



APPENDIX No. 1 - AWARD REQUEST

1. Candidate

Name: Sîrbu

First name: Emil

Doctor of the year: 2010

Position held: General Director

Institution: S.C. Intervenții Active în Atmosferă S.A. Bucharest

Mobile phone:

Email address:

2. Edition "Romanian Research Gala": 2024

3. Award and category for which it is applied (individual or research team):

- Earth sciences, environment and climate change – award "Grigore Cobălcescu";
- Research team;

4. Team leader:

- dr. eng. dr. h.c. Sîrbu Emil;

5. Composition of the research team (names of team members, position held, year of last degree awarded):

- a. dr. eng. dr. h.c. Sîrbu Emil, General Director of S. Intervenții Active în Atmosferă S.A., 2022 – Scientific title of Doctor of Biology at the University of Bucharest and Doctor Honoris Causa at Bioterra University;
- b. eng. Lazăr Ionuț – Lucian, Program Director of the Hail Combat Unit Moldova – 2 Vrancea, Intervenții Active în Atmosferă S.A., 2015 – Graduated from the Faculty of Automation, Computers, Electrical and Electronics Engineering – Dunărea de Jos Galati University;
- c. Ph.D. Istrate Vasiliță, Coordinator of Active Interventions in the Atmosphere at Intervenții Active în Atmosferă S.A., 2021 – Ph.D. in Geography;



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d. Ph.D. Dobri Radu Vlad, Coordinator of Active Interventions in the Atmosphere of S. Intervenții Active în Atmosferă S.A., 2021 – Ph. D. In Geography;

6. A description of the most important scientific achievements of the last 5 years

a. *2019, 2021, 2022, 2023, Research - Development conducting "Experimental Program, through small-scale local experiments rain enhancement in the Banat, western Oltenia, southeast and north-northeastern Romania regions" - Integrated experimental tests for rain enhancement, using aircraft technology;*



b. *2022, Research development through the realization of an experimental program for rain enhancement using new cloud seeding technology with helium and silver iodide balloon systems.*





c. 2022 and 2023, *Research-Development of ground-based systems for the generation and dispersion of active cloud seeding agents and active interventions in the atmosphere using ground-based generator technology by conducting the following experimental Programmes:*

c.1. *Experimental programme through small-scale local experiments in the field of Hail Suppression Technology, New Active Cloud Seeding Agents and Other Weather Modification Active Agents, using ground-based generator technology";*

c.2. *„Experimental programs through small-scale local experiments for rain enhancement in the regions: Banat, western Oltenia, south-east and north-north-east Romania, using the technology of ground generators", carried out within the Hail Suppression Unit Moldova - 2 Vrancea.*

The specific objectives of the experimental programme were to test the silver iodide (AgI) ground generator technology, with a perspective of its gradual implementation in Romania, for active interventions in the atmosphere to control hail and enhance/uniform precipitation. The ability to manage physical processes in clouds in order to artificially modify them is based on the use of the atmospheric instability in the process of cloud evolution and precipitation formation, which allows the modification of their development course with minimal energy input. The scientific basis of the Active Cloud Intervention technology for enhancing/uniforming precipitation consists of the physical characteristics related to the unstable state of the cloud environment formed by liquid droplets and the competitive nature of the growth of crystalline precipitation nuclei by assimilation of the supercooled droplets from clouds. The number of crystallization nuclei is a link which, through control and given the limited energy and hydrological resource in this thermodynamic process, can favor the intensification of the precipitation formation process. AgI, which has an ice-like crystal structure and elementary cell dimensions, is used as an ice-forming reagent in this technology. Various technical standards have been developed for the introduction of this agent into the cloud. In particular, in terrestrial generators, in order to obtain ice-forming AgI particles with high dispersion, the method of thermal condensation of their formation is applied, which is obtained by burning 2% AgI solution in acetone at the combustion flame of compressed propane at a temperature of about 1000°C. The AgI reagent activity increases depending on the temperature of the medium in which it is dispersed: between -3°C and -15°C, the temperature at which the maximum activity is reached.

As a result, the experiments carried out confirmed the fact that active interventions in the atmosphere with the technology of ground generators on cold clouds such as Nimbostratus and convective can lead to an increase in the amount of precipitation between 5 and 10% compared to neighboring areas, where no intervened. Also, on the radar images, the local increase in the intensity



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of the rain and the surface on which the phenomenon manifested itself was also observed in the areas where the experiment was carried out.

d. 2022 – 2023, The production of an automated, power-independent, silver iodide Ground Generator with atmospheric ionisation system for active atmospheric intervention actions, with the purpose of seeding clouds in order to reduce the risks caused by hailstorms and to enhance/uniform precipitation;

The positive results of the experiments carried out with the help of manual ground generators, determined the start of a research - development project for the realization of a prototype of the Ground Generator with silver iodide and atmospheric ionization system, automated and power independent. The AgI particles released above the chimney of a generator form a plume which, together with the related heat release (about 7 kW when burning 1.1 l/h of acetone), rises to a height of about 10 m above the ground under normal conditions. The particles are then transported and dispersed along with other atmospheric aerosols by horizontal and vertical movements of winds and turbulence in the lower troposphere. Innovations in the prototype, from laboratory measurements, can improve the vertical transport of seeding agent by up to 200% in the first 100 meters above ground. For this prototype, a patent application with number A/00023 of 30.01.2024 was applied at the State Office for Inventions and Trademarks.





