Sante Laviola
PhD

WORK ADDRESS

Consiglio Nazionale delle Ricerche (CNR)
Istituto di Scienze dell'Atmosfera e del Clima (ISAC)
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PERSONAL DATA

Date of birth: July 21, 1973
Place of birth: Policoro (Matera), Italy

EDUCATION

2003	Graduated Environmental Engineering at the University of Basilicata. Thesis: "Characterization of Clouds from Satellite Data"
2003	Remote Sensing Summer School "Application with the newest Multi-Spectral Meteorological Satellites", 22-31 May, Maratea, Italy
2005	Visiting Scientist at MetOffice, Satellite Application Division, (UK).
2007	PhD in "Methods and Technologies for the Environmental Monitoring" at the University of Basilicata. Thesis: "Estrazione di parametri ottici e microfisici da immagini satellitari di sistemi nuvolosi"

EMPLOYMENT

2013 – Present   Full-time Research Scientist at the CNR-ISAC, Satellite Meteorology

2009 – 2013   Research Scientist at the CNR-ISAC, Satellite Meteorology

2007 – 2009   Post-Doc at the CNR-ISAC, Satellite Meteorology

RESEARCH INTERESTS

➢ Algorithm development for studying precipitation, hailstorms and cloud structure.
➢ Satellite remote sensing severe storms (focus on the Mediterranean)
➢ Climate studies of extreme weather
➢ Atmospheric Rivers
➢ Storm-producing Terrestrial Gamma Ray-flashes (TGF)

EXTRA-SCIENCE PROFESSIONAL ACTIVITIES
Sommelier, professional wine taster, wine judge to national and international committees, columnist for Italian wine magazines, book writer.

MEMBERSHIPS IN SCHOLARLY SOCIETIES

➢ EMS - European Meteorological Society
➢ AMS - American Meteorological Society
➢ EGU - European Geosciences Union
➢ AIT - Associazione Italiana Telerilevamento
➢ AISAM - Associazione Italiana Scienze dell'Atmosfera e Meteorologia

REVIEWING AND EDITORIAL ACTIVITIES

Activity as Reviewer

➢ Advances in Geosciences
➢ Advances in Meteorology
➢ Atmospheric Research
➢ European Journal of Remote Sensing
➢ Geophysical Research Letters (GRL)
➢ IEEE Gescience and Remote Sensing Letters
➢ IEEE Transactions on Geoscience and Remote Sensing
➢ IEEE Selected Topics in Applied Earth Observations and Remote Sensing
➢ Journal of Geophysical Research (JGR)

- ➢ Journal of Hydrometeorology
- ➢ Quarterly Journal of the Royal Meteorological Society
- ➢ Journal of Hydrology
- ➢ Earth System Science Data (ESSD)
- ➢ MDPI Remote Sensing
- ➢ Journal of Applied Meteorology and Climatology (JAMC)
- ➢ Nature – Scientific Reports
- ➢ Microwave Radiometer Specialists' Meeting (MicroRad)

Editorial activity

- ➢ 2023 - present – Associated Editor for Atmosphere and Climate – Special section of Frontiers in Environmental Science
- ➢ 2022 - 2023 – Guest Editor for the MDPI Remote Sensing Special Issue: Atmospheric Rivers from Modeling and Remote Sensing
- ➢ 2021 - present – Scientific and Editorial Board of the Climate Monthly Bulletin – Dep. of Meteorology of the Instutute of GeoSciences (IGEO) – University of Tirana (Albania)
- ➢ 2021 - present – Review Editor for Frontiers in Climate (Frontiers Journal)
- ➢ 2020 - 2022 – Guest Editor for the MDPI Remote Sensing Special Issue: Satellite Microwave Remote Sensing for Severe Storms Detection

LEADERSHIP AND/OR PARTICIPATION TO SCIENTIFIC PROJECTS

2007 – 2017	Satellite Application Facility on Support to Operational Hydrology and Water Management (H-SAF). Funded: EUMETSAT.
2007 – 2011	PROSA–Prodotti di osservazione satellitare per allerta meteorologica PI: Dr. Franco Prodi. Funded: Agenzia Spaziale Italiana (ASI).
2007 – 2010	Progetto Strategico "Nowcasting avanzato con l'uso di tecnologie GRID e GIS", PI: Dr. Franco Prodi. Funded: Regione Puglia.
2011 – 2012	Partner of the European Comm. GMES Project "A collaborative project aimed at pre-validation of a GMES Global Water Scarcity Information Service – GLOWASIS", PI: Dr. Rogier Westerhoff, Deltares.
2013 – 2017	Partner of WP3 of the European Comm. Collaborative Project "Global Earth Observation for integrated water resource assessment - EartH2Observe", PI: Dr. Jaap Schellekens, Deltares
2013 – 2015	Research Project "NextSnow", PI: Dr. Vincenzo Levizzani. Funded: Project of Interest "NextData".
2014 – 2016	Space Advanced Project Excellence in Research and Enterprise (SAPERE), PI: Andrea Pietropaolo. Funded: Industrial cluster
2014 – 2016	PON03_00067_6 "Apulia Space", PI: Distretto Tecnologico Aerospaziale (DTA) - Puglia. Funded: MIUR
2015 – 2016	Telerilevamento da satellite della tipologia di precipitazione sulla regione Antartica", PI: Dr. Daniele Casella. Funded: Programma Nazionale di Ricerche in Antartide (PNRA).
2015 – 2017	Pilot Project "RAilway Meteorological SEcurity System (RAMSES)" PI: Ing. Salvatore Gabriele, CNR-IRPI. Funded: RFI, Direzione

