N° 66 DECEMBER 2022

IGRGEA LETTER

International Geophysical Research Group /Europe-Africa
International Geophysical Research Group /Europe-Asia

IGRGEA

At the end of the IEEY (International Equatorial Electrojet Year), in 1995, IGRGEA (International Geophysical Research Group Europe Africa) were organized to follow the research work initiated during IEEY, in 1992. Since January 2003 IGRGEA has been established at the Institute of Geophysics in Hanoï, Vietnam.

The last letter, No. 65, dated June 2021

ALGERIA

Dr Omar HAMMOU ALI defended his thesis in physics on November 21 2021 at the University of Sciences and Technologies Houari Boumedienne (USTHB), Algeria.

Title: Response to VTEC solar events and ionospheric scintillations at low latitudes from SWARM satellite data and ground array data

Jury

President: M. Amar BOUDELLA, Professor (USTHB)
Examiner: M. Mourad DJEBLI, Professor (USTHB)
Examiner: M. Toufik ABDELATIF, Director of Research (CRAAG), Algeria
Examiner: Mme. Soraya MAKHLOUF Senior Lecturer (USTHB)
Director of the PhD: Mme. Naima ZAOURAR Professor (USTHB)
Examiner: Ms. Christine Amory-Mazaudier Senior scientist at LPP / polytechnique, Sorbonne universities.

Tarek BELBACHIR has successfully completed the intense one-year post-graduation program of the ICTP in the "Earth system physics" section, which is a program that includes the physics of the atmosphere and the physics of the solid earth. He is currently working at the INGV for a year; he has joined the upper atmosphere research group, which is working on a project to install a new ionosonde in Lampedusa.

BURKINA FASO

Dr Inza GNANOU defended her thesis on July 30, 2022 at the Norbert Zongo University.

Title of the thesis: Statistical study of the electric field of magnetospheric convection under the action of fast solar winds.

Jury

President: Emmanuel NANEMA, Director of Research IRSAT/CNRST, Ouagadougou Burkina Faso
Director of the PhD: Frédéric OUATTARA, Full Professor at University of Norbert Zongo, Koudougou, Burkina Faso
External Examiners and reporters
Issaka OUEDRAOGO, Senior Lecturer, IRSAT/CNRST, Ouagadougou Burkina Faso
Jean-Louis ZERBO, Senior Lecturer, University Nazi BONI, Bobo-Dioulasso, Burkina Faso

Editor - Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

Internal examiner and reporter
Doua Allain GNBAHOU, Senior Lecturer, University Norbert Zongo, Koudougou, Burkina Faso

Dr. Frédéric OUATTARA Professor was appointed Minister of Higher Education, Research and Innovation on March 5, 2022, for a transition period of 8 months. Dr. Frédéric OUATTARA is Director of LAREME.

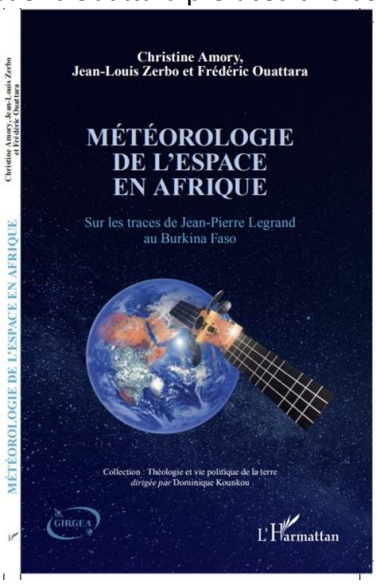
Dr. Frédéric OUATTARA obtained his PhD in geophysics from GIRGEA in 2006.

Dr Doua Allain GNABAHOU Senior Lecturer, Vice-President of the Norbert Zongo University, in charge of Teaching and Pedagogical Innovations.

Dr. Doua Allain GNABAHOU obtained his PhD in Geophysics from GIRGEA in 2014

Dr Jean Louis ZERBO, Senior Lecturer, was appointed on July 20, 2022, Vice President, in charge of Research, Prospective and International Cooperation of the Nazi BONI University. He obtained his PhD in Physics from GIRGEA in 2012.

Book published by HARMATTAN
Frédéric Ouattara prefaced this book



This book is in bookstores in Africa. [Library Jeunesse de France in Ouagadougou / Library 4 vents in Dakar/ Library of France in Abidjan], at the FNAC, on AMAZON and all bookshops.

CÔTE D'IVOIRE

Dr Ziè TUO defended his thesis in Physics on June 24, 2022 at the University Félix Houphouët Boigny, Abidjan in Ivory Coast

Title of the thesis: Study of the space-time variability of the equatorial electrojet from the magnetic data of the CHAMP satellite.

Jury

From left to right
Examiner: M. AMAN Angoran, Professor University Félix Houphouët-Boigny- UFBH, Abidjan, Côte d'Ivoire
The candidate: Zié TUO

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

President: M. KOBEA Toka Arsène, Professor UFHB, Abidjan
Director of the PhD: M. DOUMBIA Vafi, senior Lecturer, UFHB, Abidjan
Reporter M. OBROU Kouadio Olivier, Professor UFBH, Abidjan
Reporter: Mme ZAOURAR Naima, Director of Research University of Sciences and Technology Houari Boumediene, Algeria, (not on the photo)

Dr Kassamba Abdel DIABY defended his doctorate in physics in September 2022 at Félix Houphouët Boigny University, Abidjan, Côte d'Ivoire.
Title of his thesis: "*Estimation of the diurnal vertical drift velocities ExB in the F region of the equatorial ionosphere using magnetic data from the AIEE and AMBER in West Africa*".

