

**Alexandre Baron**  
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POST-DOC RESEARCHER IN ATMOSPHERIC PHYSICS

## Research Interests

- Aerosols optical and microphysical properties
- Aerosol - water vapor - cloud interactions
- Innovative instrumentation for meteorology and atmospheric physics
- Active / passive remote sensing synergy from all measuring platforms
- 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 ( $\phi$ ), particle  $\phi$ , nuclear  $\phi$ , laser  $\phi$ , solid state  $\phi$ , material engineering, neutronics, heat-transfer.
- 2014 – 2015 **ERASMUS**, *Universidad Complutense de Madrid*, Madrid, Spain
- 2013 – 2014 **Bachelor in Fundamental Physics**, *Paris-Saclay University*, Orsay, France  
Statistical physics, thermodynamic, quantum mechanics, special relativity, analytical mechanics, electromagnetism, optics, programming.
- 2011 – 2013 **Preparatory classes in Mathematics, Physics and Chemistry to enter French elite universities**, *Chateaubriand Highschool*, Rennes, France  
Mathematics, Physics, Chemistry, Engineering sciences.

## Research and Teaching Experience

### Research

- 2022 – Present **Research scientist in atmospheric physics**, *Cooperative Institute for Research in Environmental Sciences (CIRES) at the NOAA Chemical Sciences Laboratory - University of Colorado*, Boulder, CO, USA  
NOAA funding from the Balloon Baseline Stratospheric Aerosol Profiles B<sup>2</sup>SAP project
- 2021 – 2022 **Post-doctoral researcher in atmospheric physics**, *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

2017 – 2020 **Young researcher 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.

2017 **Study of winter aerosol pollution events in Paris**, *5 months*, CEA Saclay, Internship at the Laboratoire des Sciences du Climat et de l'Environnement (LSCE)

In-depth knowledge of the LIDAR system, algorithmic development, data analysis (MATLAB), instrumental developments (opto-mechanics and electronics), measurement campaign.

2014 **Study of a neutrino detector (bolometer) for double- $\beta$ -decay research**, *6 weeks*, Orsay, Internship at the Centre for Nuclear and Material Sciences (CSNSM), data analysis (MATLAB, ROOT), cryogenics

### 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

2022 **TR<sup>2</sup>Ex 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**, *EUREC<sup>4</sup>A*, 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

2022 **Extreme temperature events monitored by Raman lidar – consistency and complementarity with spaceborne observations and modelling**, *A. Baron, P. Chazette and J. Totems*

Accepted at *Meteorological Application*

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 **EUREC<sup>4</sup>A 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.Gourbeyre, L.Guiraud, T.Jiang, C.Lainard, C.Le Gac, C.Lendroit, J.Lernould, 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 EUREC<sup>4</sup>A**, 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 **EUREC<sup>4</sup>A**, B.Stevens, S.Bony, D.Farell, [...], **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 EUREC<sup>4</sup>A 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  
Publié dans la revue *Atmospheric Chemistry and Physics*, DOI : 10.5194/acp-19-14979-2019
- In progress
- 2022 **Early evolution of the Hunga-Tonga mid-stratospheric aerosol plume from lidar observations at La Réunion (21°S, 55°E)**, **A.Baron**, P.Chazette, S.Khaykin, G.Payen, N.Marquestaut, N.Bègue, V.Duflot  
Submitted to *Geophysical Research Letters*

- 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*  
Submitted to Nature Communication Earth & Environment

## Communications

- 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.Dufлот*  
ILRC 2022 - 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.Dufлот, P.Chazette, S.Khaykin, Y.Hello, N.Marquestaut, M.Ranaivombola, N.Bègue, T.Portafaix, and J.-P.Cammas*  
EGU 2022 - Oral presentation
- 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.Dufлот*  
SPARC - SSiRC wokshop 2022 - Oral presentation
- 2022 **Remote-sensing of aerosol atmospheric rivers over the southwest Indian Ocean in September 2017 : origins, evolution and impacts**, *A.Baron, V.Dufлот, P.Chazette, M.Gaetani, C.Flamant, J.Cuesta, G.Payen, P.Keckchut, and P.Goloub*  
EGU 2022 - Oral presentation
- 2021 **Remote-sensing of aerosol atmospheric rivers : multi-instruments observations over the southwest Indian Ocean in September 2017 :**, *A.Baron, V.Dufлот, P.Chazette, G.Payen, P.Keckchut, and P.Goloub*  
ACTRIS-FR Genereal Assembly 2021 - Oral presentation
- 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 oral presentation, DOI : 10.5194/egusphere-egu2020-17672
- 2020 **A new insight into the synergy between water vapor content and temperature given by Raman lidar observations**, *A.Baron, P.Chazette, C.Flamant, J.Totems, O.Caumont and N.Fourrié*  
HyMeX workshop 2020 - accepted abstract for oral presentation - Workshop cancelled
- 2019 **Cold wave of February 2018 above Europe observed by rotational Raman lidar**, *A.Baron, P.Chazette and J.Totems*  
EGU 2019 - Oral presentation, 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
  - 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 : *Mothertongue* - English : *Fluent* - Spanish : *Intermediate, fluently spoken*
- Computing Microsoft and Linux environnements, MATLAB, Office Pack, L<sup>A</sup>T<sub>E</sub>X
- Specific Written and oral communication skills - Scientific curiosity - Team spirit

## Hobbies

- Sports Rock Climbing - Hiking - Bicycling
- Volunteering Board member in an Association for Community-supported Agriculture (AMAP in French)