

## Piero Di Carlo

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### PROFESSIONAL POSITIONS

- 2018 - present, Associate professor with Tenure, University "G. D'Annunzio" of Chieti-Pescara, Italy.
- 2017 - present, Italian official qualification as Full Professor (National Scientific Habilitation, FIS/06)
- 2008 - 2017, Assistant professor with Tenure, University of L'Aquila, Italy, until 2016 and University "G. D'Annunzio" of Chieti-Pescara from 2016.
- 2005 - 2008, Research Associate, University of L'Aquila, Italy.
- 2004 - 2009, Research Associate, National Laboratories of Gran Sasso, Assergi, Italy.
- 2002 - 2005, Post-Doc, University of L'Aquila, Italy.
- 1998 - 2002, PhD student, University of L'Aquila, Italy.
- 1997 - 1998, Research Assistant University of L'Aquila, Italy.

### EDUCATION

- Ph.D. (Physics), University of L'Aquila, Italy, 4 Feb. 2002. Thesis title: Production and loss of hydroxyl radical in a forest and in a city. With 11 months of study abroad at the Pennsylvania State University (USA).
- Laurea (equivalent to B.S.+M.S.) in Physics, University of L'Aquila, Italy, (mark 110/110 summa cum laude), 13th June 1997. Thesis title: Observation of sodium in the upper atmosphere using LIDAR techniques

### PROFESSIONAL EXPERIENCE

- Visiting Professor - Harvard University, USA. 21/Jul/2016 - 25/Aug/2016.
- Visiting scientist - University of York, UK. 5/Aug/2014 - 7/Sep/2014.
- Visiting scientist - Tokyo Metropolitan University, Japan. 1/12/2010 - 12/12/2010.
- Visiting scientist - Argonne National Laboratory, USA. 4/Feb/2006 - 22/Feb/2006.
- Visiting scientist - Pennsylvania State University, USA. October 2003.
- Visiting scholar - Pennsylvania State University, USA, August 2001 - October 2001.
- Visiting scholar - Pennsylvania State University, USA, May 2000 - December 2000.
- Visiting scholar - Sodankyla Finnish Meteorological Institute in Finland. 1-20/March/1998.

### INTERNATIONAL SCHOOL

- Director of the International Summer School (7th EUFAR FP7 Training Course): "School and Training on Aircraft New techniques for Atmospheric Composition Observation", University of Cambridge (UK), 26<sup>th</sup> June-6 July 2017
- Director of the International Summer School (4th EUFAR FP7 Training Course): "School On Aircraft Techniques for the studies of Atmospheric chemistry", Pescara (Italy), 17-28 August 2011

### LEAD SCIENTIST OF MULTI-INVESTIGATOR INTENSIVE FIELD CAMPAIGN

- Mission Scientist on board the atmospheric research aircraft BAe-146, responsible for the flight missions and the scientific instruments of the SONATA campaign, Pescara (Italy), 24-28 Aug. 2011

### SCIENTIFIC CONFERENCES AND SUMMER SCHOOLS COMMITTEE

- Convener of session: Impact of boreal wildfires on trop. chem. EGU, Vienna, Austria, April 2013.
- Local organizer of 9th International Symp. on Trop. Profiling, L'Aquila (Italy), 3-7 Sep. 2012
- Member organizer committee, 4th EUFAR FP7 Training Course, Pescara, Italy, 17-28 Aug. 2011.
- Local organizer committee, 6th Air Fluorescence Workshop, Lab. G. Sasso, Italy, 11-14 Feb. 2009.
- Local org. committee, Intl. Summer School 'Aerosols and Climate Change', Italy. 22-26 Sep. 2008.

- Local org. committee, Intl. Summer School ‘Observing sys. for atmo. comp.’, Italy. 22-24 Sep. 2004.

#### CURRENT/RECENT COMMITTEES AND RESPONSIBILITIES

- Member of the User Group Selection Panel of the EU Facility for Airborne Res., France. 2007–present.
- Member of the Chem. Working Group of the FAAM (Facility for Air Atmo. Meas.), UK. 2009 – present.
- Director of the Climate Observatory “Portella del Gran Sasso” (2401 m. a.s.l.), Italy 2012 - present.
- Director of the LIF laboratory of CETEMPS-University of L’Aquila from 2007-2016.
- Member of the Scientific Committee of the Centre of Excellence CETEMPS, Italy. 2008 - present.
- Member of the Committee of Graduate courses in Physics, University of L’Aquila, 2011-2016.
- Member of the Committee of the Master courses in Environ. Bio., University of L’Aquila, 2011-2013.
- Member of the Physics Department Committee University of L’Aquila (Italy). 2010 - 2016.
- Responsible of the research line ‘Atmo. chem. and air quality’, CETEMPS (Italy). 2008 - present.
- Member of the Science Faculty Committee for the Courses org. L’Aquila University (Italy). 2008 - 2016.