7. Narrative curriculum vitae of the 'individual' applicant or of each member of the research team in the case of the 'research team' applicant, showing the results of the research activity over the last 5 years, according to the quantitative indicators in Annex 2 to the Regulation and the qualitative evaluation criteria in Annex 3 to the Regulation.

Sîrbu Emil - Narrative curriculum vitae

Emil Sîrbu was born on August 25, 1962, in the commune of Popești, Argeș County. From 1976 to 1980, he graduated with outstanding results from Pipera Industrial High School of Electronics. He then pursued and completed his studies at the Faculty of Electronics and Telecommunications at the Polytechnic University of Bucharest, between 1983 and 1989.

He continued to enhance his professional skills by completing postgraduate courses at the National Institute for Research and Cultural Training, specializing in "Risk Level Assessment" in 2002 and "Certification of Personal Protective Equipment" in 2003.

In 2004, he graduated from the National Defense College of "Carol I" National Defense University in Bucharest.

In 2010, he publicly defended his **doctoral thesis in the field of Biology at the Doctoral School of Biology at the University of Bucharest.**

He continues to enhance his professional training by completing the course "Protocol Architecture, Etiquette, and Art of Communication in Diplomacy" at the Romanian Diplomatic Institute in 2022.

Also in 2022, he received the title of **Honorary Doctor from Bioterra University in Bucharest.**

He began his professional career in 1983 as an electronics engineer at the Ministry of Light Industry. Between 1989 and 1992, he worked as an engineer at SC Info Service SA in Bucharest, and between 1992 and 1994, he served as an Administrator and Chief Engineer at SC Dimar Impex SRL in Bucharest.

Since 1994 and up to the present, he has been the **General Manager of SC Active Atmosphere Interventions SA** (the former name of the company until 2019 being SC General Conf Grup SRL).

Regarding professional expertise, his main fields are the development and manufacture of civil protection equipment, biomaterials, and, starting in 2012, the development of active atmospheric intervention technologies.

He conducted his first research internship between 2002 and 2005 as part of the **CALIST Program** - contract no. 3503/04.11.2002 (Project Name: Development of a methodology for correlating anthropometric dimensions with constructive dimensions for 3 types/2-5 representative assortments of protective clothing).

Between 2004 and 2006, he was a member of the team that implemented the **RELANSIN 2004 Program** - Contract no. 1912 (Project Name: Ecological Composite Biomaterial and obtaining procedure



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Collaborators: University of Bucharest - Faculty of Biology - Microgen Center USAM Timișoara and SC General Conf. Grup SRL).

He was the **coordinator** of the Research and Development Program "Study of research and development regarding the production and use of materials and biomaterials for protection" carried out by SC GENERAL CONF GRUP SRL between 2003 and 2009.

Between 2019 and 2023, he coordinated six experimental tests as part of the "Experimental research program, through local experiments of small amplitude for the increase/uniformity of precipitation in the Banat regions, western Oltenia, southeast, and north-northeast of Romania - Integrated experimental tests regarding the application of precipitation increase, using aviation technology".

Also, in the years 2022 and 2023, he coordinated the conduct of experimental tests within the experimental program through local experiments of small amplitude in the field of technical means for combating hail falls, new active cloud seeding agents, and other active agents for local modifications of meteorological factors, using ground generator technology respectively of the experimental program through local experiments of small amplitude for the uniform increase of precipitation in the regions: Banat, western Oltenia, southeast, and north-northeast of Romania, using ground generator technology, conducted within the Hail Combat Unit of Moldova - 2 Vrancea.

He has participated in over 20 international conferences, symposiums, and professional visits in Romania, Great Britain, France, Germany, Spain, the United States of America, China, Brazil, Russia, Indonesia, the United Arab Emirates, and the Republic of Moldova.

Among his most important scientific achievements are the publication of three articles in Web of Science indexed journals and five books and courses on adapting to climate change and active atmospheric interventions.

He holds two **invention patents** for "Work and rescue vest from drowning" (Invention Patent No. 112100 C / 30.05.1997), "Transportable light column" (Invention Patent RO121291B1 / 28.02.2007 published in BOPI 2/2007), and two invention patent applications for "Biocomposite material based on collagen with advanced hygroscopicity and its obtaining process" and "Ground vortex type generator, with silver iodide and ionization system".

Emil Sîrbu is a member of various organizations and committees, including the Employers' Association of Military Technical Producers "Patromil", the Military Order of Romania, the Association for the Defense of Human Rights (OADO), the International Police Association (IPA Romania), the Union of Professional Journalists of Romania (UZPR), and the ASRO / CT 227 standardization committee.

He has been awarded several medals over time for activities undertaken to defend human rights (2017 - Silver Medal for the Defense of Human Rights; 2018 - Gold Medal for the Defense of Human Rights; 2019 - Order of the Gold Star for the Defense of Human Rights; 2021 - Gold Cross in the rank of knight for the



Defense of Human Rights), as well as the Excellence Diploma at the Romania-Israel International Symposium 2020.

Since 2021, he has been appointed as an **Honorary Consul of the Republic of Indonesia in Constanța**.

In 2023, he obtained the title of **Academician**, within the Academy of Medical Sciences "Acad. Gheoghe Țîbîrnă" in the Republic of Moldova.

Currently, Emil Sîrbu is actively involved in the development and implementation of new active atmospheric intervention technologies aimed at reducing the damages of meteorological-climatic risks such as hailstorms, early frosts, fog, and drought.