	Territoriale Produzione Reggio Calabria.
2016 – 2017	Bilateral project CNR-AORI "Comparison of tornadic supercells and their environmental conditions in Japan and Italy", PI: Dr. Miglietta Mario, CNR-ISAC.
2018 – 2019	European Comm. Collaborative Project H2020 "Copernicus Evolution And Applications with Sentinel Enhancements and Land Effluents for Shores and Sea (CEASELESS)", PI: Prof. Agustín Sánchez-Arcilla, Technical University of Catalonia BarcelonaTech – UPC
2019 – 2021	Raincast – ESA AO/1-9324/18/NL/NA A multi-platform and multi-sensor study to address the requirement from the research and operational communities for global precipitation measurements. Co-responsible for Task 3.2.2 and contributor to WP2200 and WP4000. PI: Prof. Alessandro Battaglia, University of Leicester.
2023 – 2025	Exploring Atmospheric Rivers in the Mediterranean and their Connection with extreme hydrometeorological events over Italy: observation, modelling and impacts (ARMEX) – PRIN Project Prot. 2022RTRLEJ - responsible of WP for satellite analysis - PI: Dr. Silvio Davolio, CNR-ISAC.
2023 – 2025	Hail Hazard in the Mediterranean (H2Med) – PRIN-PNRR Project Prot. P2022X5MBJ - responsible of WP1 (hail climatology) and WP4 (hail from the MASHA technique) - PI: Dr. Sante Laviola, CNR-ISAC.

VISITING SCIENTIST ACTIVITY

2005	UK MetOffice, Satellite Application Division, Exeter (UK).
2010	Swedish Meteorological and Hydrological Institute (SMHI), Atmospheric Remote Sensing Research Division, Norrköping (S).
2014	National Oceanic and Atmospheric Administration (NOAA), Center for Satellite Applications and Research (STAR) Division, University of Maryland, College Park, USA.
2019	National Oceanic and Atmospheric Administration (NOAA), Center for Satellite Applications and Research (STAR) Division, University of Maryland, College Park, USA.

TEACHING

2023 – present	Adjunct Professor of Satellite Meteorology (MTO506E), Program of Atmospheric Sciences, Technical University of Istanbul (İTÜ)
2008 – 2021	Cloud Physics (sector FIS/06), Univ. of Bologna, Dept. of Physics. Course lecture: Remote Sensing by Microwave Satellite Sensors: Theory and Methods.

<u>Schools and Training Courses</u>

2009   EUMETSAT H-SAF Training and User Service: "Precipitation Rates at Ground by GEO/IR Supported by LEO/MW". USAM, Rome, 14-15 December

2014   EUMETSAT International Remote Sensing School for Hydrological Applications: "PMW–IR blended technique for precipitation products" Dipartimento di Protezione Civile, Rome, 14-18 July.

2016   8th IPWG Training Event, Retrieval Algorithms Session: "Microwave Sounder Precipitation Algorithms". CNR, Bologna, 3-7 October

2018   EUMETSAT Autumn School 2018: "Use of satellite data and products for severe weather nowcasting". Thessaloniki, Greece, 24-28 September

