UNIVERSITY OF PATRAS

SCHOOL OF SCIENCE

DEPARTMENT OF PHYSICS

LABORATORY OF ATMOSPHERIC PHYSICS

Activity Report 2006 - 2012

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Patras, Greece, 2013

Laboratory of Atmospheric Physics of the University of Patras

Activity Report 2006 - 2012

Note of the Head of the LAPUP

The Laboratory of Atmospheric Physics (www.atmosphere-upatras.gr) of the University of Patras (LAPUP) was founded in 1968. It is currently part of the Department of Physics, School of Science. The mission of the LAPUP is teaching and research in Atmospheric Physics, Meteorology, Climatology and Environmental Physics.

The personnel of the LAPUP comprise members of the faculty of the Department of Physics, graduate students and research associates. The faculty members teach mainly undergraduate and graduate courses related to Atmospheric and Environmental Physics in several undergraduate and graduate programs.

The LAPUP participates actively in international and national research programs but provides also services related to Atmospheric Physics, Meteorology and Climatology.

After years of a rather slow pace the LAPUP since 2006, with the support of the Department of Physics and the University of Patras, entered a new phase by broadening both its teaching and research horizons, nationally and internationally. Currently the LAPUP is again an equal partner of the Hellenic and international meteorological and atmospheric physics community. This is demonstrated by the continuously increasing number of publications in international peer reviewed journals and conferences, the number of research programs and research collaborations and the careers of its graduate students.

The aim of this report, which we intend to issue annually from now on, is to inform the scientific community about the activities of the LAPUP during the last seven academic years, to demonstrate the advantages of a potential collaboration with us in teaching and research and to advertise the fascinating world of research in Atmospheric Physics in order to attract high quality students, "ΟΥ ΛΟΓΩ ΑΛΛ' ΕΡΓΩ" (i.e. "Deeds, not words"), as our ancestor Homer wrote in the 8th century b.C. Your comments are more than welcome and can be addressed to athanarg@upatras.gr

Historical Background

The LAPUP was established in 1968 as one of the first six Laboratories of the newly then founded School of Science of the University of Patras. It was the second Laboratory of Atmospheric Physics – after that of the Aristotle University of Thessaloniki – in Greece. The first Head of the LAPUP (1971 – 1989) was the late Professor Dimitrios Ilias (1922 – 2007).

Professor Ilias, authored one of the first undergraduate textbooks in Atmospheric Physics in Greek and taught the course until his retirement in 1989. At the same time he organized and supervised since the early '70ies the teaching of a series of undergraduate level laboratory exercises on Atmospheric Physics. In the frame of this laboratory course the students were using cutting edge instrumentation of that time. It is characteristic that, apart the common instrumentation then used (e.g. Stevenson screen and related instrumentation) undergraduate students were performing global, diffuse and beam irradiance measurements, albedo measurements but, most importantly, calibration of an upper air radiosounding sensor, radiosounding measurements and collection and processing of radiosounding data. Professor Ilias designed and operated also prototype automatic weather stations – a common feature now, but not commercially available at that time.

The LAPUP operates under its current administrative structure since 2006; in 2007 the LAPUP proposed a new internal regulation that replaced the one of 1968, in order to adapt with the modern international academic requirements. The regulation was approved by the Hellenic Ministry of Education and published in the Official Journal of the Hellenic Republic.

Past members of the LAPUP were the late lecturer Ioannis Pnevmatikos (1976 – 2001) and Professor Georgios Mandas (1983 – 2005).

Location

The main facilities of the LAPUP are located on the 3rd floor of Physics Building B at the main campus of the University of Patras in Rion, Achaia. The LAPUP operates also two weather stations located in the campus of the University of Patras.

Staff

Faculty Members

- Athanassios A. Argiriou, Physicist (U. Patras) - D.E.A. (I.N.P. Grenoble) - Ph.D. (Univ. Aix-Marseille 1), Associate Professor (Head of the LAPUP)
- Andreas Kazantzidis, Physicist - M.Sc. - Ph.D. (Aristotle University of Thessaloniki), Assistant Professor with tenure
- Anastasia Rapti, Physicist - Ph.D. (University of Patras), Lecturer with tenure
- Ioannis Kioutsioukis, Physicist - M.Sc. - Ph.D. (Aristotle University of Thessaloniki), Lecturer, appointment pending.

Graduate Students

Ph.D. Candidates

- Kotti Maria – Christina, Physicist, University of Patras – M.Sc., National & Kapodistrian University of Athens (Use of modern techniques for solar radiation measurement and estimation for energy applications)
- Mamara Anna, Mathematician – M.Sc. (Homogenization of meteorological parameters)
- Nikitidou Efterpi, Physicist - M.Sc., Aristotle University of Thessaloniki (Variability of optical properties of aerosols and clouds and their effect on the energy balance in the atmosphere)
- Salamalikis Vasileios, Physicist - M.Sc., University of Patras (Stable isotopes in atmospheric processes)
- Tzoumanikas Panayiotis, Computer and Informatics Engineer, M.Sc., University of Patras, (Estimation of atmospheric parameters using digital image processing)

