rivers: multi-instruments observations over the southwest Indian Ocean in September 2017:**, *A. Baron, V. Duflot, P. Chazette, G. Payen, P. Keckchut, and P. Goloub*
ACTRIS-FR General Assembly 2021 - Talk
- 2020 **Relative humidity fields in the Annecy Alpine valley observed by Ro-Vibrational Raman lidar in the framework of L-WAIVE**, *A. Baron, P. Chazette and J. Totems*
EGU 2020 - virtual talk, DOI: 10.5194/egusphere-egu2020-17672
- 2019 **Cold wave of February 2018 above Europe observed by rotational Raman lidar**, *A. Baron, P. Chazette and J. Totems*
EGU 2019 - Talk, Abstract : Vol. 21, EGU2019-4012, 2019
- 2018 **Events of intense aerosol pollution over Paris Area during winter 2016-2017 observed by Raman lidar**, *A. Baron, P. Chazette and J. Totems*
EGU 2018 - Poster, Abstract: Vol. 20, EGU2018-3433, 2018

Outreach

- 2022 **Hunga – Tonga Aerosol Plume Observations**, *A. Baron et al.*, Invited talks
- Reuniwatt webinar, Virtual, moderated by V.-H. Peuch
 - Cité du volcan, La Réunion
 - Journée de l'Académie des laves de Ste Rose, La Réunion
 - Classe préparatoire Lycée Leconte De Lisle, La Réunion

Skills

- Languages French: *Mother tongue* - English: *Fluent* - Spanish: *Proficient*
- Computing Microsoft, Mac and Linux, PYTHON, MATLAB, Office Pack, L^AT_EX
- Specific Written and oral communication skills - Scientific curiosity - Team spirit

Hobbies

- Sports Rock Climbing - MTB - Hiking - Cycling
- Other DIY - Cooking - Cinema