STUDENT ADVISING

<u>Doctor in Physics and Mathematics</u>

1. Academic year 2008-2009 Francesco Marra. Doctor in Physics, Dept. of Physics, Univ. of Bologna. Thesis: Misura della precipitazione da satellite mediante un nuovo algoritmo a 183 GHz. Tutors: V. Levizzani, **S. Laviola**.
2. Academic year 2009-2010 Stefania D'Aurizio. Doctor in Physics, Dept. of Physics, Univ. of Bologna. Thesis: Sviluppo di un algoritmo per la stima della precipitazione nevosa nelle microonde ad alta frequenza da satellite. Tutors: V. Levizzani, **S. Laviola**.
3. Academic year 2011-2012 Alice Malvaldi. Doctor in Physics, Univ. of Bologna. Thesis: Cicloni di tipo tropicale nel Mediterraneo: Analisi combinata da satellite e modello. Tutors: V. Levizzani, **S. Laviola,** M. M. Miglietta.
4. Academic year 2012-2013 Massimo Valeri. Doctor in Physics, Univ. of Bologna. Thesis: Analisi satellitare della struttura fisica di un ciclone di tipo tropicale sul Mediterraneo. Tutors: V. Levizzani, **S. Laviola**, M. M. Miglietta.
5. Academic year 2014-2015 Diego Cerrai. Doctor in Physics of the Earth System, Univ. of Bologna. Thesis: Moisture and vorticity in Medicanes: Theoretical approach and case studies. Tutors: V. Levizzani, **S. Laviola**, M. M. Miglietta, E. Cattani.
6. Academic year 2014-2015 Francesca Vittorioso. Doctor in Physics, Univ. of Bologna. Thesis: An inter-comparison between a VIS/IR and a MW satellite-based methods for cloud detection and classification. Tutors: V. Levizzani, E. Cattani, **S. Laviola**.
7. Academic year 2015-2016 Matteo Ponzano. Doctor in Physics, Univ. of Bologna. Thesis: Simulazione della risposta dei radiometri satellitari nelle microonde AMSU-B e MHS per il retrieval della precipitazione nevosa e studio di sensibilità dell'algoritmo 183-WSL. Tutors: V. Levizzani, **S. Laviola**.
8. Academic year 2017-2018 Paolo Pettinari. Doctor in Physics, Univ. of Bologna. Thesis: Studio di sensibilità dei sensori MHS, ATMS, GMI, SSMIS e sviluppo di un

algoritmo prototipale per il retrieval del vapore acqueo. Tutors: V. Levizzani, **S. Laviola**, Alessandro Tiesi.

9. Academic year 2018-2019 Stefano Della Fera. Doctor in Physics, Univ. of Bologna. Thesis: Il ruolo di un *atmospheric river* nell'evento di precipitazione estrema dell'ottobre 2018 in Italia. Tutors: V. Levizzani, S. Davolio, **S. Laviola**, M. M. Miglietta.

10. Academic year 2020-2021 Matteo Pellacani Doctor in Physics, Univ. of Bologna. Thesis: Satellite hailstorm climatology over the Mediterranean area (1999 2020). Tutors: V. Levizzani, **S. Laviola**, G. Monte.

11. Academic year 2020-2021 Marco Vercellino Doctor in Physics, Univ. of Bologna. Thesis: Effetti di un atmospheric river atlantico sulle precipitazioni intense del 2 ottobre 2020 sulle Alpi: V. Levizzani, S. Davolio, **S. Laviola**, M. M. Miglietta.

12. Academic year 2020-2021 Luca Patrick McAllister Doctor in Physics, Univ. of Bologna. Thesis: Caratterizzazione dinamica e microfisica del medicane Zorbas (27-29 settembre 2018): V. Levizzani, **S. Laviola**, G. Monte

13. Academic year 2021-2022 Federico Vermi Doctor in Physics, Univ. of Bologna. Thesis: Analisi ad alta risoluzione spazio-temporale di eventi grandinigeni nel bacino del Mediterraneo mediante una nuova tecnica satellitare ibrida multisensore: V. Levizzani, **S. Laviola**, G. Monte, M. Guarascio

14. Academic year 2022-2023 Michele Tonnini Doctor in Physics, Univ. of Bologna. Thesis: Caratterizzazione multisensore di eventi grandinigeni e di tipo flash flood nel bacino del Mediterraneo attraverso un indice di severità basato sulla combinazione ottimale di misure satellitari, radar e fulminazioni: F. Porcù, **S. Laviola**, G. Monte, A. Fornasiero

Batchelor Degree in Atmospheric Physics and Meteorology

1. Academic year 2009-2010 Michele Cicoria. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: Prima validazione di una maschera di copertura nevosa nelle microonde ad alta frequenza. Tutors: V. Levizzani, **S. Laviola**.

2. Academic year 2009-2010 David Fibbi. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: Utilizzo di dati satellitari nell'analisi di eventi di precipitazione intensa. Tutors: V. Levizzani, **S. Laviola**, D. Conte, M. M. Miglietta.

3. Academic year 2009-2010 Massimo Valeri. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: Stima della precipitazione nevosa da satellite. Tutors: V. Levizzani, **S. Laviola**.

4. Academic year 2009-2010 Mauro Bianconi. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: Utilizzo delle microonde ad alta frequenza per la stima della precipitazione. Tutors: V. Levizzani, **S. Laviola**.

5. Academic year 2009-2010 Alessandro Maffioli. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: Caratterizzazione delle nubi e formazione delle idrometeore mediante sensori satellitari di ultima generazione. Tutors: V. Levizzani, E. Cattani, **S. Laviola**.