REPORT - SUMMER SPACE WEATHER SCHOOL
Physics and use of tools 17-28 October 2022,
Houphouët Boigny University, Abidjan, Côte d'Ivoire
2022

- ✓ Centenary of the discovery of the Equatorial Electrojet
- ✓ Thirty years of the International Year of the Equatorial Electrojet hé actuellement Opel astra hybride rechargeable et à partir de 299€ par mois

The school was organized locally by
Dr Zaka KOMENAN, Assistant Professor
(PhD in Physics in GIRGEA in 2010)
Dr Olivier OBROU, Vice-Dean
(State doctorate in physics in 2008)
Dr Vafi DOUMBIA, Director General of Higher Education and Research
(State doctorate in physics in 2008)

Group photo of the school

The Minister of Research and Higher Education Professor Adama DIAWARA (photo on the press article below) chaired the opening ceremony. The entire master's students in Physics, from the University, attended this ceremony, see the photo above.
All press articles are available at the link below
https://drive.google.com/drive/folders/10eFLcP4uvGAz3W2vTp38Gw64CGOUMWQ0?usp=sharing

EGYPT

Dr. Amira Shimeis, Researcher, National Research Institute of Astronomy and Geophysics NRIAG was selected by VinFuture Foundation in Hanoi, Vietnam to be part of the Committee that selects the winners of the VinFuture 2022 Award.
(PhD in Physics from GIRGEA in 2015)

FRANCE

A special issue of the journal MDPI-Atmosphere with the theme: Ionospheric and Magnetic signatures of Space Weather event is available at the following link:
https://www.mdpi.com/journal/atmosphere/special_issues/Space_Weather_Events
Select
ionospheric and magnetic signatures of space weather events
We recommend reading the journal articles and especially the following journals:
*Sun and Space Weather by Nat Gopalswamy

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

*Equatorial plasma bubbles: a Review by Archana Bhattacharyya

Dr Christine Amory-Mazaudier from the Laboratory of Plasma Physics, Sorbonne Universities received the ISRO/COSPAR medal, in Athens on July 18, 2022. This joint medal of the Indian Space Research Organization (ISRO) and the Committee on Space Research (COSPAR) is awarded every 2 years.

Christine Amory-Mazaudier has been nominated for: 1) her PhD work in 1983 on ionospheric electric currents and 2) for the development of space weather research in Africa, especially in the framework of the GIRGEA network, created in 1995.

ICMP Project: International Circle Meridian Project

Dr Michel Blanc of IRAP is leading a new project, whose theme is:

A Europe-Africa meridian circle for the monitoring of natural phenomena at risk: IMCP-Europe-Africa.

The next steps are the following:

*Census of all scientific teams and colleagues interested, and observation means that could participate in the space coverage of a Europe-Africa meridian circle: fall 2022 - spring 2023;

*Setting up a steering committee of the project before summer 2023

*Organization of a founding workshop of the project before the end of 2023;

*Organization of a session on the project at the European Space Weather Week 2022 (Toulouse, France, October 2023).

(michel.blanc@irap.omp.eu)

GUINEA

Dr. René Tato LOUA was appointed on January 21, 2022 as National Director of Meteorology of Guinea and on January 26, 2022 as Permanent Representative of Guinea to WMO.

On January 26, 2022, he was appointed Permanent Representative of Guinea to the WMO. On September 6, 2022, he became Administrator of the National Center for Fisheries Surveillance and Police. He obtained his PhD in physics from GIRGEA in 2018.

ITALY/ NETHERLANDS

Dr Claudia PAPARINI defended her MBA on July 17, 2022 at Haagse Hogeschool, University of Applied Sciences The Hague.

Theme: *Pedagogical Frameworks for Distance Learning, Opportunities and Challenges: Finding the Perfect Balance*.

The objectives of the thesis were:

*To gain insight into student and teacher/professor needs and expectations for online education;

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

*Formulate recommendations in terms of strategy and approach to improve systems for monitoring learning processes by
The work took into consideration the importance of the learning process and the need to improve the quality of the learning process.
*The work took into consideration the analysis of questionnaires sent to teachers and students worldwide. In total, I received 178 completed questionnaires (96 students, 72 faculty from the GIRGEA and ISWI networks). In addition, she also conducted interviews of 10 professors.

MORROCO

Dr Amal LOUTFI defended her thesis in physics on December 8, 2021 at the University of Marrakech.
Title of the thesis: Ionosphere-Thermosphere couplings at low latitudes during extreme solar events.

In the room from left to right
Examiner: EMRAN Anas, CRASTE-LF, Morocco
Reporter: TAHAYT Abdelilah, Abdelmalek Essaadi University, Tangier, Morocco
Supervisor: BENKHALDOUN Zouhair, Cadi Ayyad University, Marrakech, Morocco
LOUTFI Amal, PhD student
President: SEFIANI Fouad, Cadi Ayyad University, Marrakech, Morocco
On the screen
Examiner: MARCHAUDON Aurélie, IRAP, Toulouse, France
Examiner: ASTAFYEVA Elvira, IPGP, Paris, France
Reporter: LILENSTIEN Jean, IPAG, Grenoble, France
Supervisor: PITOUT Frédéric, IRAP, Toulouse, France
Reporter: AMORY-MAZAUDIER Christine, LPP, Sorbonne University, Paris, France
Supervisor: BOUNHIR Aziza, Mohammed V University, Rabat, Morocco

NEPAL

Dr Drabindra PANDIT defended his thesis in physics on September 23 at Tribhuvan University in Nepal.
Title of the thesis: *Signatures related to super substorms in the mid and low latitude ionosphere*.