Research Associates

- Daskalos Emmanuel, Physicist – M.Sc. (Under contract in the frame of the ETCP Greece – Italy 2007 -2013 Program "CESAPO")
- Dimopoulos Spiros, Computer Engineer, M.Sc., Ph.D. (Under contract in the frame of the FP7 project "ENORASIS")
- Kanakaris Ioannis, Informatics for Business Planning Engineer (Under contract in the frame of the ETCP Greece – Italy 2007 -2013 Program "CESAPO")
- Karagiannidis Athanassios, Physicist – M.Sc. – Ph.D. (Under contract in the frame of the ETCP Greece – Italy 2007 -2013 Program "CESAPO")
- Katragkou Eleni, Physicist, M.Sc., Ph.D. (Under contract in the fraeme of the FP7 project "ENORASIS")
- Poupkou Anastasia, Physicist – M.Sc. – Ph.D. (Under contract in the frame of the ETCP Greece – Italy 2007 -2013 Program "CESAPO")

Research Facilities

The research infrastructure of the LAPUP includes instrumentation for the measurement and calibration of meteorological instrumentation and computing facilities.

Research Instrumentation

- Fully equipped chamber for indoor calibration of pyranometers.

- Two automated weather stations measuring ambient temperature and relative humidity, wind speed and direction, atmospheric pressure, and precipitation amount and rate.

- System for hygrometer calibration using saturated salts solutions.
- System for atmospheric water vapor collection for stable isotope analysis.

- Handheld thermometers and hygrometers.
- Precision multimeters for electric and electronic measurements.
- An automated radiometric station including a) instrumentation for the measurement of global and diffuse horizontal solar irradiance (station of the Hellenic Network of Solar Energy, www.helionet.gr) and sunshine duration and b) a sky camera.

- A narrowband multifilter radiometer NILU-UV6 for UV and PAR measurements (station of the Greek National UV Network, www.uvnet.gr).

Computing facilities

- Three cluster computers for detailed weather forecast and air pollution modeling.
- PCs/data loggers for data collection connected to the weather and radiometric stations.
- A computer facility for online collection of satellite images (EUMETCAST system)
- A network of 10 PCs for other types of computing (simulations and data processing).

Software

- GNU Fortran (GFortran) (http://gcc.gnu.org/fortran/)
- IBM SPSS Statistics – central license of the University of Patras (http://www-01.ibm.com/software/analytics/spss/products/statistics/)
- R free software environment for statistical computing and graphics (http://www.r-project.org/)
- R studio interface for R (http://www.rstudio.com/)
- Maxima Computer Algebra System (http://maxima.sourceforge.net/)
- Weather Research and Forecasting (WRF) Model mesoscale numerical weather prediction system (http://www.wrf-model.org)
- A suite of radiative transfer models (LibRadtran, TUV, SMARTS etc.)

Teaching Activities

During the reporting period, the LAPUP staff taught several undergraduate and graduate courses.

Undergraduate Programs

- Atmospheric Physics I (7nth semester, Dept. of Physics, University of Patras)
- Atmospheric Physics II (8th semester, Dept. of Physics, University of Patras)
- Atmospheric Pollution (7nth semester, Dept. of Physics, University of Patras)
- Environmental Physics (3rd semester, Dept. of Physics, University of Patras)
- Fluid Mechanics (7nth semester, Dept. of Physics, University of Patras)
- Introduction to Physical Sciences (Yearly Course, Hellenic Open University)
- Meteorology – Climatology (7nt semester, Dept. of Geology, University of Patras)
- Physics Laboratory III (Thermodynamics – Waves – Optics) (3rd semester, Dept. of Physics, University of Patras)
- Physics Laboratory IV (Electromagnetism) (4rht semester, Dept. of Physics, University of Patras)
- Planet Earth (Yearly Course, Hellenic Open University)
- Thermodynamics – Waves - Optics (2nd semester, Dept. of Physics, University of Patras)

Graduate Programs

Graduate Program on Energy & Environment, Department of Physics, University of Patras

- Dynamic Meteorology (1st Semester)
- Environmental Physics (1st Semester)
- Atmospheric modeling (1st Semester)
- Radiative transfer modeling (1st Semester)

Interdisciplinary Graduate Program on Environmental Sciences, University of Patras

- Atmospheric Pollution Meteorology (2nd Semester)
- Environmental Physics (1st Semester)
- Meteorological Sensors (2nd Semester)

Interdisciplinary Graduate Program on Electronics and Information Processing, University of Patras

- Geophysical – Atmospheric Signals and Remote Sensing (2nd Semester)

Environmental & Marine Geochemistry Program on Environmental Sciences, Dept. of Geology, University of Patras

- Atmospheric Pollution Meteorology (1st Semester)

Environmental Physics, Dept. of Physics, Aristotle University of Thessaloniki

- Radiation Distribution Modeling

In the frame of its teaching activities the staff of LAPUP supervised undergraduate and graduate students in the frame of their diploma, M.Sc. and Ph.D. theses:

Diploma Theses

1. Kotti Maria – Christina, 2006, Study and evaluation of shadowband correction models.
2. Tsati Eleni, 2006, Simulation of atmosphere – solar irradiance interactions using the SMARTS software code.
3. Varelas Georgios, 2006, Mathematical simulation of thermal behavior of buildings.
4. Giza Kalliopi – Panayiota, 2007, Evaluation of UV measurements of the LAPUP station.
5. Prodromidis Georgios, 2007, Climatological analysis of the precipitation in Athens for the period 1901 – 2002.
6. Barbounis Constantinos, 2008, Non-linear analysis of time series in Atmospheric Physics.
7. Bidikoudi Maria, 2008, The North Atlantic Oscillation and its impact on the meteorological conditions in Greece.
8. Kaldis Panayiotis, 2008, Statistical analysis of precipitation in Athens.
9. Katavouta Anna, 2008, Simulating and forecasting erythemal radiation time series using artificial neural networks.
10. Maneta Aggeliki, 2008, Meteorological instrumentation and links to the web page of the Laboratory of Atmospheric Physics.
11. Saitaki Evangelia, 2008, Study of grid connected photovoltaic systems in Greece.
12. Sakka Aggeliki, 2008, simulating the UV radiation using the SMARTS code.
13. Salamalikis Vasileios, 2008, Stable isotopes ($\delta^{18}O$, $\delta^{2}H$) in precipitation and atmospheric water vapor.
14. Chereti Irini, 2009, Photovoltaics in buildings.
15. Beskos Theodoros, 2009, Digitization and processing of the climatic archive of the Laboratory of Atmospheric Physics.
16. Galanopoulou Maria, 2009, Statistical study of precipitation in Patras.
17. Govaris Panayiotis, 2009, Estimation of the photosynthetically active radiation in Athens.
18. Passissis Ioannis, 2009, Comparison between surface weather station measurements and high resolution gridded numerical forecasts.
19. Skourtis Constantinos, 2009, Stable isotopes ($\delta^{18}O$, $\delta^{2}H$) in precipitation and atmospheric water vapor.
20. Vandoros Gerasimos, 2009, Calibration of hygrometers.
21. Kaminari Maria, 2010, Stable isotopes ($\delta^{18}O$, $\delta^{2}H$) in precipitation and atmospheric water vapor.

22. Petrou Eirini, 2010, Application of the R programming language in Climatology – Parameterization of environmental parameters, mathematical and graphical processing and quality control.
23. Papachristopoulou Kyriakoula, 2011, Cressman objective analysis routine in R – Development and application.
24. Argiropoulos Christos, 2012, Satellite derived global climatology of cloud coverage and optical depth.
25. Christopoulou Georgia, 2012, The effect of aerosol and cloud optical properties on solar radiation.
26. Giatzoglou Alexandros, 2012, Study of the relation of the isotopic signature of water vapor and their source of origin using the HYSPLIT backtrajectory model.
27. Vourliotou Paraskevi, 2012, The effect of cloudiness on solar energy reaching the ground at Peloponnese.
28. Mavrogiorgi Maria, 2012, Assessment of the direct effect of aerosols on SW radiation reaching the ground.

M.Sc. Theses

1. Lyberopoulou Kyriaki, 2006, Use of artificial neural networks for forecasting of tropospheric ozone concentration in urban environment.
2. Tsagogeorgas Georgios, 2008, Relation between cosmic rate fluxes and observed climate changes.
3. Spyropoulos Petros, 2009, Climate indexes and processing of precipitation time series of Western Greece.
4. Kolokythas Constantinos, 2010, Techniques for homogenization of meteorological time series.
5. Mentzelopoulos Eleftherios, 2010, Satellite estimations of air pollution over Greece.
6. Salamalikis Vasileios, 2010, Development and validation of a methodology for producing stable isotope gridded data.
7. Tzoumanikas Panayiotis, 2011, Processing and analysis of digital all-sky images for estimations of atmospheric constituents.
8. Chalmoukis Athanassios, 2012, Intelligent data analysis for the spatial variation of the optical properties of aerosols.
9. Varotsou Efrosyni, 2012, Study of particulate matter (PMs) in indoor spaces.

Ph.D. Theses

1. Katsanos Dimitrios, 2007, Study of severe weather phenomena using atmospheric remote sensing satellites and electrical activity data. Current affiliation: National Observatory of Athens, Athens, Greece.
2. Mazarakis Nikolaos, 2010, Observational and numerical study of dynamic and physical processes related to summertime storm activity over Greece. Current affiliation: Hellenic Naval Academy, Piraeus, Greece.

3. Lykoudis Spyridon, 2010, Stable isotopes ($\delta^{18}O$, $\delta^{2}H$) in precipitation: Analysis of isotopic signatures over Greece and climatological analysis over the central and eastern Mediterranean area. Current affiliation: National Observatory of Athens, Athens, Greece.
4. Zagouras Athanassios, 2012, Methods of extraction and digital processing of environmental signals and images – Application on the automatic classification of weather patterns. Current affiliation: University of California at San Diego, San Diego, California, USA.

Research Activities

The main research axes of the LAPUP include:

- Measurements, quality control, processing and homogenization of meteorological and environmental time series.
- Stable isotopes ($\delta^{18}O$ & $\delta^{2}H$) in rain and in atmospheric water vapor.
- Ultraviolet radiation: Measurements, modeling and biological dose rates.
- Solar Radiation: Measurements, modeling and solar energy.
- Artificial intelligence methods applied to atmospheric and environmental physics problems.
- Weather and atmospheric pollution forecasting modeling.

In the frame of the above research axes, the LAPUP carried out a number of research projects that led to a series of publications in international scientific journals and conferences.