6. Academic year 2011-2012 Jacopo Alessandri. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: I cicloni di tipo tropicale sul Mediterraneo. Tutors: V. Levizzani, **S. Laviola**.

7. Academic year 2013-2014 Giulio Mucci. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: L'attività elettrica nei cicloni tropicali e di tipo tropicale. Tutors: V. Levizzani, **S. Laviola**.
8. Academic year 2013-2014 Lorenzo Smorlesi. Degree in Atmospheric Physics and Meteorology, Dept. of Physics, Univ. of Bologna. Thesis: I Medicane – Cicloni di tipo tropicale. Tutors: V. Levizzani, **S. Laviola**.
9. Academic year 2014-2015 Veronica Masi. Degree in Physics and Mathematics, Dept. of Physics, Univ. of Bologna. Thesis: Aspetti fondamentali dell'interazione tra la radiazione nelle microonde e le nubi nell'osservazione satellitare. Tutors: V. Levizzani, **S. Laviola**.

Ph.D.

1. 2012 - Andrès Merino Suances. Dept. of Chemistry and Applied Physics, Univ. of Leon, Leon, Spain. Thesis: Analysis, identification and forecasting of hail precipitation events in the Iberian Peninsula. Advisors. Jose Luis Sànchez Gomez, Laura Lopez Campano, Eduardo Garcia Ortega. International Reviewer: **S. Laviola**.

ERASMUS+ Program

1. 2023 - Areti Angeli, University of Ioannina, Greece
2. 2021 - Theodoros Chatzichristos, University of Ioannina, Greece
3. 2016 - Kyrkou Natalia, University of Ioannina, Greece
4. 2013 - Christina Tsarsitalidou, University of Ioannina, Greece

SCIENTIFIC TRAINING/EDUCATIONAL SEMINARS

1. **S. Laviola, 2023**: "Hail from space … and in time!", University of Naples "Parthenope" – Napoli, 28 November 2023
2. **S. Laviola, 2023**: "Impronte e deformazioni: come si studia la grandine? Il ruolo dei satelliti nel Mediterraneo", 20th Festival della Scienza – Impronte, Genova, 28 October 2023
3. **S. Laviola, 2023**: "L'Italia, il Mediterraneo e i cambiamenti climatici", educational seminar organised by Presidio del Libro Magna Grecia/UniTre Foundation, Sala Consiliare del Comune di Policoro, 12 July 2023
4. **S. Laviola, 2023**: "Microwave satellite sensors for detecting heavy precipitation. Looking at near future with new generation radiometers", scientific seminar series "Incontri del giovedì", CNR-IEIIT, 09 February 2023
5. **S. Laviola, 2023**: "Il vigneto, un bioindicatore naturale. Pensare oggi al vigneto di domani", 4th Congress - Evoluzione Naturale, Grottaglie, 22 January 2023
6. **S. Laviola, 2022**: "Il clima e la meteorologia nella viticoltura e nel gusto del vino", Professione Enogastronomo II - Dipartimento di Scienze, University of Roma Tre, 31 May 2022
7. **S. Laviola**, **2021**: "Osservare la grandine da satellite: una prospettiva per applicazioni operative e climatologiche", Workshop (virtual) on Advanced Meteorology (WAM), 22 May 2021

8. **S. Laviola**, **2019**: "Typicity and territoriality of local wines in a changing climate - Climate change and viticulture: what's the future?", I.T.A.S. ''G. Briganti'', Matera, 2 March 2019

9. **S. Laviola**, **2019**: "Climate change and biodynamic viticulture", 1st Congress - Evoluzione Naturale, Grottaglie, 27 January 2019

10. **S. Laviola**, **2017**: "Tornado in Italia: un rischio sottovalutato?", 15th Festival della Scienza – Contatti, Genova, 04 November 2017

11. **S. Laviola**, **2013**: "Osservazioni dallo spazio dell'acqua in atmosfera", 10th Festa Internazionale della Storia – Noi: storia e futuro – 19-27 October 2013

12. **S. Laviola**, **2012**: "Il Ciclo Idrologico: principi fisici di funzionamento della macchina della vita", 9th Festa Internazionale della Storia – I Patrimoni della Storia – 20-28 October 2012

NATIONAL/INTERNATIONAL CONFERENCES

1. **Laviola S.** et al., **2023**: "Osservazione delle grandinate in Emilia-Romagna combinando misure dallo spazio e da sistemi radar", V Convegno Nazionale di Radar Meteorologia (RadMet) – Bologna, 05-07 Jul 2023 (oral presentation).

2. Antonini A., **Laviola S.** S. Melani, G. Monte, A. Ortolani., **2023**: "Sinergia tra sistemi radar e satelliti meteorologici per il rilevamento di eventi grandinigeni terrestri e off-shore", V Convegno Nazionale di Radar Meteorologia (RadMet) – Bologna, 05-07 Jul 2023 (oral presentation).