From left to right : Mrs. Usha Joshi, Dr. Binod Adhikari, Drabindra Pandit, Dr. Narayan Prasad Chapagain, Mr. Basudev Ghimire, Mr. Prakash Shrestha, and Mr. Daya Nidhi Chhatkulli.

NIGERIA

Prof Babatunde Rabiu has been elected as a member of the Board of Directors of the American Geophysical Union AGU for the years 2023 - 2024 and renewable until 2026.
The Leadership Development/Governance Committee on the webpage of the AGU made this announcement. The AGU Board is the topmost and governing body of the Union. The Board makes the critical strategic and fiduciary decisions that advance AGU's forward-looking strategic plan while ensuring that operations and member services remain robust. With this record-breaking appointment, an African has been appointed for

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

the first time to the topmost decision making of the global scientific Union, which has been in existence for over a century with membership in over 120 countries.
In addition, Professor Babatunde Rabiu has been appointed as the Executive Director of the United Nations - African Regional Centre for Space Science and Technology Education - English located in Nigeria. The UN African Regional Centre for Space Science and Technology Education in English (UN-ARCSSTE-E) was inaugurated in Nigeria on 24 November 1998 and affiliated to the United Nations Office for Outer Space Affairs (OOSA).

REPUBLIC OF CONGO

Dr. Bienvenu Dinga, Lecturer-Researcher at Marien Ngouabi University participated in the 2022 Technical Conference on Instruments and Methods of Meteorological and Environmental Observation (TECO) (Paris, France, 10-13 October 2022).

He received his PhD in Physics from GIRGEA in 2017.

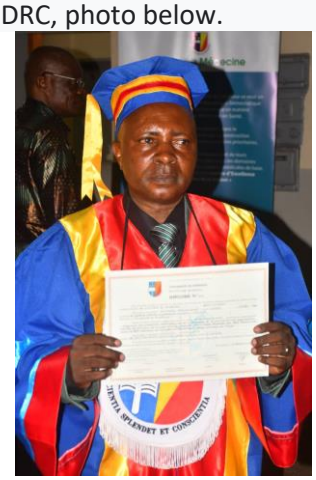
DRC

Dr. Jean KIGOTSI, Professor at the University of Kinshasa, was appointed Academic Secretary of the Institute Superior Pedagogies and Technics (ISPT) in Kinshasa on June 15, 2022.

Dr. Jean KIGOTSI received his PhD in physics from GIRGEA in 2017.

Dr. Patient NTUMBA WA NTUMBA from DRC defended his thesis, in English, on September 9, 2022 at the INRIA research center, Sorbonne Universities.
Title of the thesis: Planning of streaming operators for 'IoT Edge Analytics'.
The jury was composed of Pr. Bernd AMANN, Pr. Panos KYPROS CHRYSANTHIS (University of Pittsburgh, USA), Dr. Cédric TEDESCHI (Université de Rennes 1 & INRIA, France), Pr. Frédéric LE MOUËL (INSA, France), Pr. Patricia STOLF (University of Toulouse Jean Jaurès, France), Dr. Nikolaos GEORGANTAS (INRIA, France) and Pr. Vassilis CHRISTOPHIDES (ENSEA Cergy-Pontoise, France).

Dr Jean-Claude KYUNGU KASOLENA defended his thesis on December 15 2022 at the University of KINSHASA / DRC, photo below.



Theme of his thesis: *Impacts of anthropogenic pressures on the habitat and survival of an isolated*

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

population of gorillas, Gorrill Beringei Graueri (Hominidae, Primates), at Mount Tshiaberimu in Virunga National Park, Democratic Republic of Congo

RWANDA

Dr. Jean UWAMAHORO is a Full Professor at the University of Rwanda, in the specialty of Space Weather, since July 2022.

Dr Jean UWAMAHORO is now Deputy Director of the African Centre of Excellence for Innovative Teaching and Leaning Mathematics and Sciences (ACEITLMS) and a member of the Rwanda Academy of Sciences (RAS).

Ms. Ange Cynthia UMUHIRE is a PhD candidate at the University of Rwanda, College of Science and Technology (UR-CST) in astronomy and space sciences.

Each year, 20 African women researchers (15 doctoral students and 5 post-doctoral students) are awarded for the excellence of their scientific work. They embody the diversity and potential of the continent's science through their backgrounds and research themes and represent a source of hope for the future of our world. The L'Oréal-UNESCO Foundation has selected Cynthia for Women in Science as the 2022 Young Talent of Sub-Saharan Africa.

VIETNAM

Dr. Hong Thi Thu PHAM, from the Hanoi Institute of Geophysics, received an ISSN International Research Award for her paper "*Comparison between IRI-2012, IRI-2016 models and F2 peak parameters at two EIA stations in Vietnam during different solar motion periods*".

Dr. Hong Thi Thu PHAM received her PhD in physics from GIRGEA in 2012.