Lazăr Ionuț-Lucian - Narrative curriculum vitae

Ionuț - Lucian Lazăr was born in 1989 in Focșani, Vrancea County. He attended the Faculty of Automation, Computers, Electrical Engineering, and Electronics at Dunărea de Jos University in Galați, obtaining a Bachelor's degree in Computer Science and Information Technology in 2013. In 2015, he earned a Master's degree in Business Law from the Faculty of Law at the Bucharest Ecological University. Since 2023, he has been pursuing a Master's degree in Natural Hazards, GIS, and Remote Sensing at the Faculty of Geography and Geology at Alexandru Ioan Cuza University in Iași.

Since 2015, Ionuț - Lucian Lazăr has been employed at INTERVENȚII ACTIVE ÎN ATMOSFERĂ S.A., a company based in Bucharest that holds the license as a Licensed Operator of the National Anti-Hail and Precipitation Enhancement System, as well as a Member of the General Designer of the National Anti-Hail and Precipitation Enhancement System in Romania. His professional experience has encompassed various key roles, where he has made significant contributions to innovative projects and operations for protection against dangerous weather phenomena.

From 2015 to 2019, he underwent continuous professional training in the field of active atmospheric interventions, progressing through all professional levels as a Coordinator of Active Interventions in the Atmosphere. Since 2019, he has served as Program Director at INTERVENȚII ACTIVE ÎN ATMOSFERĂ S.A., leading the Anti-Hail Combat Unit Moldova - 2 Vrancea, which provides protection against hazardous meteorological phenomena for agricultural crops, infrastructure, and local communities over an area of over 600,000 hectares using anti-hail rocket technology.

As Program Director, he has led vital operations to combat hail in the Vrancea and Galați regions. Under his guidance, the team successfully implemented advanced weather modification technologies to protect vulnerable areas against hail and other meteorological hazards. This experience has developed his leadership and management skills, strengthening his strategic vision in the field of climate change.



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Simultaneously, he has been actively involved in innovative research projects aimed at stimulating precipitation and developing solutions to combat hail. Since 2019, he has been a permanent member of the research team working on projects related to the use of aviation technology to increase and uniformize precipitation in various regions of Romania. These projects have involved collaborations with external partners and the conduct of integrated experimental tests to evaluate the effectiveness of technologies and identify optimal solutions for protecting vulnerable communities from extreme weather phenomena. These projects have involved flights with specially equipped aircraft for cloud seeding to stimulate precipitation and have resulted in the preparation of research reports.

Throughout his professional career, he has contributed to the development and implementation of innovative technologies in the field of active atmospheric interventions, focusing on combating extreme weather phenomena and increasing the resilience of affected communities.

Since 2022, he has also served as Project Manager in the research and development project on hail suppression and precipitation increase/uniformization using ground generator technology. As Project Manager, he has conducted research projects with his team under the coordination of the Authority for the Administration of the National Anti-Hail and Precipitation Enhancement System, focusing on hail suppression and precipitation increase/uniformization using ground generator technology in the responsibility area of the Anti-Hail Combat Unit Moldova - 2 Vrancea.

One of the most significant projects he has been involved in is the development of a prototype automated ground generator with silver iodide and ionization system, a revolutionary technology that will contribute to increasing resilience to climate change in the regions where it will be implemented. This project, initiated by Ionuț - Lucian Lazăr and his team in 2022, was completed in 2023 with the filing of a patent application with OSIM for the Invention Patent. This initiative was supported by technical expertise, project management, and skills acquired through research and development programs in the field of active atmospheric interventions.

In 2020, he was elected President of GAL Unirea Focșani, a position from which he was involved in regional and community development projects, emphasizing innovation, sustainability, and improving the quality of life in the local community.

His education and continuous training reflect his interest in the field of climate change, applied research in the field of active atmospheric interventions, and management. In 2022 and 2023, he completed postgraduate courses in Strategic Management of Internal Affairs and Top Management of Internal Affairs at the National College of Internal Affairs within the Police Academy, demonstrating his commitment to professional development and continuous specialization.

In 2020, he was part of the team of specialists of the General Designer of the National Anti-Hail and Precipitation Enhancement System, involved in the elaboration of the Homologation Program of the Anti-Hail Combat Units in Romania, a document subsequently approved by 5 Ministries.



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He contributed to the development and publication of three course materials entitled "Coordinator of Active Interventions in the Atmosphere" (Qualification Levels 1, 2, and 3). These publications are essential for the training and preparation of specialists in the field of active atmospheric interventions to combat the negative effects of extreme weather phenomena such as hail. The works cover essential aspects of coordinating and implementing active interventions in the atmosphere through the launch of anti-hail rockets, providing updated and practical information for system specialists.

His accumulated experience at the national level has become visible to other states worldwide, leading to his involvement in organizing and participating in presentations in Romania for high-level government representatives from countries such as France, Italy, Turkey, Indonesia, Morocco, China, the USA, and Germany.

Ionuț - Lucian Lazăr has attended prestigious international conferences, where he has made significant contributions to the field of active atmospheric intervention research. At the 28th IUGG General Assembly (IUGG2023) in Berlin, Germany, he presented a detailed physical assessment of a hail suppression project in Romania using radar data and provided an analysis of its effectiveness. At the XVIII-th edition International Conference Present Environment and Sustainable Development in Iași, Romania, Ionuț discussed the influence of seeding with glaciogenic substances on the radar characteristics of hail clouds, offering a detailed perspective on the meteorological processes involved in hail formation. Also, at the 3rd European Hail Workshop organized at the Karlsruhe Institute of Technology, Germany, Ionuț presented the results of his research on hail reports from the severe meteorological database in Europe, highlighting climatology and sounding parameters as essential tools for managing meteorological risks.