#### POST-DOC MENTOR

1. Dr. Eleonora Aruffo, 2012-2016.
2. Dr. Marcella Busilacchio, 2009-2015.
3. Dr. Fabio Biancofiore, 2013-2015.
4. Dr. Cesare Dari-Salisburgo, 2009-2012.

#### FIELD CAMPAIGNS

- Principal Investigator of the TD-LIF system for NO<sub>2</sub> and NO<sub>y</sub> obs. in the following field campaigns:
  13. Cape Verde Atmospheric Observatory, CVAO – NCAS, 8 Jan. -15 Feb. 2015.
  12. Auchencorth Moss (Edinburgh, Scotia). ACTRIS campaign, 22 April – 15 June 2013•
  11. SONATA campaign on the BAE146 aircraft, Pescara airport (Italy), 24 – 28 Aug. 2011.
  10. BORTAS campaign on the BAE146 aircraft, Halifax airport (Canada), 5 July – 3 Aug. 2011.
  9. RONOCO WINTER campaign on the BAE146 aircraft East Midlands (UK). 4 - 28 Jan. 2011.
  8. SetptEX campaign on the BAE146 aircraft East Midlands (UK) airport. 31 Aug. – 9 Sep. 2010.
  7. RONOCO campaign on the BAE146 aircraft East Midlands (UK) airport. 12 - 30 July 2010.
  6. OP3 campaign, Bukit Atur tower, Borneo forest (Malaysia). 28 June – 26 July 2008.
- Other field campaigns:
  5. NO<sub>2</sub> intercomparison campaign at L’Aquila (Italy), 2 - 30 July 2007.
  4. AIRFLY campaign, Argonne National Laboratory, University of Chicago (USA). 4- 22 Feb. 2006.
  3. AIRFLY campaign, Frascati National laboratories (Italy)., 18-24 March 2003.
  2. TexAQS campaign, Houston (USA). Team member, 6 Aug.– 12 Sep. 2000.
  1. PROPHET campaign, Michigan forest (USA). Team member, 26 June - 3 August 2000.

#### INVITED SEMINARS

8. University of Innsbruck, Austria, 28 October, 2015.
7. University “G. D’Annunzio” of Chieti-Pescara, Italy, 5 February 2014.
6. University of York, UK, 23 October 2012.
5. Cambridge University, UK, 24 January 2011.
4. Tokyo Metropolitan University, Japan, 6 December 2010.
3. ISAC, CNR, Bologna (Italy), 2007.
2. ISSAOS, L’Aquila, Italy, 2007.
1. IBAF, CNR, Montelibretti (Rome, Italy), 2007.

#### TEACHING ACTIVITIES

##### University “G. d’Annunzio” of Chieti-Pescara:

- Teacher of the course: ‘Remote Sensing’ for undergraduate students, A.Y. 2016-2017

##### University of L’Aquila:

- Teacher of course: ‘Environmental data analysis with laboratory’ for undergraduate, AY 2015-2016

- Teacher of the course: ‘Statistics methods’ for graduate students, A.Y. 2011-2016
- Teacher of the course: ‘Ecological Statistics’ for graduate students, A.Y. 2009-2011.
- Assistant teacher of following the courses:
  - ‘Remote sensing of the atmosphere’ for undergraduate, A.Y.: 2001-2007.
  - ‘Introduction to physics of the sensors’ for undergraduate students, A.Y. 2002-2008.
  - ‘Laboratory of mechanics and thermodynamics’ for undergraduate students, A.Y 2008-2010.
  - ‘Laboratory of physics and computer sciences’ for undergraduate students, A.Y. 2007-2008.
  - ‘Physics and chemistry of the atmosphere’ for undergraduate students, A.Y. 2000-2006
  - ‘Mechanics and thermodynamics III’ for undergraduate students, A.Y. 2002-2005.

#### PHD STUDENTS SUPERVISED

- 1) Aruffo Eleonora (XXV cycle, 2009-2012); 2) Fabio Biancofiore (XXV cycle, 2009-2012).

#### MASTER THESIS SUPERVISOR

Supervisor of 6 Master thesis in Physics and Chemistry of the Atmosphere, candidates: E. Coppari, A. Taddei, M. Barone, A. Fasoli, E. Aruffo, S. De Novellis

Supervisor of 10 Master thesis in Environ. Science, candidates: E. Avocone, R. De Feo, G. Magrini, G. D’Amicodatri, L. Boccacci, M. Molino, M. La Barbera, P. Casalena, N. De Luca, M. Paglione.