SITE INTERNET

On the site www.girgea.org, you will find all the GIRGEA letters sent since May 1992.
You will also be able to download all Rolland FLEURY's programs allowing to process GPS data as well as some ionosonde data. To download the programs you need a password that Rolland will provide you.
Mails from Rolland :
rolland.fleury@telecom-bretagne-eu
rolland.fleury@imt-atlantique.fr

PUBLICATIONS

Adil, Muhammad A., A Lithosphere-Atmosphere-Ionosphere Coupling Phenomenon Observed Before 2020 M 7.7 Jamaica Earthquake, Pure Appl. Geophys. 2021, https://doi.org/10.1007/s00024-021-02867-z

Agbazo, Médard Noukpo, G. Koto N'Gobi ; A. J. Adéchinan ; B. Kounouhewa ; B. E. Houngninou ; A. Afouda Multifractal Characteristics of Cloud-to-Ground Lightning Intensity Observed in AMMA CATCH Station (Northern Benin, Bulletin of Atmospheric Science and Technology date de publication : 18 February 2020, https://doi.org/10.1007/s42865-020-00004-7

Agbazo Medard Noukpo, Joseph Adébiyi Adéchinan, Gabin Koto N'gobi, Joseph Bessou Analysis and Predictability of Dry Spell Lengths Observed in Synoptic Stations of Benin Republic (West Africa), Journal : American Journal of Climate Change date de publication : 31 Décembre 2020, https://doi.org/10.4236/ajcc.2021.104030

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

Agbazo Médard Noukpo, Joseph Adébiyi Adéchinan, Gabin Koto N'gobi, Joseph Bessou Long-Term Trends and Its Best Functional Form Estimation of Yearly Maximum and Minimum Temperatures at Cotonou City by Improved Complete Ensemble Empirical Mode Decomposition with Adaptive Noise Method, Journal : Atmospheric and Climate Sciences date de publication : 26 Novembre 2021, https://doi.org/10.4236/acs.2022.121003

Amaechi, P.O., E. O. Oyeyemi, A. O. Akala, M. Kaab, W. Younas, Z. Benkhaldoun, M. Khan, C. Amory Mazaudier, Comparison of Ionospheric Anomalies over African Equatorial/Low-latitude Region with IRI-2016 Model Predictions during the Maximum Phase of Solar Cycle 24, https://doi.org/10.1016/j.asr.2021.03.040

Amory-Mazaudier, C., Magnetic Signatures of Large-Scale Electric Currents in the Earth's Environment at Middle and Low Latitudes, Atmosphere 2022, 13, 1699. https://doi.org/10.3390/ atmos13101699

Anscair Mukange Besa and Zana Ndotoni, Design of a Unified Scale for the Characterization of Seismic Activity, International Journal of Innovative Science and Research Technology, Volume 6, Issue 7, July – 2021 ISSN No:2456-2165 IJISRT21JUL1048, www.ijisrt.com 1407

Anscair Mukange Besa and Zana Ndotoni, Application of the Unified Scale to the Characterization of Seismic Activity of the Democratic Republic of Congo and its Surroundings (Comparative study for Africa, Indonesia and the Pacific coast of Central America), International Journal of Innovative Science and Research Technology Volume 6, Issue 7, July – 2021 ISSN No:2456-2165 IJISRT21JUL1049 www.ijisrt.com 1516

Bencherif Hassan, Aziza Bounhir, Nelson Bègue, Tristan Millet, Zouhair Benkhaldoun, Kévin Lamy, Thierry Portafaix and Fouad Gadouali; "Aerosol Distributions and Sahara Dust Transport in Southern Morocco, From Ground-Based and Satellite Observations" Remote Sens. 2022,
14, 2454. *Remote Sens.* 2022, *14*(10), 2454; https://doi.org/10.3390/rs14102454

Calabia Andres, Chukwuma Anoruo, Munawar Shah, Christine Amory-Mazaudier, Yury Yasyukevich, Charles Owolabi, and Shuanggen Jin1,Low-latitude Ionospheric Responses and Coupling to the February 2014 Multiphase Geomagnetic Storm from GNSS, Magnetometers, and Solar Wind Data , *Atmosphere* 2022, *13*(4), 518, March 24, 2022, https://doi.org/10.3390/atmos13040518

Curto, J.J., Fischer-Carles, A., Solé, A. (2022) Automatic detection of Sfe: a step forward, Atmosphere, 13, 199. https://doi.org/10.3390/atmos13020199.

Curto, J.J., Segarra, A., Altadill, D., Chambodut, A. (2022) Service of Rapid Magnetic Variations, an update, Geoscience Data
Journal, https://doi.org/10.1002/gdj3.164.

De Paula, V., Curto, J.J., Olivé, R. (2022) The cyclic behaviour in the N-S asymmetry of sunspots and solar plages for the period 1910 to 1937 using data from Ebro catalogues, Monthly Notices of the Royal Astronomical Society, MNRAS, Volume 512, Issue 4, June 2022, Pages 5726–5742, https://doi.org/10.1093/mnras/stac424.