Research projects

- Pilot study on the development and application of geostatistical tools to map the variability of the isotopic composition of water in the Mediterranean. International Atomic Energy Agency, Contract # 13931,15/09/2006 – 01/12/2010.
- Advances in homogenization methods of climate series: an integrated approach (COST Action ES0601 - HOME). European Science Foundation, 1/5/2007 – 30/4/2011, www.homogenisation.org/v_02_15/
- Stable isotopes in biospheric – atmospheric – earth system research (COST Action ES0806 - SIBAE). European Science Foundation, 5/2009 –4/2013, www.sibae.ethz.ch/cost-sibae/
- Weather Intelligence for Reneable energies (WIRE, COST Action ES1002), Eurpean Science Foundation, 11/2010 – 11/2014
- Hellenic Network of Solar Energy (General Secretariat of research and Technology, Greece), 1/2011 – 3/2013, www.helionet.gr
- Contribution of Emission Sources on the Air quality of the Port-cities in Greece and Italy. ETCP GREECE – ITALY 2007-2013 – European Commission, 11/2011 – 10/2013, www.cesapo.upatras.gr

- ENvironmental Optimization of IRrigation Management with the Combined uSe and Integration of High PrecisIon Satellite Data, Advanced Modelling, Process Control and Business Innovation (ENORASIS), FP7-ENV Project ENORASIS, Grant Agreement 282949, 01/ 2012 – 12/2014, www.enorasis.eu/

Publications in peer-reviewed journals

1. Cloud detection and classification with the use of whole-sky ground-based images, A. Kazantzidis, P. Tzoumanikas, A.F. Bais, S. Fotopoulos, G. Economou, , Atmospheric Research, 113, 80-88, 2012.
2. Reverse flood routing with the inverted Muskingum storage routing scheme, A. D. Koussis, K. Mazi, S. Lykoudis, A. A. Argiriou, , Nat. Hazards Earth Syst. Sci., 12, 217-227, 2012.
3. An advanced method for classifying atmospheric circulation types based on prototypes connectivity graph, Athanassios Zagouras, Athanassios A. Argiriou, Helena A. Flocas, George Economou, Spiros Fotopoulos, , Atmospheric Research, 118, 180-192, 2012.
4. On the differences of ultraviolet and visible irradiance calculations in the Mediterranean basin due to model- and satellite-derived climatologies of aerosol optical properties, E. Nikitidou, A. Kazantzidis, International Journal of Climatology, DOI: 10.1002/joc.3638, 2012.

   The sensitivity of warm period precipitation forecasts to various modifications of the Kain-Fritsch convective parameterization scheme, Mazarakis, N., Kotroni, V., Lagouvardos, K., Argiriou, A.A., Anderson, C.J., , Nat. Hazards Earth Syst. Sci., 11 (5) pp. 1327 - 1339, 2011.
5. Projections of UV radiation changes in the 21st century: impact of ozone recovery and cloud effects, A. F. Bais, K. Tourpali, A. Kazantzidis, H. Akiyoshi, S. Bekki, P. Braesicke, M. P. Chipperfield, M. Dameris, V. Eyring, H. Garny, D. Iachetti, P. Jöckel, A. Kubin, U. Langematz, E. Mancini, M. Michou, O. Morgenstern, T. Nakamura, P. A. Newman, G. Pitari, D. A. Plummer, E. Rozanov, T. G. Shepherd, K. Shibata, W. Tian, and Y. Yamashita, , Atmospheric Chemistry and Physics, 11, 7533-7545, 2011.
6. Effects of cirrus cloudiness on solar irradiance in four spectral bands, A. Kazantzidis, K. Eleftheratos, C.S. Zerefos, , Atmospheric Research, 102, 452-459, 2011.
7. An Efficient Approach to Spatiotemporal Analysis and Modeling of Air Pollution Data, Tsiotas G., Argiriou A. A., , Journal of Agricultural, Biological and Environmental Statistics, Vol. 16, N. 3, 371-388, DOI: 10.1007/s13253-011-0057-7, 2011.
8. Stable isotopic signature of precipitation under various synoptic classifications, Lykoudis S., Kostopoulou E., Argiriou A. A., Physics and Chemistry of the Earth, 35, (9-12), 530-535, 2010.
9. Variability of cloud-free ultraviolet dose rates on global scale due to modeled scenarios of future ozone recovery, A. Kazantzidis, K. Tourpali, A. F. Bais, , Photochemistry and Photobiology, 86(1),117-122, 2010.