3. **Laviola S.**, G. Monte, E. Cattani, V. Levizzani, **2023**: "Hail climatology in the Mediterranean basin using the GPM constellation (1999-2021)", 9th International Conference on Meteorology and Climatology of the Mediterranean (MetMed) – Genova, 22-24 May (oral presentation).

4. **Laviola S.**, P. Colosio, G. Monte, R. Ranzi, **2023**: "Satellite, radar and raingauge investigation of severe flash flood events in mountain Mediterranean catchments", 9th International Conference on Meteorology and Climatology of the Mediterranean (MetMed) – Genova, 22-24 May (poster presentation).

5. **Laviola S.**, F. Vermi, M. Guarascio, G. Monte, G. Folino, V. Levizzani, **2022**: "The Multi-sensor Approach for Satellite Hail Advection (MASHA). A new technique for nowcasting applications", EMS Annual Meeting 2022 – European Meteorological Society Conference – 04-09 Sep.

6. **Laviola S.**, A. Fornasiero, M. Celano, G. Monte, P. P. Alberoni, and V. Levizzani, **2022**: "A novel multi-sensor technique for the optimal detection of hailstorms", (poster) ERAD - Locarno (CH), 29 Aug-2 Sep.

7. Antonini A., **S. Laviola,** S. Melani, A. Sonnini, G. Monte, A. Ortolani, and V. Levizzani, **2022**: "Off-shore and in-land hail detection through radar and satellite", (poster+extended abstract) ERAD - Locarno (CH), 29 Aug-2 Sep.

8. **Laviola S.**, F. Chiaravalloti, G. Monte, and V. Levizzani **2022**: "A quasi-real time satellite method for tracking Atmospheric Rivers", 4th AISAM National Congress, Milan, Italy, February.

9. **Laviola S.** (Invited Speaker), **2021**: "Hail from Space", International Symposium on Remote Sensing in Meteorology, 01-02 Dec, Istanbul, Turkey.

10. **Laviola S.**, G. Monte, V. Levizzani, R. Ferraro, J. Beauchamp, **2021**: "Hail detection from high-frequency radiometers on the GPM constellation. A new prospect for a global hailstorm climatology", EMS virtual Conference, 03-10 Sep.

11. **Laviola S.**, G. Monte, V. Levizzani, R. Ferraro, J. Beauchamp, **2021**: "Hail detection from high-frequency radiometers on the GPM constellation. A new prospect for operational applications and a global climatology", X International Conference AIT (virtual), 13-15 Sep, Cagliari.

12. **Laviola S.**, G. Monte, V. Levizzani, R. Ferraro, J. Beauchamp, **2021**: "Detecting hail from the GPM constellation: a prospect for the new generation microwave sensors of the EPS-SG programme", EUMETSAT Conference (virtual), 20-24 Sep, Romania.

13. **Laviola S.**, O. Peverini, G. Virone, E. Castelli, E. Papandrea, and G. Monte **2021**: "CubeX: the microwave nano-radiometer for exploring precipitation processes and convection evolution", EUMETSAT Conference (virtual), 20-24 Sep, Romania.

14. **Laviola S.**, G. Monte, V. Levizzani, R. Ferraro, J. Beauchamp, **2021**: "Hail Detection from the GPM Constellation: a prospect for a global hailstorm climatology", 3rd AISAM National Congress (virtual), L'Aquila, Italy, February.

15. **Laviola S.**, R. Ferraro, J. Beauchamp, V. Levizzani, **2018**: "Cloud Type Classification and Solid Precipitation Retrieval from Satellite Microwave Sensors", 1st AISAM National Congress, Bologna, Italy, September.

16. Manzato A., V. Riva, M. Miglietta and **S. Laviola**, **2017**: "Analysis and simulations of the 7 July 2007 large hailstorm in NE Italy", 9th European Conference on Severe Storms (ECSS), Pula, Croatia, September.

17. **Laviola S.**, and co-authors (14), **2017**: "Meteorological tools in support to the railway security system on the Calabria region", European Geosciences Union General Assembly 2017, Wien, Austria, April.

18. **Laviola S.**, M. M. Miglietta, D. Cerrai, Elsa Cattani, and V. Levizzani, **2016**: "Potential vorticity patterns in Mediterranean hurricanes", European Geosciences Union General Assembly 2016, Wien, Austria, April.

19. **Laviola S.**, E. Cattani, V. Levizzani, and G. P. Marra, **2016**: "Classificazione e identificazione di nubi grandinigene col metodo MicroWave Cloud Classification (MWCC)", VIII Convegno Nazionale AIT, 15-16-17 giugno 2016, Palermo.

20. **Laviola S.**, J. Beauchamp, R. Ferraro, and V. Levizzani, **2015**: "Two passive microwave prototype methods for hail detection", European Geosciences Union General Assembly **2015**, Wien, Austria, April.