These participations in international conferences reflect Ionuț's commitment and expertise in the field of active atmospheric intervention research and the implementation of effective strategies to combat the effects of climate change.

In conclusion, Ionuț - Lucian Lazăr is a dedicated and experienced professional in the field of artificial weather modification, with extensive experience in coordinating and managing research and active atmospheric intervention projects. Through his contributions to international conferences and his extensive research and development activities, Ionuț has demonstrated not only remarkable technical skills but also a profound passion for innovation and finding innovative solutions to problems related to climate change and environmental protection. His vast expertise and remarkable results recommend him as a valuable leader in efforts to combat extreme meteorological phenomena and promote environmental sustainability.

Istrate Vasiliță - Narrative curriculum vitae

Istrate Vasiliță was born in 1987 and is originally from Bârsești commune, Vrancea county. He has graduated the Faculty of Geography and Geology at Alexandru Ioan Cuza University in Iasi (bachelor's degree in 2009). In 2011 he obtained his master's degree in Geography at the same university, specializing in Natural



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Hazards and Spatial Planning. In 2016 he defended his PhD thesis in the field of Geography, obtained with Magna Cum Laude (title of the thesis: *Characteristics of the genesis, forecast and climatic risk of hail in agricultural areas from Moldova*, scientific coordinator: Liviu Apostol).

Since 2012 he has been employed by Active Interventions in the Atmosphere Company as Coordinator of Active Interventions in the Atmosphere and Program Director. The main activities are monitoring weather conditions using data from weather radars; **conducting weather modification intervention for hail suppression and rain enhancement; managing a unit for combating hail falls; conducting studies in the field of weather active interventions**. Since 2003 he is also Assistant Professor at Alexandru Ioan Cuza University, Iasi, Faculty of Geography and Geology, Department of Geography. He has a good expertise in the fields of natural risk assessment, active interventions in the atmosphere and physical geography. Moreover, he has advanced expertise in Geographic Information Systems: ESRI ArcGIS (digitization, editing and spatial analysis) Datum (digitization, georeferencing, editing and spatial analysis), QGIS (georeferencing and interoperability with other GIS software) and meteorological **radar data processing software: ASU-MRL and LROSE-TITAN**.

In 2014 he was GIS Expert in the project "Species and habitat mapping services and maps production in the framework of the scientific studies necessary for the elaboration of the Management Plans of Natura 2000 sites: ROSPA0049, ROSCI0391, ROSCI0255 and Dersca Peat Bog Nature Reserve". Participated in 206 and 2027 as a research assistant in the research project PN-II-RU-TE-2014-4-1602 "Burials and funerary customs in the late Hallstatt period in the Lower Danube", Institute of Archaeology "Vasile Pârvan", Bucharest, project leader - Dr. Teleaga Emilian.

From 2019 to 2023 he was a member of the team conducting **6 local experiments** in the framework of the "Experimental Program through small-scale local experiments for rainfall increase/uniformity in the regions of Banat, western Oltenia, south-east and north-north-east Romania" - Integrated experimental tests on **rain enhancement application using aviation technology**. In 2022 and 2023 he was a member of the team conducting **two integrated experimental tests** on hail suppression and **rain enhancement application using ground generator technology** in the "Experimental program by small-scale local experiments for other weather modification applications using ground generator technology." conducted at UCCG Moldova - 2 Vrancea.

From 2014 to present he has attended **19 international conferences** on physical geography, environment, meteorology and atmospheric physics with presentations, communications and posters. In 2021 and 2022 he participated in the realization of two research topics on the feasibility of using ground-based silver iodide generators for hail suppression and rain enhancement. He has published 22 scientific papers in extenso in international journals or conference volumes as first author or co-author. The most valuable are published in journals listed in the Web Science Core Collection, **Progress in Physical Geography: Earth and Environment (Q1 AIS, 2022)**, **Land (Q4 AIS, 2023)**, **Időjárás (Q4 AIS, 2021)** and **Present Environment and Sustainable Environment (Q4 AIS, 2021)**.



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He is currently working as Coordinator of active interventions in the atmosphere within the Moldova 2 Vrancea Hail Suppression Unit, having as main activities the analysis of the efficiency of hail suppression actions and **research for the development of ground generator technology with silver iodide and ionization system.**

Dobri Radu-Vlad - Narrative curriculum vitae

Dobri Radu-Vlad was born in 1994, originally from Barcea commune, Galați county. He graduated from the Faculty of Geography and Geology of the "Alexandru Ioan Cuza" University in Iasi, where he obtained his bachelor's degree in the Hydrology-Meteorology specialization, in 2016. In 2018 he obtained his master's degree in geography, Geomatics specialization, within the same faculty.

In September 2023, he publicly defended his doctoral thesis in the field of Geography, and obtained the Magna Cum Laude qualification with the title: **"The use of satellite images and the standardized precipitation index for the analysis of drought and rainfall excess in Romania"** coordinated by Professor Eugen Rusu.

Since April 2017, he is employed within the Active Interventions in the Atmosphere SA company, holding the position of Coordinator of Active Interventions in the Atmosphere. The main attributions are represented by the use of the data provided by meteorological radars through specialized software, with the aim of monitoring the development of convective cells (storms) and carrying out active interventions in the atmosphere with the aim of combating hail and increasing precipitation. In addition to the specialized software for analyzing meteorological data, he also has solid knowledge of using the software for editing, analyzing and mapping spatial and climatic data, ESRI ArcGIS.