10. Reconstructing of erythemal radiation levels in Europe for the last 4 decades, den Outer, P. N., Slaper, H., Kaurola, J., Lindfors, A., Kazantzidis, A., Bais, A. F., Feister, U., Junk, J., Janouch, M., Josefsson, W., J. Geophys. Res., 115, D10102, 2010.
11. Temporal trends in the stable isotope composition of precipitation: a comparison between the eastern Mediterranean and central Europe, S.P. Lykoudis, A.A. Argiriou, , Theor. Appl. Climatol., 1-9, doi 10.1007/s0074-010-0384-6, 2010.
12. The sensitivity of numerical forecasts to convective parametrization during the warm period and the use of lighting data as an indicator for convective occurrence. Mazarakis N., Kotroni V., Lagouvardos K., Argiriou A., Atmospheric Research, 94 (4): 704-714, 2009.
13. Using data mining techniques for estimating minimum, maximum and average daily temperature values., Kotsiantis S., Kostoulas A., Lykoudis S., Argiriou A., Menagias K., Int J Math, Phys Eng Sci, 1 (1), pp. 16-20, 2008.
14. Storms and Lightning Activity in Greece during the Warm Periods of 2003–2006., N. Mazarakis, V. Kotroni, K. Lagouvardos, A.A. Argiriou, , Journal of Applied Meteorology and Climatology, 47, 3089-3098, 2008.
15. Spatially interpolated time series of δ18O in Eastern Mediterranean precipitation, Spyridon P Lykoudis; Athanassios A Argiriou; Elissavet Dotsika, , Global and Planetary Change, Special Issue MedClivar Pisa 2008, manuscript ID D-08-00151R2, 2008.
16. Combined analysis of rainfall and lightning data produced by mesoscale systems in the central and eastern Mediterranean., D. Katsanos, K. Lagouvardos, V. Kotroni, A.A. Argiriou, , Atmospheric Research, 83(1), 55-63, 2007.
17. Gridded dataset of the stable isotopic composition of precipitation over the Eastern and Central Mediterranean., S. Lykoudis and A.A. Argiriou, J. Geophys. Res., 112, D18107-D18305, 2007.
18. The relationship of lighting activity with microwave brightness measurements and spaceborn reflectivity profiles in the Central and Eastern Mediterranean., D.K. Katsanos, K. Lagouvardos, V. Kotroni, A.A. Argiriou, Jounal of Applied Meteorology and Climatology, 46, 1901-1912, 2007.
19. Isotopic composition of precipitation in Greece, A.A. Argiriou, S. Lykoudis, Journal of Hydrology, 327(3-4):486-495, 2006.

Publications in peer-review international conferences

1. A.A. Argiriou, S. Lykoudis, Isotopic composition of precipitation in Greece – Past and present data, Proc. International Workshop on Isotopic Effects in Evaporation – Revisiting the Craig – Gordon Model, four decades after its Formulation, pp. 14-17, Pisa, Italy, 3-5 May 2006.
2. Kotsiantis S., Kostoulas A., Lykoudis S., Argiriou A., Menagias K., 2006, Filling Missing Temperature Values in Weather Data Banks, 2nd IEE International Conference on Intelligent Environments, 5-6 July, Athens, Greece, Vol 1, 327-334.
3. Kotsiantis S., Kostoulas A., Lykoudis S., Argiriou A., Menagias K., A Hybrid Data Mining Technique for Estimating Mean Daily Temperature Values, 64th Meeting of the

European Working Group on "Multiple Criteria Decision Aiding", 28-30 September 2006, Larissa, Greece, CD Proceedings.

4. Lykoudis S., Argiriou A., Tendencies of stable isotopic content of rainfall in Central and Eastern Mediterranean, Proc. Climate Change and the Middle East: Past, Present and Future, pp. 46-56, Istanbul, Turkey, November 20-23, 2006.
5. Mazarakis N., Kotroni V., Lagouvardos C., Argiriou A., Investigation of the role of different convective parametrization schemes on the prediction of summer precipitation events over Greece, Proc. 9th Plinius Conference on Mediterranean Storms, Varena, Italy, 10 – 13 September 2007.
6. Lykoudis S., Argiriou A., Spatially interpolated isotopes in Easern Mediterranean precipitation, European Science Foundation MedCLIVAR programme workshop: "Oxygen isotopes as tracers of the Mediterranean climate variability: linking past, present and future". Invited talk, Pisa, June 11-13 2008.
7. A Saltamavros, A Tsekouras, P Mylonas, E Lampropoulou, NA Georgopoulos, A Argyriou and KB Markou, The influence of Ultraviolet (UV) radiation on seasonal variations of the male reproductive axis, Proc. The Endocrine Society's 90th Annual Meeting, June 15 - 18 in San Francisco, California, 2008.
8. Lykoudis S., Kostopoulou E., Argiriou A., Stable isotopic signature of precipitation under various synoptic classifications, Advances in weather and circulation type classifications & applications, COST 733 Mid-term Conference, 22-25 October 2008, Krakow, Poland.
9. N. Mazarakis, V. Kotroni, K. Lagouvardos, A. Argiriou, The sensitivity of warm season quantitative precipitation forecasts to modifications of the Kain – Fritsch parametrization scheme, Proc. 11th Plinius Conference on Mediterranean Storms, 7-11 September 2009, Barcelona, Spain.
10. Saltamavros AD., Tsekouras A., Mylonas P., Labropoulou E., Georgopoulos NA., Kazantzidis A., Argiriou A., Markou KB, Bais A.F. The seasonal variation of ultraviolet radiation result in changes of human serum bone turnover markers. XIX Congress of the Carpathian Balkan Geological Association, September 23-26, 2010, Thessaloniki, Greece.
11. C.V. Chrysikopoulos, I.D. Manariotis, V. Sygouni, A. Vantarakis, A. Argiriou, H.K. Karapanagioti, J. Vakros, M. Kornaros, C.A. Paraskeva, and S. Dailianis. Interuniversity network for biocolloid fate and transport in environmental systems "BIOMET' Protection and Restoration of the Environment X, 5 – 9 July 2010, Corfu, Greece.
12. A.D. Koussis, K. Mazi, S. Lykoudis, A. Argiriou, Reverse flood routing with the inverted Muskingum storage routing scheme. 12th Plinius Conference on Mediterranean Storms. 1 – 4 September 2010, Corfu, Greece.
13. T. Zagouras, A. Argiriou, Application of affinity propagation clustering on meteorological data, COST Action 733 - Harmonisation and application of weather type information classifications in Europe - Final Workshop, Vienna, 22 – 24 November 2010.
14. The seasonal variations of ultraviolet radiation result in changes of human serum bone turnover markers, A.D. Saltamavros, A. Tsekouras, P. Mylonas, E. Lambropoulou, N.A.