21. **Laviola S.**, M Valeri, M.M. Miglietta, and V. Levizzani, **2014**: "Multi-sensor approach for a satellite detection and characterization of Mediterranean Hurricanes: a case study", European Geosciences Union General Assembly 2014, Wien, Austria, April.

22. Gabriele S., **Laviola S.**, F. Chiaravalloti, **2014**: "Meteorological considerations and satellite retrievals in supporting to the assessment of local hydrologic homogeneity over Italy", 7th IPWG Workshop on Precipitation Measurements, Tsukuba, 17-21 November.

23. Gabriele S., **Laviola S.**, V. Levizzani, M. M. Miglietta, L. Balcini, S. Dietrich, S. Federico, and G.P. Marra, **2014**: "Analysis and investigation of extreme rainfall events combining different data sources", European Geosciences Union General Assembly 2014, Wien, Austria, April.

24. Levizzani V., **S. Laviola**, E. Cattani, and M. J. Costa, **2013**: "Extreme precipitation on the Island of Madeira on 20 February 2010 as seen by the satellite passive microwave sounders", European Geosciences Union General Assembly 2013, Wien, Austria, April.

25. **Laviola S.**, A. Moscatello, M. M. Miglietta, E. Cattani, and V. Levizzani, **2012**: "A satellite and numerical model combined approach to study extreme rain events over

the Mediterranean basin", European Geosciences Union General Assembly 2012, Wien, Austria, 22 – 27 April.

26. **Laviola, S.**, Gabriele, S., Miglietta, M.M., Cattani, E., Levizzani V, **2012**: "Meteo-hydrological analysis of intense flash-flood events over Southern Italy". Atti 86° Congresso della Società Geologica Italiana, vol. 21, Collana 2012.

27. **Laviola S.**, E. Cattani, and V. Levizzani, **2011**: "Rainfall estimations and characterization of snow-covered terrains: Validation of the new version of the 183-WSL retrieval method", European Geosciences Union General Assembly 2011, Wien, Austria, 03 – 08 April.

28. **Laviola S.**, S. D'Aurizio, E. Cattani, and V. Levizzani, **2010**: "Characterization of Snow-Covered Terrains and Detection of Snowfall by Using the 183-WSL Retrieval Scheme", 5th Workshop of the International Precipitation Working Group, Hamburg, Germany, 11-15 October.

29. **Laviola S.** and V. Levizzani, **2008**: "Observing precipitation with AMSU-B opaque channels: the 183-WSL algorithm", 4th Workshop of the International Precipitation Working Group, Beijing, China, 13-17 October.

30. Torricella F., E. Cattani, **S. Laviola** and V. Levizzani, **2008**: "On the statistical relationship between the optical and microphysical characteristics of (warm topped) clouds from AVHRR and the rainfall intensity derived from new AMSU rain algorithm", 4th Workshop of the International Precipitation Working Group Beijing, China, 13-17 October.

31. **Laviola S.**, V. Levizzani, M. M. Miglietta, and A. Moscatello, **2008**: "Satellite and numerical model investigation of two Mesoscale Convective Systems over Central Mediterranean", EGU 10th Plinius Conference on Mediterranean Storms, Nicosia, Cyprus, Vol. 10, 22–24 September.

32. Torricella F., E. Cattani, V. Levizzani, and **S. Laviola**, **2008**: "On the statistical relationship between the optical and microphysical characteristics of warm topped clouds from AVHRR and the rainfall intensities derived from AMSU", EGU 10th Plinius Conference on Mediterranean Storms, Nicosia, Cyprus, Vol. 10, 22–24 September.

33. **Laviola S.**, and V. Levizzani, **2008**: "Rain retrieval using the 183-WSL algorithm", Proc. of EUMETSAT Meteorological Satellite Conference, Darmstadt, Germany, 8-12 September.

34. **Laviola S.**, and V. Levizzani, **2008**: "Rain retrieval using the 183-WSL algorithm", Proc. of European Geosciences Union General Assembly, Vienna, Austria, 13-18 April.

35. **Laviola S.**, and V. Levizzani, **2008**: "Rain retrieval using the 183-WSL algorithm", Proc. Of International Conference on Clouds and Precipitation, Cancun, Mexico, 7-11 July. CD-ROM.

36. Cimini D., V. Cuomo, **S. Laviola**, T. Maestri, P. Mazzetti, S. Nativi, J. M. Palmer, R. Rizzi, F. Romano, **2005**: "Cloud parameters from infrared and microwave satellite measurements", Proc. Of ITWG: ITSC-XIV, Beijing, China, 25-31 May.