De Paula, V., Segarra, A., Altadill, D., Curto, J.J., Blanch, E. (2022) Detection of Solar Flares from the Analysis of Signal-To-Noise Ratio Recorded by Digisonde at mid-latitudes, Remote Sens., 14, 1898. https: //doi.org/10.3390/rs14081898

De Paula, V., Curto, J.J., Solé, T. (2021) Application of the Markov Chain Model to Sunspots and Solar Plages for the Period 1910 to 1937 Using Data from Ebro, Solar Physics, https://doi.10.1007/s11207-021-01838-w

Funke F., D. Altadill, J.C. Del Toro, J.L. Ortiz, J.M. Trigo, J.C. Gómez, M. García, M. López-Puertas, D. Barriopedro, R. García-Herrera, E. Blanch, Curto, J.J., S. Marsal, J. M. Torta (2021) Space opportunities and threats for society: predicting the space-Earth interaction, Ed. L. M. Lara, G. Léger, CSIC Scientific Challenges: Towards 2030. Vol. 12, 2021. https://desafios2030.csic.es/espacio-colonizacion-y-exploracion/

Gnanou Inza, Zoundi Christian, Kaboré Salfo and Ouattara Frédéric, (2022). Variability of the magnetospheric electric field due to high-speed solar wind convection from 1964 to 2009. African Journal of Environmental Science and Technology, 16(1), 1-9.https://doi.org/10.5897/AJEST2021.3075

Gnanou Inza., Christian Z., Emmanuel W. S., & Frédéric O., (2022). Geoeffectiveness of the inner magnetosphere under the impact of fast solar wind currents: Case of solar cycles 20 to 23. Scientific Research and Essays. 17(1), 8-16. https://doi.org/10.5897/SRE2022.6740

Gnanou, I., Gyébré, A.M.F., Guibula, K., Zoundi, C. and Ouattara, F. (2022) Energetic Dynamics of the Inner Magnetosphere in Contact with Fast Solar Wind Currents: Case of the Period 1964-2009. International

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

Journal of Geosciences, 13, 329-348. https://doi.org/10.4236/ijg.2022.135018

Grodji Oswald Didier Franck, Vafi Doumbia, Paul Obiakara Amaechi , Christine Amory-Mazaudier, Kouassi N'guessan, Kassamba Abdel Aziz Diaby, Tuo Zie and Kouadio Boka, A Study of Solar Flare Effects on the Geomagnetic Field Components during Solar Cycles 23 and 24, Atmosphere 2021, 13, 69. https://doi.org/10.3390/atmos13010069

Guibula Karim, Frédéric Ouattara, Doua Allain Gnabahou. , foF2 Seasonal Asymmetry Time Variation at Korhogo Station from 1992 to 2002. International Journal of Geosciences, 2018, 9, 207-213, https://doi.org/10.4236/ijg.2018.94013

Guibula Karim, Jean Louis Zerbo, M'Bi Kaboré and Frédéric Ouattara. Critical frequency variations at Korhogo station from 1992 to 2001 prediction with IRI-2012, International Journal of Geophysics, Volume 2019, Article ID 2792101, 11 pages, https://doi.org/10.1155/2019/2792101

Hayakawa, H., Oliveira, D.M., Shea, M.A., Smart, D.F., Blake, S.P., Hattori, K., Bhaskar, A.T., Curto, J.J., Franco, D.R., Ebihara, Y. (2021) The Extreme Solar and Geomagnetic Storms on 21-27 March 1940, Monthly Notices of the Royal Astronomical Society, https://doi:10.1093/mnras/stab3615

Hoa, Jeffrey C., William Vub, BethT ellmanac, Jean Bienvenu Dinga, Patrick Impeti N'diayee, Sam Weberaf, Jean-Martin Bauerg, Bessie Schwarza, ColinDoyleah, Matthias Demuzereij, Tyler Andersona, Emmalina Glinskisa, 2021, From Cloud to Refugee Camp: ASatellite-Based Flood Analytics Case-Study in Congo-Brazzaville, Earth Observation for FloodApplications, ScienceDirectElsevier, Pg 131-146, https://doi.org/10.1016/B978-0-12-819412-6.00006-7

Imtiaz, Nadia, Omar Hammou Ali, and Haider Rizvi. "Impact of the intense geomagnetic storm of August 2018 on the equatorial and low latitude ionosphere." Astrophysics and Space Science 366.11 (2021): 1-14. https://link.springer.com/article/10.1007/s10509-021-04009-2

Joshua B. W., Adeniyi J. O, ., Amory-Mazaudier C, On the Pre-Magnetic Storm Signatures in NmF2 in Some Equatorial, Low and Mid-Latitude Stations, Journal of Geophys. Res. https://doi:10.1029/2021JA029459

Kaboré M'Bi, Diabaté Abidina and Ouattara Frédéric, Variability of the critical frequency foF2 during minimum and maximum phases of solar cycles 20 and 21: A Comparative study between American and African equatorial regions. Atmospheric and Climate Sciences, 2022, 12, 105-112, *ISSN 1450-216X / 1450-202X Vol. 155 No 4 March, 2020, pp.422 – 430*, https://doi.org/10.4236/acs.2022.121008

Kaboré Salfo, Guibula Karim, Zerbo Jean Louis and Ouattara Frédéric, Solar activities and geomagnetism: Long-term statistical study of magnetics clouds activity day's occurrence as a function of the phases of solar cycles 11 to 24, International Journal of Physical Science, Vol. 16(4), pp. 180-187, October-December, 202, https//doi.10.5897/IJPS2021.4973