Georgopoulos, A. Kazantzidis, A. Argiriou, K.B. Markou, A.F. Bais, XIX Congress of the Carpathian-Balkan Geological Association, Thessaloniki, Greece, 23-26 September 2010.

15. Climatolology of erythemally and vitamin D weighted irradiance at Thessaloniki, Greece, from a NILU-UV multi-filter radiometer and a YES UVB-1 radiometer, M.M. Zempila, C. Meleti, A.F. Bais. A. Kazantzidis, XIX Congress of the Carpathian-Balkan Geological Association, Thessaloniki, Greece, 23-26 September 2010.
16. The effect of future ozone recovery on the vitamin D effective dose rates, A. Kazantzidis, K. Tourpali, A.F. Bais, XIX Congress of the Carpathian-Balkan Geological Association, Thessaloniki, Greece, 23-26 September 2010.
17. The Hellenic Network of Solar Energy, A. Kazantzidis, E. Nikitidou, A. Bais, C.S. Zerefos, COST ES1002 Workshop, 22-24/3/2011, Juan Les Pins, France
18. Projections of springtime surface UV-B radiation over southern high latitudes using ozone and clouds derived from chemistry-climate models, A. Bais, K. Tourpali, K. Fragkos, A. Kazantzidis, U. Langematz, E. Rozanov, T. Shepherd, and A. Kubin, EGU General Assembly 2011, 3.-8. April 2011, Wien, Österreich, Geophysical Research Abstracts, Volume 13, EGU2011-10057.
19. Variability of aerosol optical properties and their radiative effect over the Mediterranean region, E. Nikitidou, A. Kazantzidis, European Conference on Applications of Meteorology, EMS Annual Meeting, 12-16 September 2011, Berlin, Germany.
20. Estimation of aerosol optical properties and their effect on UV irradiance at Uccle, Belgium, E. Nikitidou, V.De Bock, H. De Backer, A. Kazantzidis , European Conference on Applications of Meteorology, EMS Annual Meeting, 12-16 September 2011, Berlin, Germany.
21. Assessment of shadowband correction models under different sky conditions, Maria–Christina Kotti, Athanassios A. Argiriou, Andreas Kazantzidis, European Conference on Applications of Meteorology, EMS Annual Meeting, 12-16 September 2011, Berlin, Germany.
22. Spatial and temporal representativeness of satellite-derived cloud modification factor over Greece, A. Zagouras, A. Kazantzidis, S. Fotopoulos, European Conference on Applications of Meteorology, EMS Annual Meeting, 12-16 September 2011, Berlin, Germany.
23. Cloud detection and properties with whole sky images, P. Tzoumanikas, A. Kazantzidis, S. Fotopoulos, G. Economou, A.F. Bais, European Conference on Applications of Meteorology, EMS Annual Meeting, 12-16 September 2011, Berlin, Germany.
24. Hellenic Network for Solar Energy, A.F. Bais, A. Kazantzidis, C.S. Zerefos, D. Melas, E. Kosmidis, S. Kazadzis, E. Nikitidou., T. M. Giannaros, M.M. Zempila, K. Fragkos, V. Salamalikis, 11th International Conference on Meteorology, Climatology and Atmospheric Physics, Athens, 29 May – 1 June 2012.
25. Estimation of the cloud modification factor from satellite and ground data at Thessaloniki, Greece, A. Kazantzidis, E. Nikitidou, A.F. Bais, 11th International

Conference on Meteorology, Climatology and Atmospheric Physics, Athens, 29 May – 1 June 2012.

26. Cloud detection and classification with the use of whole-sky ground-based images, P. Tzoumanikas, A. Kazantzidis, A. F. Bais, S. Fotopoulos, G. Economou, 11th International Conference on Meteorology, Climatology and Atmospheric Physics, Athens, 29 May – 1 June 2012.
27. Aerosols optical properties and their effect on the UV solar irradiance at Uccle, Belgium, E. Nikitidou, V. De Bock, H. De Backer, A. Kazantzidis, 11th International Conference on Meteorology, Climatology and Atmospheric Physics, Athens, 29 May – 1 June 2012.
28. Estimation of solar irradiance from satellite data and numerical weather predictions over Greece, A.F. Bais, A. Kazantzidis, P. Tzoumanikas, E. Nikitidou, T. Giannaros, D. Melas, C. Meleti, H. Kambezidis, V. Salamalikis, International Radiation Symposium 2012, Berlin, Germany, 6-10 August 2012
29. Aerosols optical properties and their effect on the UV solar irradiance at Uccle, Belgium, E. Nikitidou, V. De Bock, H. De Backer, A. Kazantzidis, International Radiation Symposium 2012, Berlin, Germany, 6-10 August 2012
30. A new method for the selection of measuring UV sites, based on cloud classification from satellite data, A. Zagouras, A. Kazantzidis, E. Nikitidou, International Radiation Symposium 2012, Berlin, Germany, 6-10 August 2012
31. Prediction of beam solar irradiance using shadowband correction models, M. C. Kotti, A. A. Argiriou, A. Kazantzidis, International Radiation Symposium 2012, Berlin, Germany, 6-10 August 2012