Scopus-ID: 35345247500

PUBLICATIONS

<u>Technical reports</u>

1. **Laviola S.**, Visiting Scientist Activity, **2015**: "Development of a passive microwave prototype method for hail detection and validation of the 183-WSL algorithm over CONUS. NOAA Technical Report, p. 20, NOAA/STAR.
2. **Laviola S.**, Visiting Scientist Activity, **2011**: "Validation and evaluation of different AVHRR and AMSU/MHS based precipitation retrieval algorithms. EUMETSAT SAF-NWC Technical Report, p. 34, SMHI.
3. **Laviola S.**, Visiting Scientist Activity, **2006**: "Rain rate detection using scattering index approach. A quantitative comparison of two techniques and an improvement of Bennartz algorithm", EUMETSAT SAF-NWP Technical Report, p. 22, MetOffice.

<u>Books</u>

1. Levizzani V. and **S. Laviola**, **2020**: "Snow cover and snowfall from satellite passive microwave sensors". Climate and environmental changes in the Italian mountains, Edited by Assunta Donato and Elisa Palazzi. NextData Project.
2. Ferraro, R.R., D. Cecil, and **S. Laviola**, **2020**: "Hailfall detection". Satellite Precipitation Measurements (ISBN 978-3-030-35797-9 / ISSN 1574-0919). Levizzani, V., C. Kidd, D. B. Kirschbaum, C. D. Kummerow, K. Nakamura, and F. J. Turk, Eds., Advances in Global Change Research, 69, Springer Nature, Cham, 791-817, doi: https://doi.org/10.1007/978-3-030-35798-6_20.
3. Kidd C., V. Levizzani and **S. Laviola**, **2013**: "Quantitative Precipitation Estimation from Earth Observation Satellites". "Rainfall: State of the Science", Geophysical Monograph Series, ISBN 978-0-87590-481-8, vol. 191, 288 p.
4. **Laviola S.**, and V. Levizzani, **2010**: "Passive Microwave Remote Sensing of Rain from Satellite Sensors". "Advanced Microwave and Millimeter Wave Technologies Semiconductor Devices Circuits and Systems", Ed. M. Mukherjee, InTech, ISBN 978-953-307-031-5, 642 p.

<u>International journals</u>

1. **Laviola S.**, G. Monte, E. Cattani, V. Levizzani, **2023**: How Hail Hazards Are Changing Around the Mediterranean. Eos, 104, https://doi.org/10.1029/2023EO230070. Published on 27 February 2023 (printed on ed. Sept. 2023).
2. Davolio S., M. Vercellino, M. M. Miglietta, L. Drago Pitura, **S. Laviola**, V. Levizzani, **2023**: The influence of an atmospheric river on a heavy precipitation event over the western Alps. Weather and Climate Extremes, 39 (2023) 100542. https://doi.org/10.1016/j.wace.2022.100542
3. **Laviola S.**, G. Monte, E. Cattani, V. Levizzani, **2022**: Hail Climatology in the Mediterranean Basin Using the GPM Constellation (1999–2021). Remote Sens. 2022, 14, 4320. https://doi.org/10.3390/rs14174320

4. **Laviola S.**, G. Monte, V. Levizzani, R. R. Ferraro, and J. Beauchamp, **2020**: A New Method for Hail Detection from the GPM Constellation: A Prospect for a Global Hailstorm Climatology. Remote Sens. 2020, 12(21), 3553; https://doi.org/10.3390/rs12213553

5. Davolio S., S. Della Fera, **S. Laviola**, M. M. Miglietta, and V. Levizzani, **2020**: Heavy Precipitation over Italy from the Mediterranean Storm "Vaia" in October 2018: Assessing the Role of an Atmospheric River. Mon. Wea. Rev., 148 (9), 3571-3588; https://doi.org/10.1175/MWR-D-20-0021.1

6. **Laviola S.**, V. Levizzani, R. R. Ferraro, and J. Beauchamp, **2020**: Hailstorm detection by satellite microwave radiometers. Remote Sens. 2020, 12(4), 621; https://doi.org/10.3390/rs12040621

7. Miglietta, M. M., D. Cerrai, **S. Laviola**, E. Cattani, V. Levizzani, **2017**: Potential vorticity patterns in Mediterranean "hurricanes". Geophys. Res. Lett., 44, https://doi.org/10.1002/2017GL072670

8. Gascón, E., **S. Laviola**, A. Merino, and M. M. Miglietta, **2016**: Analysis of a localized flash-flood event over the central Mediterranean. Atmos. Res., 182, 256-268, https://doi.org/10.1016/j.atmosres.2016.08.007

9. Gjesteland, T., N. Østgaard, **S. Laviola**, M. M. Miglietta, E. Arnone, M. Marisaldi, F. Fuschino, A. B. Collier, F. Fabro, and J. Montanya, **2015**: Observation of intrinsically bright Terrestrial Gamma ray Flashes from the Mediterranean basin. J. Geophys. Res.,120, 12143-12156, https://doi.org/10.1002/2015JD023704