Within the company, in 2023 he was a member of the team for the realization of an experimental test on the use of terrestrial generator technology (on the ground), with the aim of combating hail and increasing atmospheric precipitation within the "Experimental program by small-scale local experiments for other weather applications in the field of weather modification, using the ground generator technology" conducted at UCCG Moldova - 2 Vrancea.

During the years of faculty, master and doctorate, **he obtained 8 awards** for very good academic results, but also for the presentation of scientific results at specialized conferences. One of these was offered by the Institute of Geography of the Romanian Academy, for the best work addressing issues related to sustainable development. He also obtained an attestation certificate for the **"Training Course on Weather Modification"** organized by Nanjing University of Information Science & Technology - A Regional Training Center of World Meteorological Organization in 2020, he obtained a doctoral scholarship for participating in the project entitled **"PhD students and postdoctoral researchers prepared for the labor market!"** and obtained an award offered by UEFISCDI for the article **"Drought Extent and Severity on Arable Lands in Romania Derived from Normalized Difference Drought Index (2001–2020)"**.



He has participated so far in 19 scientific conferences organized in Romania and in 5 scientific conferences organized abroad, he has published several scientific abstracts in the volumes of the conferences as well as 10 articles, 3 of which are ISI quoted and 5 are ISI indexed. The most important are the ISI quoted ones, published in internationally renowned magazines such as **Remote Sensing from MDPI**, **Atmosphere from MDPI** and **Időjárás - Quarterly Journal of the Hungarian Meteorological Service**.

8. List of publications of the 'individual' candidate or of each member of the research team in the case of the 'research team' candidate, highlighting relevant publications of the candidate in the last 5 years and joint publications of members of a research team in the case of the 'research team' candidate. A link to the web page where the candidate's publications can be found should also be provided.

A. Scientific articles published in extenso in Web of Science cited journals with impact factor

1. Abshaev, A.M.; Abshaev, M.T.; Kolskov, B.P.; Piketh, S.J.; Burger, R.P.; Havenga, H.; Al Mandous, A.; Al Yazeedi, O.; Hovsepian, S.R.; Sîrbu, E.; Sîrbu D-A.; Eremeico S.; Hrysto K. *Assessment of Cloud Resources and Potential for Rain Enhancement: Case Study—Minas Gerais State, Brazil. Atmosphere* **2023**, *14*, 1227. <https://doi.org/10.3390/atmos14081227> (AIS, Q3)
2. Abshaev, M.T.; Abshaev, A.M.; Aksenov, A.A.; Fisher, J.V.; Shchelyaev, A.E.; Al Mandous, A.; Al Yazeedi, O.; Wehbe, Y.; Sîrbu, E.; Sîrbu, D.A.; Eremeico S. *Results of Field Experiments for the Creation of Artificial Updrafts and Clouds. Atmosphere* **2023**, *14*, 136. <https://doi.org/10.3390/atmos14010136> (AIS, Q3)
3. Sfică, L.; Istrate, V.; Hrițac, R.; Machidon, O. *The continental and regional synoptic background favorable for hailstorms occurrence in North-Eastern Romania. Prog. Phys. Geogr.: Earth and Environment*, **2023**, *47*(1), 3–31. <https://doi.org/10.1177/03091333221100819> (AIS, Q1)
4. Istrate, G.-A.; Istrate, V.; Ursu, A.; Ichim, P.; Breabăn, I.-G. *Using Diachronic Cartography and GIS to Map Forest Landscape Changes in the Putna-Vrancea Natural Park, Romania. Land* **2023**, *12*, 1774. <https://doi.org/10.3390/land12091774> (AIS, Q4)



5. **Dobri, Radu-Vlad**, Lucian Sfică, Vlad-Alexandru Amihăesei, Liviu Apostol, and Simona Țîmpu. 2021. "*Drought Extent and Severity on Arable Lands in Romania Derived from Normalized Difference Drought Index (2001–2020)*" *Remote Sensing* 13, no. 8: 1478. <https://doi.org/10.3390/rs13081478> (AIS, Q2)
6. **Istrate, V.; Dobri R-V.**; Bărcăcianu F.; Ciobanu, R-A and Apostol L. (2021), *Sounding-derived parameters associated with severe hail events in Romania, Időjárás*, 125(1), 39-52, <https://doi.org/10.28974/idojaras.2021.1.2> (AIS, Q4)
7. **Istrate, V.**; Jitariu V.; Ichim P.; Machidon O-M.; Apostol L. (2021), *Hailstorm risk assessment for crop areas in Moldova Region (Romania), Present Environment and Sustainable Development*, 15 (2), p. 55-67, <https://doi.org/10.15551/pesd2021152005> (AIS, Q4)
8. Țîmpu, Simona, Lucian Sfică, **Radu-Vlad Dobri**, Marius-Mihai Cazacu, Andrei-Ion Nita, and Marius-Victor Birsan. 2020. "*Tropospheric Dust and Associated Atmospheric Circulations over the Mediterranean Region with Focus on Romania's Territory*" *Atmosphere* 11, no. 4: 349. <https://doi.org/10.3390/atmos11040349> (AIS, Q3)
9. **Istrate, V.; Dobri R-V.**; Bărcăcianu F.; Ciobanu, R-A and Apostol L. (2017), *A ten years hail climatology based on ESWD hail reports in Romania, 2007-2016*, *Geographia Technica*, Vol 12, Nr. 2/2017, pp. 110-118. https://doi.org/10.21163/GT_2017.122.10 (AIS, Q4)