Kalita B. R., Bhuyan P. K., Nath S. J., Choudhury M. C., Chakrabarty D., Wang K., Hozumi K., Supnithi P., Komolmis T., Yatini C. Y., M. Le Huy, 2022. The investigation on daytime conjugate hemispheric asymmetry along 200°E longitude using observations and model simulations : new insights, *Adv. Space Res.*, **69**, 3726-3740. https://doi.org/10.1016/j.asr.2022.05.058

Khan Jahanzeb, Waqar Younas, Majid Khan and Christine Amory-Mazaudier, Climatology of O/N2 Variations at Low- and Mid-Latitudes during Solar Cycles 23 and 24, Atmosphere 2022, 13, 1645. https://doi.org/10.3390/atmos13101645

Kigotsi Jean Kasereka, Serge Soula, Albert Bantu Mukenga Kazadi, Andre Ndotoni Zana, Contribution to the study of thunderstorms in the Congo Basin: Analysis of periods with intense activity, journal of Atmospheric Research 269 (2022) 106013.http://doi.org/10.1016/j.atmosres.2021.106013

Koala, S., Sawadogo, Y., Zerbo, J.L., 2022. Solar wind and geomagnetic activity during two antagonist solar cycles: Comparative study between the solar cycles 23 and 24. International Journal of Physical Sciences, 17, 57–66. https://doi.org/10.5897/IJPS2022.4998

Konate Moustapha, Raoul Iboudo, Kadidia Nombo Drabo, Emmanuel Nanéma and Frédéric Ouattara, Contribution of the International Reference Ionosphere 2026 model, Evidence of Winter anomaly, Open Journal of Applied Sciences, 2022, 12, 1749-1757 https://www.scirp.org/journal/ojapps ISSN Online: 2165-3925 ISSN Print: 2165-3917

Loutfi, A., Pitout, F., Bounhir, A., Benkhaldoun, Z., Makela, J. J., Abamni, S., et al. (2022). Interhemispheric asymmetry of the equatorial ionization anomaly (EIA) on the African sector over 3 years (2014–2016): Effects of thermospheric meridional winds. /Journal of Geophysical Research: Space Physics/, 127, e2021JA029902. https://doi.org/10.1029/2021JA029902

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

Loutfi A., F. Pitout, A.Bounhir, Z. Benkhaldoun and J. J. Makela ; Effects of thermospheric meridional winds on the interhemisphericasymmetry of the equatorial ionization anomaly over the African sector ; URSI GASS 2021, Rome, Italy, 28 August - 4 September 2021.

Luan Thanh Pham, Saulo P. Oliveira, Minh Huy Le, Trinh Trong Phan, Tich Van Vu, Van-Hao Duong, To-Nhu Thi Ngo, Thanh Duc Do, Tho Huu Nguyen, Ahmed M. Eldosouky, 2021. Delineation of structural lineaments of the Southwest Sub-basin (East Vietnam Sea) using global marine gravity model from CryoSat-2 and Jason-1 satellites, *Geocarto International*, https://doi.org/10.1080/10106049.2021.1981463.

Mamadou Yacine BA, Mame Faty MBAYE FALL, Mbi KABORE, Gora DIOP1, Ibrahima DIATTA, Mor SARR, Mamadou SALL, Mamadou WADE and Gregoire SISSOKO, Etude de la capacité d'une photopile au silicium à jonctions verticals series sous éclairement monochrmatique, International journal of advanced research (Int. J. Adv. Res) . 9(12), 126-135 December 2021, https://dx.doi.org/10.21474/IJAR01/13884

Marsal, S., Solé, G., Curto, J.J., Torta, J.M., Ibáñez, M., Cid, O., Calonge, M., Barroso, M.A.(2022) Boletín del Observatorio Geomagnético del Ebro 2020, Boletín del Observatorio del Ebro. Magnetismo, I.S.S.N.: 1885-9704.

Marsal, S., Torta, J.M., Solé, G., Curto, J.J., Ibáñez, M., Cid, O. (2022) Boletín del Observatorio del Ebro. Observaciones geomagnéticas en la Isla Livingston - Antártida 2020 y campaña 2020-2021, Boletín del Observatorio del Ebro. Magnetismo, I.S.S.N.: 1885-9712.

Marsal, S., Solé, G., Curto, J.J., Torta, J.M., Ibáñez, M., Cid, O., Calonge, M., Barroso, M.A. (2022) Boletín del Observatorio Geomagnético del Ebro 2021, Boletín del Observatorio del Ebro. Magnetismo, I.S.S.N.: 1885-9704.

Marsal, S., Torta, J.M., Solé, G., Curto, J.J., Ibáñez, M., Cid, O. (2022) Boletín del Observatorio del Ebro. Observaciones geomagnéticas en la Isla Livingston - Antártida 2021 y campaña 2021-2022, Boletín del Observatorio del Ebro. Magnetismo, I.S.S.N.: 1885-9712.

Marsal, S., Torta, J. M., Curto, J.J., Canillas-Pérez, V., Cid, O., Ibañez, M., Marcuello, A. (2021) Validating GIC modeling in the Spanish power grid by differential magnetometry, Space Weather, 19, e2021SW002905. https://doi.org/10.1029/2021SW002905.

Marsal, S., Torta, J.M., Canillas, V., Curto, J.J. (2022) A New Standalone Tool for DC-Equivalent Network Generation and GIC Calculation in Power Grids With Multiple Voltage Levels, Space Weather, http://doi.org/10.1029/2021SW002984.