Awards & Distinctions

- The graduate student Mr. Vasileios Salamalikis received the Young Scientist Poster Award for the paper

  A.A. Argiriou. V. Salamalikis, S.P. Lykoudis "Development and evaluation of a methodology for the generation of gridded datasets"

  presented during the International Symposium on Isotopes in Hydrology, Marine Ecosystems and Climate Change Studies organized in Monaco from March 27th to April 1st 2011 by the International Atomic Energy Agency.

- LAPUP, in the frame of its cooperation with the International Atomic Energy Agency, developed an open source based utility used to generate gridded maps of stable isotopes ($\delta^{18}O$, $\delta^{2}H$) in precipitation. The package uses a combined multiple regression/interpolation approach to generate gridded stable precipitation isotope maps. The software is distributed officially by the IAEA.

Organisation of Conferences

The LAPUP in collaboration with the Hellenic Meteorological Society and Mariolopoulos-Kanaginis Foundation organized the 10th International Conference on Meteorology, Climatology and Atmospheric Physics at the University of Patras Conference Center, May 25-

28, 2010 (www.comecap10.upatras.gr). It was the first time in this series of conferences that all presentations were webcasted. Footage of all presentations is available through the link http://www.upnet.gr/vod.php#10o_die8nes_meteo

Dissemination activities

The LAPUP informs the scientific community and the general public about its activities mainly through its web pages that include

The main web page www.atmosphere-upatras.gr

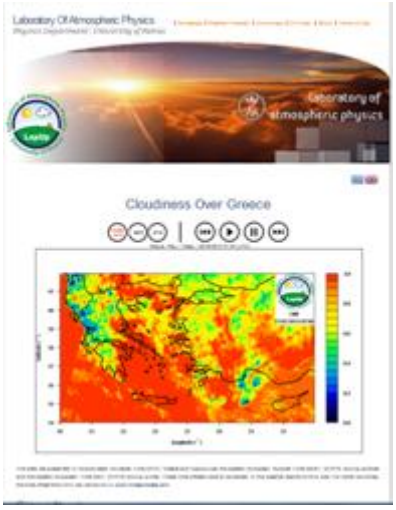
The LAPUP forecasts web pages www.weather.upatras.gr

The meteorological prediction for the Mediterranean (25 x 25 km resolution) and Greece (5 x 5 km resolution) is conducted operationally with the mesoscale meteorological model WRF (version 3). The forecast horizon is 3.5 days with the first 12h used for spin up. The model simulations start daily at 20:00 LST, upon the termination of the NCEP/GFS forecast that serves as the atmospheric initial and lateral boundary conditions. The selected output fields for visualization purposes are the temperature field at 2m, the wind field at 10m and the accumulated precipitation.

For Greece & for the Mediterranean

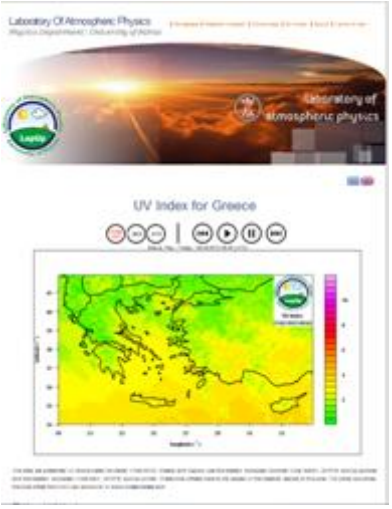
Cloudiness measurement and forecast

Cloudiness is estimated by the use of the Cloud Modification Factor (CMF). CMF is defined as the ratio between the irradiance under the cloudy sky and the irradiance for the same atmosphere but for cloud-free conditions. CMF includes both the effects of cloud optical depth and cloud coverage. CMF values close to 1 correspond to cloud-free atmospheric conditions. On the contrary, deep gray and overcast clouds result in CMF values close to 0. CMF is estimated from the Meteosat Second Generation (MSG) satellite images and the LibRadtran model CMF values are recorded and presented in near real-time every 15 minutes during daytime with a resolution of $0.05^{o} \times 0.05^{o}$ resolution. The method for the estimation of CMF has been developed in collaboration with the Joint Research Center of the European Commission, Ispra, Italy and the Laboratory of Atmospheric Physics of the Aristotle University of Thessaloniki, Greece.



UV index for Greece and Cyprus

The UV index is estimated from the Meteosat Second Generation (MSG) satellite images and the LibRadtran model. The UV index values are recorded and presented in near real-time every 15 minutes from sunshine to sunset at 0.05° × 0.05° resolution. The method for the estimation of the UV index has been developed in collaboration with the Joint Research Center of the European Commission and the Laboratory of Atmospheric Physics of the Aristotle University of Thessaloniki.