B. Scientific articles or abstracts published in journals or conference volumes indexed by Web of Science and/or SCOPUS

1. **Istrate V.**, Axinte A-D, Florea D., Barcacianu F., Apostol L., (2019), *Characteristics and impacts of the severe hailstorms on 18 june 2016 in northern Moldavia, Romania*, 19th International Multidisciplinary Scientific GeoConference SGEM 2019, 30 June - 6 July, 2019, Vol 19, Book 4.1, pp 899-906, <http://doi:10.5593/sgem2019/4.1/S19.114>
2. **Istrate V.**, Ursu A., **Dobri R-V**, Axinte A-D, Stoica D., (2019), *Hail suppression system in Romania and its relation with land cover*, 19th International Multidisciplinary Scientific GeoConference SGEM 2019, 30 June - 6 July,



2019, Vol 19, Book 2.2, pp 871-878,

<http://doi:10.5593/sgem2019/2.2/S11.107>

3. **Istrate V.**, Axinte A-D, Apostol L., Florea D, Machidon O-M, (2016) *The efficacy of hail suppression in Iași county (Romania) - Case study 09 July 2015*, , 16th International Multidisciplinary Scientific GeoConference SGEM 2016, Conference Proceedings – Air Pollution and Climate Change, ISBN 978-619-7105-64-3 / ISSN 1314-2704, June 28 - July 6, 2016, Book4 Vol. 2, 631-638 pp,

<http://10.5593/SGEM2016/B42/S19.081>,

<http://sgem.org/sgemlib/spip.php?article8245&lang=en>

C. Scientific articles published in journals or conference volumes not indexed by Web of Science and/or SCOPUS

1. **Istrate, V.**; Podiuc, D.; Sîrbu, D.A.; Popescu, E.; **Sîrbu, E.**; Popescu, D.D. (2023) *Characteristics of Convective Parameters Derived from Rawinsonde and ERA5 Data Associated with Hailstorms in Northeastern Romania. Meteorology*, 2,387-402. <https://doi.org/10.3390/meteorology2030023>

D. Books and chapters

1. **Sîrbu E.**, Popescu D.D., Podiuc D., Serghei E., **Lazăr I.L.**, Hortolomei A. M., Ioan L.V., Rățoi C., **Istrate V.**, Dumitrache C.I., Țigănuș T., Course support "Coordinator of active interventions in the atmosphere" within the hail fighting units of the Authority for the Administration of the National Anti-Hail and Precipitation Increase System: qualification level 3, Darclée Publishers, ISBN 978-606-9010-21-1551.58, Bucharest, 2021.
2. **Sîrbu E.**, Popescu D.D., Podiuc D., Serghei E., **Lazăr I.L.**, Hortolomei A. M., Ioan L.V., Rățoi C., **Istrate V.**, Dumitrache C.I., Țigănuș T., Course support "Coordinator of active interventions in the atmosphere" within the hail fighting units of the Authority for the Administration of the National Anti-Hail and Precipitation Increase System: qualification level 2, Darclée Publishing House, ISBN 978-606-9010-38-9551.58, Bucharest, 2021.
3. **Sîrbu E.**, Popescu D.D., Podiuc D., Serghei E., **Lazăr I.L.**, Hortolomei A. M., Ioan L.V., Rățoi C., **Istrate V.**, Dumitrache C.I., Țigănuș T., Course support "Coordinator of active



interventions in the atmosphere" within the hail fighting units of the Authority for the Administration of the National Anti-Hail and Precipitation Increase System: qualification level 1, Darclée Publishing House, ISBN 978-606-9010-20-462, Bucharest, 2021.

4. **Sîrbu E.**, Popescu P-P, Străinu E., Climate change, agrometeorology, active interventions in the atmosphere, Darclée Publishing House, 2021, ISBN 978-606-9010-29-7.
5. **Sîrbu E.**, Axinte A-D, Florea D., Popescu D-D, The manual of the coordinator of active interventions in the atmosphere, AgroTehnica, 2021, ISBN 978-606-8135-07-6.

E. Presentations and communications at international conferences

1. Sîrbu Dragoș Andrei, **Istrate Vasilică**, Eremeico Serghei, Dobircianu Sorin, Căuneii-Florescu Gheorghe, *Hail suppression in Romania - the estimation of seeding effect using radar parameters*, Weather Modification Association Annual Meeting, 18 -20 April 2023 Denver, Colorado, USA.
2. **Istrate Vasilică**, Eremeico Serghei, **Lazăr Ionuț-Lucian**, Popescu Doru-Dorian *A physical evaluation of a hail suppression project in Romania using radar data*, 28th IUGG General Assembly (IUGG2023) 11 to 20 July 2023, CityCube, Berlin, Germany.
3. **Istrate Vasilică**, Sîrbu Dragoș Andrei, Eremeico Serghei, **Lazăr Ionuț-Lucian**, Dobircianu Sorin *Influence of glaciogenic seeding on the radar characteristics of hail clouds*, XVIII-th edition International Conference Present Environment and Sustainable Development 9-10 June 2023, Iași, Romania.
4. **Istrate Vasilică**, Emil Sîrbu, Eremeico Serghei, **Lazăr Ionuț-Lucian**, *European Severe Weather Database hail reports in Romania – Climatology and analysis sounding-derived parameters* 3rd European Hail Workshop: 15 March – 18 March 2021, Karlsruhe Institute of Technology, Germania.
5. **Istrate Vasilică**; Jitariu Vasile; Ichim Pavel; Machidon O-M.; Apostol L. *Hailstorm risk assessment for crop areas in Moldova Region (Romania)*, XVI-th edition International Conference Present Environment and Sustainable Development 18 June 2021, Iași, Romania.
6. Jitariu Vasile, **Istrate Vasilică**; Ursu Adrian, Ichim Pavel, Istrate Adrian *Tracking the hail impact on orchards through remote sensing methods. Study case: 18. 06. 2016*, XV-th edition International Conference Present Environment and Sustainable Development, 21 November 2020, Iași, Romania.