#### INVITED TALK AT INTERNATIONAL CONFERENCES AND WORKSHOP

4. International Symposium on Sustainable Urban Environment 2010, Tokyo, Japan, Dec. 2010.
3. EUFAR Expert Working Group: Instrument Design and Installation, Exeter, UK, Nov. 2007.
2. Gordon Conference on Biogenic Chemistry & The Atmosphere, Ventura, USA 25 Feb. 2007.
1. ACCENT workshop, Julich, Germany, Nov. 2006.

#### PARTICIPATION IN EDITORIAL BOARD OF INTERNATIONAL JOURNALS

2. Associate editor of THE OPEN ATMOSPHERIC SCIENCE JOURNAL, since 2017
1. Associate Editor of the Journal ATMOSPHERIC MEASUREMENT TECHNIQUE, since 2013

#### REVIEWER OF INTERNATIONAL JOURNALS AND PROPOSALS

Review of students’ grant for the American Geophysical Union, of the Research proposal at the Natural Environment Research Council (NERC), UK, and of the following journals: Geophy. Res. Letters, Atmo. Chem. and Phys., Envir. Earth Sciences, Annales Geophysicae. Analytical Chem., Science of the Total Envir., Journal of Geophy. Research, Envir. Geology, Nature Communication.

#### RESEARCH GRANTS

- Principal investigator of the following projects:
  - EUFAR (European Facility For Airborne Research / Transnational Access). STANCO project. Funds 210000€, (2016-2017).
  - ACTRIS TNA. Nitrogen Oxides and nitrate radical in the Auchencorth Moss, Funds 6000€, (2015).
  - EUFAR (European Facility For Airborne Research / Transnational Access). SONATA project. Funds 130000€, (2010-2011).
  - SHARE Ev-K2. High altitude observatories. Funds: 35000€, 2010-2015.
  - Bilateral project Japan-Italy, Italian Minister of the Foreign Affair. Funds 3500€, 2010 - 2011.
  - CETEMPS-Italian Space Agency. Develop. of TD-LIF for aircraft meas. Funds 155000€, 2009-2010.
  - CETEMPS-Italian Space Agency. Develop. of LIF for ground meas. Funds 85000€, 2005-2008.
  - CETEMPS. Develop. of high resolution spectrometer for DOAS meas. Funds 105000€, 2001-2004.
- Principal investigator of the following projects funded as subcontractor:
  - NERC (UK). BORTAS campaign. Funds 50000£, 2011-2012.
  - NERC (UK). Certification of the TD-LIF to be installed on BAe aircrafts and RONOCO campaign. Funds 100000£, 2009-2011.

-Young research grant of the Italian Ministry of the University and Research. Funds 2500€. 2000.

#### PRIZES AND AWARDS

- The paper: Di Carlo P, et al., *Science*, 30, 304, 722-725, 2004 is the first one (as number of citation) in the: "top 20 of articles published on the same topic", years 2011-2016. From BioMedLib.
- Winner of a Young Research fellowship of the INFM, Italy to visit a foreign University, 2000.
- Winner of the 'Nicola Chiari' prize for the best application for measurements and automation, National Instrument Meeting, Rome (Italy), 2009.
- Member of the American Geophysical Union and European Geophysical Union since 2002
- Member of the European Geosciences Union since 2011