Millet Tristan, Hassan Bencherif, Aziza Bounhir, Nelson Bègue, Kévin Lamy, Marion Ranaivombola, Zouhair Benkhaldoun, Thierry Portafaix and Valentin Duflot; "Aerosol Distributions and Transport over Southern Morocco from Ground-Based and Satellite Observations (2004–2020)" *Atmosphere* 2022, *13*(6), 923; https://doi.org/10.3390/atmos13060923

Ndiadia, K.E., P. L. Rostha, F. K. Tondozi, M. J. M. Tshitenge, K. J. C. Kayembe, and P. E. Phuku, "Study of the correlation between lightning activity and convective rain over Equatorial Africa," 2022 36th International Conference on Lightning Protection (ICLP), 2022, pp. 354-358, https://doi:10.1109/ICLP56858.2022.9942590

Ndiadia, K.E., P. L. Rostha, F. K. Tondozi, M. J. M. Tshitenge, K. J. C.Kayembe, and P. E. Phuku, "Comparative study of lightning activity overnorth vs south Equatorial Africa," 2022 36th International Conference onLightning Protection (ICLP), 2022, pp. 359-363, https://doi:10.1109/ICLP56858.2022.9942454

Migoya-Orué, Y., K. Alazo-Cuartas, A. Kashcheyev, C. Amory-Mazaudier, S.M. Radicella, B. Nava, R. Fleury, and R. G. Ezquer, B2 thickness parameter response to Equinoctial geomagnetic storms accepted for publication in Journal Remote sensing, Sensors 2021, 21, 7369, https://doi.org/10.3390/s21217369

Ndacyayisenga Theogene, Uwamahoro Jean, Raja KS, Monstein C. A statistical study of solar radio Type III bursts and space weather implication. Advances in Space Research. 2021 Feb 15;67(4):1425-35. https://doi.org/10.1016/j.asr.2020.11.022

Ndacyayisenga Theogene, Ange Cynthia Umuhire, Jean Uwamahoro, and Christian Monstein. "Space Weather Study through Analysis of Solar Radio Bursts detected by a Single Station CALLSTO Spectrometer." Ann. Geophys., 39, 945–959, https://doi.org/10.5194/angeo-39-945-2021 , 2021.

Ndao, A., I. Gaye, R. Fleury and C. Amory-Mazaudier, Effects of Ionospheric Plasma irregularities at the Equatorial Zone on GPS signal, Journal of Scientific and Engineering Research, 2022, 9(4), 109-117, ISSN 2394-2630.

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

Nguyen C.T. , J. –J. Berthelier, M. Petitdidier, C. Amory-Mazaudier and M. Le Huy, 2022.
Climatology of nighttime medium-scale traveling ionospheric disturbances at Mid and low
latitudes observed by the DEMETER satellite in the topside ionosphere during the period 2005-2010, J. Geophys. Res., https://doi:10.1029/2022JA030517

Nguyen Thanh, Dung, Minh Le Huy, Christine Amory-Mazaudier, Rolland Fleury, Susumu Saito,
Thang Nguyen Chien, Hong Pham Thi Thu, Thanh Le Truong, Mai Nguyen Thi, 2021. Characterization of ionospheric irregularities over Vietnam and adjacent region for the 2008-2018 period, *Vietnam Journal of Earth Sciences*, **43(4)**, 465-484, https://doi:10.15625/26159783/16502

Nguyen Thanh, Dung, Minh Le Huy, Christine Amory-Mazaudier, Rolland Fleury, Susumu Saito,Thang Nguyen Chien, Thanh Le Truong, Hong Pham Thi Thu, Thanh Nguyen Ha, Mai NguyenThi, Que Le, 2022. Ionospheric quasi-biennial oscillation of the TEC amplitude of the equatorial ionization anomaly crests from continuous GPS data in the Southeast Asian region, *Vietnam Journal of Earth Sciences*, https://doi.org/10.15625/2615-9783/17490.

Okoh daniel, Aziza Bounhir, John Bosco Habarulema, Babatunde Rabiu, Zama Katamzi-Joseph, Taiwo Ojo, Qian Wu and Jonathan J.Makela , "Thermospheric Neutral Wind Measurements and Investigations across the African Region—A Review" *Atmosphere* **2022**, *13*(6),863;
https://doi.org/10.3390/atmos13060863

Pahima Tinle, Doua Allain Gnabahou, Sibri Alphone Sandwidi and Frédéric Ouattara, TEC variability during fluctuating Events at Koudougou station during solar cycle 24, January 2022, International Journal of Geosciences 13(10):936-950,
https://doi.10.4236/ijg.2022.1310047

Pandit, D. B. Ghimire, C. Amory-Mazaudier, R. Fleury, N. P. Chapagain, B. Adhikari, Climatology of ionosphere over Nepal based on GPS TEC data from 2008 to 2018, in Ann. Geophys., 39, 743–758, 2021 https://doi.org/10.5194/angeo-39-743-2021

Pandit, D., C. Amory-Mazaudier, R. Fleury, N. P. Chapagain, B. Adhikari, VTEC Observations of Intense Geomagnetic Storms above Nepal: Comparison with Satellite Data CODE and IGSG Models to appear in Indian J Phys https://doi.org/10.1007/s12648-022-02441-w

Pham Hong Thi Thu, Christine Amory-Mazaudier, Minh Le Huy, Susumu Saito, Kornyanat Hozumi, Dung Nguyen Thanh, Ngoc Luong Thi, 2022. Nighttime morphology of vertical plasma drifts over Vietnam during different seasons and phases of sunspot cycles, *Adv. Space Res.*,
https://doi.org/10.1016/j.asr.2022.04.010.