7. **Istrate Vasilică**, Axinte Aurel Dănuț, Florea Daniel, Barcacianu Florentina, Apostol Liviu, (2019), *Characteristics and impacts of the severe hailstorms on 18 june 2016 in northern Moldavia, Romania*, 19th International Multidisciplinary Scientific GeoConference SGEM 2019, 30 June - 6 July, 2019, Albena, Bulgaria.
8. **Istrate Vasilică**, Ursu Adrian, **Dobri Radu-Vlad**, Axinte Aurel Dănuț, Stoica Dorinel, (2019), *Hail suppression system in Romania and its relation with land cover*, 19th International Multidisciplinary Scientific GeoConference SGEM 2019, 30 June - 6 July, 2019, Albena, Bulgaria.
9. **Dobri Radu-Vlad**, Apostol Liviu, **Istrate Vasilică**, (2019), *Characteristics of precipitations distribution induced by cut-off low cyclone activity in Romania during the warm semester*, 19th International Multidisciplinary Scientific GeoConference SGEM 2019, 30 June - 6 July, 2019, Albena, Bulgaria (poster).
10. **Istrate Vasilică**, Axinte Aurel Dănuț, Florea Daniel, Barcacianu Florentina, Apostol Liviu, (2019), *Characteristics and impacts of the severe hailstorms on 18 june 2016 in northern Moldavia, Romania*, 14th Edition International Symposium Present Environment & Sustainable Development 7-9 iunie, 2019, Iași, Romania.
11. Mișu-Pintilie Alin, **Istrate Vasilică**, Lupașcu Angela, Irka Hajdas, Teleagă Emilian, (2018), *Paleoenvironment data and vegetation history from a small mesotrophic site in the Curvature Subcarpathians. case study: Ink quaking bog, Romania*, 4rd International Scientific Conference Geobalcanica, 15-16 May, 2018 Ohrid, Republic of Macedonia.
12. Axinte Aurel Dănuț, Daniel Florea, **Vasilică Istrate**, Liviu Apostol, *A case of supercell hailstorms in Iasi county, Romania-damages, radar parameters and the necessity of Hail Supression System*, Present Environment and Sustainable Development, Ediția a XII-a, 02 – 04 June 2017, Iași, Romania.
13. **Istrate Vasilică**, Mișu-Pintilie Alin, Teleagă Emilian, *Paleoenvironment of Hallstatt archaeological sites from East Romanian Subcarpathians*, Funeral culture from 7-5 Centuries B.P. at Lower Danube, 30 noiembrie - 02 December 2017, Marburg, Germany.
14. **Istrate Vasilică**, Apostol Liviu, Bărcăcianu Florentina, Iordache Iulian, Sfică Lucian, *The relationship between atmospheric humidity, rainfall and hail events in Romania*, 11th Edition International Symposium Present Environment and Sustainable Development, Iași, 02 – 05 june 2016.
15. **Istrate Vasilică**, Axinte Aurel Dănuț, Apostol Liviu, Florea Daniel, Machidon Ovidiu Miron, *The efficacy of hail supression in Iasi county (Romania) - Case study 09 july 2016*,



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16th International Multidisciplinary Scientific GeoConference SGEM 2016, Conference Proceedings – Air Pollution and Climate Change, Albena, Bulgaria.

16. **Istrate Vasiliță**, Apostol Liviu, Machidon Ovidiu Miron, Axinte Aurel Dănuț, Florea Daniel, *The necessity for hail suppression system in vineyard and orchard areas from Moldova (Romania) International Conference* – Environment at a Crossroads: SMART approaches for a sustainable future, 12-15 november 2015, Bucharest, Romania.

17. Bărcăcianu Florentina, Apostol Liviu, Sîrghie Liliana, Iordache Iulian, **Istrate Vasiliță**; *Variations in the air temperature regime in lower troposphere above Romania*, Present Environment and Sustainable Development, Iași, 05– 07 June 2015, Romania.

18. Axinte Aurel Dănuț, Apostol Liviu, Florea Daniel, **Istrate Vasiliță**; *Hail Combat Program on the territory of Moldova*, Present Environment and Sustainable Development, Iași, 05– 07 June 2015, Romania.

19. **Istrate Vasiliță**, Loghin Oana, Sfică Lucian – *The use of sounding station indices in forecasting hail occurrence in Moldova – case study-summer of 2013*, Present Environment and Sustainable Development, 06 – 08 June 2014, Iași, Romania (poster).