#### SELECTED RELEVANT PUBLICATIONS

- Poma A, Colafarina S, Aruffo E, Zarivi O, Bonfigli A, Di Bucchianico S, **Di Carlo P.**, Effects of ozone exposure on human epithelial adenocarcinoma and normal fibroblasts cells. *PLoS ONE* 12(9): e0184519. <https://doi.org/10.1371/journal.pone.0184519>, 2017.
- Aruffo E., F. Biancofiore, **P. Di Carlo**, et al., C. Percival, Impact of biomass burning emission on total peroxy nitrates: fire plume identification during the BORTAS campaign, *Atmos. Meas. Tech.*, 9,1–16, 2016
- Reed C., M. J. Evans, **P. Di Carlo**, J. D. Lee, L. J. Carpenter, Interferences in photolytic NO<sub>2</sub> measurements: explanation for an apparent missing oxidant?, *Atmos. Chem. Phys.*, 16, 47, 2016.
- Busilacchio M., **P. Di Carlo**, et al., Production of peroxy nitrates in boreal biomass burning plumes over Canada during the BORTAS campaign, *Atmos. Chem. Phys.*, 16, 3485–3497, 2016.
- **Di Carlo P.**, Air pollution: new insight from direct measurements of ozone production, *Environ. Chem.*, 12, 706-707, 2015.
- Putero D.,..., **P. Di Carlo**, et al., Seasonal variation of ozone and black carbon observed at Paknajol, an urban site in the Kathmandu Valley, Nepal, *Atmos. Chem. Phys.*, 15, 1395713971, 2015
- **Di Carlo P.**, et al., Wildfires impact on surface nitrogen oxides and ozone in Central Italy, *Atmospheric Pollution Research*, 6, 29-35, 2015
- Biancofiore F., M. Verdecchia, **P. Di Carlo**, et al., Analysis of surface ozone using a recurrent neural network, *Science of the Total Environment*, 514, 379–387, 2015.
- Morgan WT., ..., **P. Di Carlo**, et al., Influence of aerosol chemical composition on N<sub>2</sub>O<sub>5</sub> uptake: airborne regional measurements in NorthWestern Europe, *Atmos. Chem. Phys.*, 15, 973-990, 2015.
- Jolleys M. D., ..., **P. Di Carlo**, et al., Properties and evolution of biomass burning organic aerosol from Canadian boreal forest fires, *Atmos. Chem. Phys.*, 15, 3077–3095, 2015.
- Lowe D.,..., **P. Di Carlo**, et al., WRFchem model predictions of the regional impacts of N<sub>2</sub>O<sub>5</sub> heterogeneous processes on nighttime chemistry over north-western Europe, *Atmos. Chem. Phys.*, 15, 1385-1409, 2015.
- Galassi DMP, P. Lombardo, B. Fiasca, A. Di Cioccio, T. Di Lorenzo, M. Petitta, **P. Di Carlo**, Earthquakes trigger the loss of groundwater biodiversity, *Scientific Reports*, 4, 6273, 2014.
- Aruffo, E., **Di Carlo, P.**, et al., Aircraft observations of the lower troposphere above a megacity: alkyl nitrate and ozone chemistry, *Atmospheric Environment*, 94, 479–488, 2014.
- Pacioni G., M. Leonardi, **P. Di Carlo**, et al., Instrumental monitoring of the birth and development of truffles in a Tuber melanosporum orchard, *Mycorrhiza*, 24, 65-72, 2014.
- Parrington, M., P. I. Palmer, A. C. Lewis, J. D. Lee, A. R. Rickard, **P. Di Carlo**, et al., Ozone photochemistry in boreal biomass burning plumes, *Atmos. Chem. Phys.*, 13, 7321-7341, 2013
- Palmer P. I., ... **P. Di Carlo**, et al., Quantifying the impact of Boreal forest fires on Tropospheric oxidants over the Atlantic using Aircraft and Satellites (BORTAS) experiment: design, execution and science overview, *Atmos. Chem. Phys.*, 13, 6239-6261, 2013.
- **Di Carlo P.**, E. Aruffo, et al., Aircraft based four-channel thermal dissociation laser induced fluorescence instrument for simultaneous measurements of NO<sub>2</sub>, total peroxy nitrate, total alkyl nitrate, and HNO<sub>3</sub>, *Atmos. Meas. Tech.*, 6, 971–980, 2013.
- Ave M., M. Bohacova, E. Curry, **P. Di Carlo**, et al., Precise measurement of the absolute fluorescence yield of the 337 nm band in atmospheric gases, *Astropart. Physics*, 42, 90–102, 2013.

- Fowler, D., ..., **P. Di Carlo**, et al., Effects of land use on surface–atmosphere exchanges of trace gases and energy in Borneo: comparing fluxes over oil palm plantations and a rainforest *Phil. Trans. Royal Soc. B*, 366:3196-3209, 2011
- Hewitt C. N.,..., **Di Carlo P.**, et al., Oxidant and particle photochemical processes above a southeast Asian tropical rain forest (the OP3 project): introduction, rationale, location characteristics and tools, *Atmos. Chem. Phys.*, 10, 169-199, 2010.
- Hewitt C.N., A.R. MacKenzie, **P. Di Carlo** et al., Nitrogen management is essential to prevent tropical oil palm plantations from causing ground level ozone pollution, *PNAS*, 106, 18447, 2009
- **Di Carlo P.**, G. Pitari, N. De Luca, D. Battisti, Observations of surface radon in Central Italy, *Environmental Geology*, 58, 431-436, 2009.
- Dari-Salisburgo C, **P Di Carlo**, F Giammaria, Y Kajii, A D'Altorio, Laser Induced fluorescence instrument for NO<sub>2</sub> measurements: observations at a central Italy background site, *Atmo. Envir.*, 43, 970, 2009.
- **Di Carlo, P.**, G Pitari, E Mancini, S Gentile, E Pichelli, G. Visconti, Evolution of surface ozone in central Italy based on observations and statistical model, *J. Geophys. Res.*, 112, 10316, 2007.
- **Di Carlo P.**, W. H. Brune, M. Martinez, H. Harder, R. Leshner, X. Ren, T. Thornberry, M. A. Carroll, V. Young, P. B. Shepson, D. Riemer, E. Apel, C. Campbell, Missing OH reactivity in a forest: Evidence for unknown reactive biogenic VOCs, *Science*, 304, 722-725, 2004.