10. **Laviola, S.**, J. Dong, C. Kongoli, H. Meng, R. Ferraro, and V. Levizzani, **2015**: An intercomparison of two passive microwave algorithms for snowfall detection over Europe. IEEE Geosci. Remote Sensing Symp., 886- 889, doi: 10.1109/IGARSS.2015.7325907

11. Puca, S., F. Porcù, A. Rinollo, G. Vulpiani, P. Baguis, S. Balabanova, E. Campione, A. Ertürk, S. Gabellani, R. Iwanski, et al., **2014**: The validation service of the hydrological SAF geostationary and polar satellite precipitation products, Natural Hazards and Earth System Sciences, vol. 14, no. 4, pp. 871-889, https://doi.org/10.5194/nhess-14-871-2014

12. **Laviola S.**, V. Levizzani, E. Cattani, and C. Kidd, **2013**: The 183-WSL fast rain rate retrieval algorithm. Part II: Validation using ground radar measurements. Atmos. Res., 134, 77-86, https://doi.org/10.1016/j.atmosres.2013.07.013

13. Rinollo A., G. Vulpiani, S. Puca, P. Pagliara, J. Kaňák, E. Lábó, L'. Okon, E. Roulin, P. Baguis, E. Cattani, **S. Laviola**, and V. Levizzani, **2013**: Definition and impact of a quality index for radar-based reference measurements in the H-SAF precipitation product validation. Nat. Hazards Earth Syst. Sci., 13, 2695-2705, https://doi.org/10.5194/nhess-13-2695-2013

14. Mugnai, A., D. Casella, E. Cattani, S. Dietrich, F. Di Paola, **S. Laviola**, V. Levizzani, G. Panegrossi, P. Sanò, D. Biron, L. De Leonibus, D. Melfi, P. Rosci, A. Vocino, F. Zauli, S. Puca, A. Rinollo, L. Milani, F. Porcù, and F. Gattari, **2013**: Precipitation products from the Hydrology SAF. Nat. Hazards Earth Syst. Sci., 13,1959-1981.

15. Levizzani V., **S. Laviola**, E. Cattani, and M. J. Costa, **2013**: Extreme precipitation on the Island of Madeira on 20 February 2010 as seen by satellite passive microwave sounders. European J. Remote Sensing, 46, 475-489.

16. Miglietta M.M., **S. Laviola**, A. Malvaldi, D. Conte, V. Levizzani, and C. Price, **2013**: Analysis of tropical-like cyclone over the Mediterranean Sea through a combined modelling and satellite approach. Geophys. Res. Lett., 40, 2400-2405, https://doi.org/10.1002/grl.50432

17. **Laviola S.**, V. Levizzani, E. Cattani, and C. Kidd, **2012**: First validation of retrieved rain rates and snow cover mask of the 183-WSL retrieval method. 12th Specialist Meeting of Microwave Radiometry and Remote Sensing of the Environment, IEEE, E-ISBN doi: 10.1109/MicroRad.2012.6185242

18. Levizzani V., **S. Laviola**, and E. Cattani, **2011**: Detection and measurement of snowfall from space. Remote Sensing, 3(1), 145-166, https://doi.org/10.3390/rs3010145

19. **Laviola S.**, and V. Levizzani, **2011**: The 183-WSL fast rain rate retrieval algorithm. Part I: Retrieval design. Atmos. Res., 99, 443-461, https://doi.org/10.1016/j.atmosres.2010.11.013

20. **Laviola S.**, A. Moscatello, M. Miglietta, E. Cattani, and V. Levizzani, **2011**: Satellite and numerical model investigation of two heavy rain events over Central Mediterranean. J. Hydrometeor., 12, 634-649, https://doi.org/10.1175/2011JHM1257.1

21. **Laviola S.**, and V. Levizzani, **2009**: Observing precipitation by means of water vapor absorption lines: a first check of the retrieval capabilities of the 183-WSL rain retrieval method. Italian Journal of Remote Sensing, 41(3), 39-49.

22. E. Cattani, F. Torricella, **S. Laviola** and V. Levizzani, V., **2009**: On the statistical relationship between cloud optical and microphysical characteristics from AVHRR and rainfall intensity derived from a new AMSU rain algorithm. Nat. Hazards Earth Syst. Sci., 9, 2135-2142, https://doi.org/10.5194/nhess-9-2135-2009

23. **Laviola S.**, and V. Levizzani, **2008**: Rain retrieval using 183 GHz absorption lines. 10th Specialist Meeting of Microwave Radiometry and Remote Sensing of the Environment, IEEE, E-ISBN, doi:10.1109/MICRAD.2008.4579505

24. **Laviola S.**, V. Cuomo, and F. Romano, **2005**: Precipitation rate estimations from AMSU data. Atti della Fondazione Giorgio Ronchi, vol. 4, pp. 673-680.