Pitout, F., E. Astafyeva, R. Fleury, B. Maletckii, J. He (2022), Did a minor geomagnetic storm cause the loss of 40 Starlink satellites?, Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics.

Pitout F. , A. Loutfi, A. Bounhir, S.C. Buchert, Z. Benkhaldoun, and J. J. Makela ; Ionosphere thermosphere coupling during the the 22-23 June 2015 geomagnetic storm: Swarm and FPI coordinated observations above the Oukaimeden observatory ; URSI GASS 2021, Rome, Italy, 28 August - 4 September, 2021.

Poudel, P., A. Silwal; Basu Dev Ghimire; S. P. Gautam; M. Karki; N. P. Chapagain; B. Adhikari; D. Pandit; C. Amory-Mazaudier "Study of VTEC above Nepal with different calibration techniques, and comparison with NeQuick 2 model" , Astrophysics and Space Science, 2022, 267:04, https://doi.org/10.1007/s10509-022-04041-w

Ram Kumar Vankadara , Sampad Kumar Panda, Christine Amory-Mazaudier, Rolland Fleury, Venkata Ratnam Devananboyina, Tarun Kumar Pant, Punyawi Jamjareegulgarn, Mohd Anul Haq, Daniel Okoh and Gopi Krishna Seemala, Signatures of Equatorial Plasma Bubbles and Ionospheric Scintillations from Magnetometer and GNSS Observations in the Indian Longitudes during the Space Weather events of early-September 2017 in Remote sensing, https://doi.org/10.3390/rs14030652

Sandwidi , Sibri Alphonse, and Frédéric Ouattara, Recurrent Events impacts on f_0F_2 diurnal variations at Dakar Stations during the solar cycles 21 and 22 .International Journal of Geophysics,
Volume 2022 | Article
ID 4883155 | https://doi.org/10.1155/2022/4883155

Sawadogo, Y., Koala, S., Zerbo, J.L., 2022. Factors of geomagnetic storms during the solar cycles 23 and 24: A comparative statistical study. Scientific Research and Essays,17, 46 56.
https://doi.org/10.5897/SRE2022.6751.

Sawadogo, Wambi Emmanuel, Diabate Abidina, Guibule Karim and Ouattara Frédéric, seasonal anomalies of F2

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr

layer critical frequency under geomagnetic recurrent condition during solar cycle 21 and 22 at Ouagadougou station, Int J. Adv. Res. 10(09), 213-221 https://DOI:10.21474/IJAR01/15344

Torta, J.M., Marsal, S., Ledo, J., Queralt, P., Canillas, V., Piña-Varas, P., V., Curto, J.J., Marcuello, A., Martí. A. (2021) New detailed modelling of GIC in the Spanish power transmission grid, Space Weather, https://doi.org/10.1029/2021SW002805

Umuhire Ange Cynthia, Gopalswamy N, Uwamahoro **J**, Akiyama S, Yashiro S, Mäkelä P. Properties of High-Frequency Type II Radio Bursts and Their Relation to the Associated Coronal Mass Ejections. Solar Physics. 2021 Jan;296(1):1-8. https://doi.org/10.1007/s11207-020-01743-8

Umuhire Ange Cynthia, Uwamahoro Jean, Raja KS, Kumari A, Monstein C. Trends and characteristics of high-frequency type II bursts detected by CALLISTO spectrometers. Advances in Space Research. 2021 Oct 15 ;68(8):3464-77. https://doi.org/10.1016/j.asr.2021.06.029

Younas, W., C. Amory-Mazaudier, M. Khan, M. Le Huy, Magnetic signatures of ionospheric disturbance dynamo for CME and HSSWs generated storms, Earth and Space Science, https://doi.org/10.1029/2021SW002825

Younas, W., Khan, M., Amory-Mazaudier, C., Amaechi, P. O., & Fleury, R. (2021, October). Middle and low latitudes hemispheric asymmetries in ∑O/N2 and TEC during intense magnetic storms of Solar Cycle 24. Advances in Space Research. Elsevier BV. https://doi.org/10.1016/j.asr.2021.10.027

Younas, W., C. Amory-Mazaudier, Majid Khan, Paul O. Amaechi, Climatology of global hemispheric and regional electron content variations during the solar 23 and 24., Advances in Space Research, https://doi.org/10.1016/jasr.2022.07.029

Zoundi Christian, Bazié Nongobsom, Kaboré M'Bi and Ouattara Frédéric, *Total electron content (TEC) seasonal variability under fluctuating activity, from 2000 to 2002, at Niamey station*: International Journal of Physical Sciences Vol. 16(4), pp. 138-145 October-December, 2021 https://doi. 10.5897/IJPS2021.4960

Editor- Writer : C. Amory-Mazaudier,
Laboratoire de Physiques des Plasmas, Ecole polytechnique Sorbonne Universités, 5 place Jussieu 75005 France
Tél : 33 (1) 45 11 42 37, email : christine.amory@lpp.polytechnique.fr