9. List of research projects won by the candidate and their value.

- 2003 – 2009 – Research - Development Program within SC General Conf Grup SRL: Research and development study regarding the creation and use of materials and biomaterials with a protective role within SC GENERAL CONF GRUP SRL;
 - o Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- 2019 - The experimental research program, through small-scale local experiments for the rainfall enhancing/uniformization in the regions of Banat, western Oltenia, south-east and north-northeast Romania" - Integrated experimental tests for rain enhancement using aircraft technology - Small-scale local experiment, Mihail Kogălniceanu Airport, Constanta Dobrogea Region;
 - o Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
 - o Value: 1.792.083 lei;
- 2021 - Experimental program through small-scale local experiments to increase/uniformize precipitation in the Banat, western Oltenia, southeast and north-



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northeastern Romania regions" - Integrated experimental tests for rain enhancement using aircraft technology - Local experiment of small scale, Mihail Kogălniceanu Airport, Constanta - Dobrogea Region;

- Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- Value: 1.849.697 lei;

- 2022 - Experimental program through small-scale local experiments for rain enhancement in the Banat, western Oltenia, south-east and north-northeast Romania regions" - Integrated experimental tests for rain enhancement using aircraft technology - Local experiment of small scale, Mihail Kogălniceanu Airport, Constanta - Dobrogea Region; Iași International Airport – North-East of Romania, Bacău International Airport – South-East of Romania, Craiova International Airport – Oltenia Area, Satu Mare International Airport – North-West of Romania;

- Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- Value: 4.893.501 lei;

- 2023 - Experimental program through small-scale local experiments for rain enhancement in the Banat, western Oltenia, south-east and north-northeast Romania regions" - Integrated experimental tests for rain enhancement using aircraft technology - Local experiments of small scale, Craiova International Airport - Oltenia Area, Timișoara International Airport - Western Romania;

- Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- Value: 1.892.203 lei;

- 2022 – Pilot programs through small-scale local experiments for other weather modification applications using ground-based generator technology. Integrated experimental tests on the application hail suppression and Rain enhancement, using ground generators carried out within UCCG Moldova - 2 Vrancea;

- Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- Value: 83.800 lei;

- 2023 - Experimental program through small-scale local experiments for hail suppression, new active agents of cloud seeding and other active agents of local changes in meteorological factors, using the technology of ground generators" and Experimental programs through small-scale local experiments for rain enhancement in the regions: Banat, western Oltenia, south-east and north-northeast Romania, using



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the technology of ground generators", carried out within the Hail Suppression Unit Moldova - 2 Vrancea;

- Coordinator: dr. eng. dr. h.c. Sîrbu Emil;
- Value: 161.348 lei;

10. List of patents filed and those accepted, if applicable.

- 1997 - Invention patent No. 112100 C / 30.05.1997 published in BOPI 5/97 - work vests and rescue from drowning, inventors: Sirbu Emil and Doru Dorian Popescu;
- 2006 - Patent application no. reference 094B/18.04.2006 – Biocomposite material based on collagen with advanced hygroscopicity and its production process, inventors: Sirbu Emil, Iordachel Radu, Caloianu Maria, Iordachel Catalin; (OSIM invention documents);
- 2007 - Invention patent RO121291B1/28.02.2007 published in BOPI 2/2007 - portable light column, inventors: Sirbu Emil and Doru Dorian Popescu;
- 2024 - Patent application for Groud vortex type generator with silver iodide and ionization system, number A/00023 of 30.01.2024.

DECLARAȚIE

de consimțământ privind prelucrarea datelor cu caracter personal

Subsemnatul, Sîrbu Emil, având calitatea de lider de echipă proiect declar că:

- am fost informat cu privire la prevederile Regulamentului (UE) 679/26 aprilie 2016 privind protecția persoanelor fizice în ceea ce privește prelucrarea datelor cu caracter personal și privind libera circulație a acestor date;
 - am fost informat că beneficiaz de dreptul de acces, de intervenție asupra datelor mele și dreptul de a nu fi supus unei decizii individuale;
 - am fost informat că datele cu caracter personal urmează să fie prelucrate și stocate în cadrul Ministerului Cercetării, Inovării și Digitalizării;
 - am fost informat că prelucrarea datelor mele cu caracter personal este necesară în vederea obligațiilor legale ce îmi revin Ministerului Cercetării, Inovării și Digitalizării în cadrul programului „Gala Cercetării Românești”, precum și în scopul intereselor și drepturilor ce îmi revin, conform regulamentului Galei;
 - am fost informat că datele mele cu caracter personal sunt comunicate autorităților publice, precum și altor instituții abilitate (de exemplu: ANAF, ANFP, ITM, ANI, la solicitarea instanțelor judecătorești sau organelor de cercetare penală etc.) sau parteneri pentru promovarea Galei;
 - am fost informat că, în scopul prelucrării exacte a datelor mele cu caracter personal, am obligația de a aduce la cunoștința Ministerului Cercetării, Inovării și Digitalizării orice modificare survenită asupra datelor mele personale;
 - am fost informat că am dreptul să îmi retrag consimțământul în orice moment printr-o cerere scrisă, întemeiată, datată și semnată, depusă la sediul Ministerului Cercetării, Inovării și Digitalizării, exceptând cazul în care prelucrarea datelor mele cu caracter personal este necesară în legătură cu procesul de selecție din cadrul Galei.
- În consecință, îmi dau consimțământul pentru prelucrarea, transmiterea și stocarea datelor cu caracter personal în cadrul Ministerului Cercetării, Inovării și Digitalizării.

Lider de echipă Sîrbu Emil

Semnătura

Data:

Prezenta declarație este completată de către candidatul “individual” și de către membrii echipei de cercetare, după caz.