Other dissemination activities

In the frame of the dissemination activities, the personnel of LAPUP participated in various events organized in Patras and with talks and also in the national and international media on issues related to atmospheric and environmental topics. Examples of press clips in Hellenic newspapers follow

ΤΡΙΤΗ 17 ΙΑΝΟΥΑΡΙΟΥ 2012 ΠΕΛΟΠΟΝΝΗΣΟΣ

Μεσόγειος

Τις προγνώσεις για τις καιρικές συνθήκες της Ελλάδας και της Μεσογείου για τρεις τουλάχιστον ημέρες μπορεί να δει κανείς στην ιστοσελίδα.

Πρόγνωση καιρού... μέσω Πάτρας

> Δημιούργησε ιστοσελίδα το εργαστήριο Φυσικής της Ατμόσφαιρας του πανεπιστημίου

Η ιστοσελίδα δείχνει τις προγνώσεις αλλά και τα επίπεδα υπεριώδους ακτινοβολίας

Ιστοσελίδα πρόγνωσης του καιρού, καθώς και των μετρήσεων του βαθμού νέφωσης και υπεριώδους ακτινοβολίας ξεκίνησε να λειτουργεί από το Εργαστήριο Φυσικής της Ατμόσφαιρας του Πανεπιστημίου Πατρών με διευθυντή τον αναπληρωτή καθηγητή Θανάση Αργυρίου. Οι πληροφορίες είναι προσβάσιμες μέσω της ιστοσελίδας: www.weather.upatras.gr.

Στους σχετικούς συνδέσμους, οι επισκέπτες μπορούν να βρουν πληροφορίες για την πρόγνωση θερμοκρασίας, ανέμου, βροχής και χιονιού στην Ελλάδα και τη Μεσόγειο, για τη νέφωση σε πραγματικό χρόνο και για τον δείκτη υπεριώδους ακτινοβολίας σε σχεδόν πραγματικό χρόνο.

Η μετεωρολογική πρόγνωση για τη Μεσόγειο (25 Χ 25 χλμ. ανάλυση) και την Ελλάδα (5Χ5 χλμ. ανάλυση) πραγματοποιείται σε επιχειρησιακή βάση με το μετεωρολογικό μοντέλο μέσης κλίμακας WRF. Ο χρονικός ορίζοντας των προγνώσεων είναι 3,5 ημέρες, με τις πρώτες ώρες να χρησιμοποιούνται για την αρχικοποίηση του μοντέλου. Οι προσομοιώσεις του μοντέλου αρχίζουν καθημερινά στις 20.00 (τοπική ώρα), μετά τη λήξη των προγνώσεων του παγκόσμιου μοντέλου NCEP/GFS που αποτελούν τις αρχικές και πλευρικές οριακές συνθήκες του WRF. Οι προγνωστικές μεταβλητές του μοντέλου που επιλέχτηκαν για απεικόνιση είναι το πεδίο της θερμοκρασίας στα 2 μέτρα, το πεδίο του ανέμου στα 10 μ. και η αθροιστική βροχόπτωση. Οι επιλεγμένες παράμετροι παρουσιάζονται ανά τρίωρο, εκτός της βροχόπτωσης που παρουσιάζεται με βήμα μιας ώρας.

Στη νέφωση, οι τιμές καταγράφονται και παρουσιάζονται κατά τη διάρκεια της ημέρας ανά 15 λεπτά και με ανάλυση 5 km. Το μοντέλο εκτίμησης της νέφωσης έχει αναπτυχθεί σε συνεργασία με το Joint Research Center of thw European Commision και το Εργαστήριο Φυσικής της Ατμόσφαιρας του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης.

ΚΕΙΡΗΣΕ ΝΑ ΤΑ ΜΕΤΑΦΕΡΕΙ ΣΤΗΝ ΙΤΑΛΙΑ

ΗΙΓΝΟΜΗ

ΤΡΙΤΗ 17 ΙΑΝΟΥΑΡΙΟΥ 2012

Πρόγνωση μέσω της ιστοσελίδας Εργαστηρίου του τμήματος Φυσικής του Πανεπιστημίου

Ο καιρός μέσω Πατρών

Εργαστήριο Φυσικής της Ατμόσφαιρας

ΜΕΤΕΩΡΟΛΟΓΙΚΕΣ ΠΡΟΓΝΩΣΕΙΣ

Έντυπη έκδοση

Κλείνει η τρύπα του όζοντος

iPhone 5

Parcticipation in scientific networks

The LAPUP became associate member of the Navarino Environmental Observatory (NEO). This partnership opens new opportunities for extended collaboration between the two institutions on various research and educational topics.

The LAPUP is also part of the following national research networks

- National network for the measurement of ultraviolet radiation uvnet.gr/uvnet.gr/?request=start
- BIOMET Network of the University of Patras – Fate and transport of biocolloids in environmental systems biomet.upatras.gr/?lang=en
- HPC-net High performance computing academic research network of the University of Patras hpcnet.upatras.gr/node/2
- HYDROCRITES Network of the University of Patras - Interdisciplinary research studies related to water resources and environmental engineering www.hydrocrites.upatras.gr/AboutUs.aspx