Curriculum Vitae
Andrés Calabia Aibar, PhD
ORCID: 0000-0001-6779-4341

Spanish, born in 28 June 1981 ; Website: http://calabia.eu ; e-mail: andres@calabia.eu

(a) Certificates and Accreditation

- National Agency for Quality Assessment and Accreditation (ANECA), Spain; Associate Professor, 2021.
- Chinese Academy of Sciences (CAS), China; Astrometry and Celestial Mechanics; Ph.D., 2017.
  Dissertation available at: https://zenodo.org/record/4746322
- University of Alcalá de Henares (UAH), Spain; Geodesy; M.S., 2012.
- Polytechnic University of Catalonia (UPC), Spain; Geomatics Engineering; B.S., 2004

(b) Career Development

2022 Sept. – 2025 **Assistant Professor**, Department of Physics and Mathematics, University of Alcala, 28801, Alcalá de Henares, Spain.

Main responsibilities: **(i)** Teach undergraduate students. **(ii)** Guide, direct, and mentor research scholars. **(iii)** Perform experiments, collect and analyze data, and examine works of literature and other source material. **(iv)** Disseminate results in academic journals, books, international conferences, etc. **(v)** Participate in departmental and college activities.

References: Prof. Dr. Luis del Peral (luis.delperal@uah.es)

2018 Dec.– 2022 May **Associate Professor**, School of Remote Sensing and Geomatics Engineering, Nanjing University of Information Science and Technology (NUIST), Nanjing, China.

Main responsibilities: **(i)** Guide, direct, and mentor research scholars. **(ii)** Supervise and support teaching assistants. **(iii)** Teach graduate as well as undergraduate students. **(iv)** Grade papers and tests, prepare exercises, lessons and lab experiments. **(v)** Assess, review and evaluate student activities and progress. **(vi)** Perform experiments, collect and analyze data, and examine works of literature and other source material. **(vii)** Publish results in scholarly papers or journals, electronic media and books. **(viii)** Assist and support senior professors in their day-to-day tasks and functions. **(ix)** Participate in departmental and college activities. **(x)** Serve and support functional activities of departmental committees.

References: Prof. Dr. Shuanggen Jin (sgjin@nuist.edu.cn)

2017 Jul.–2018 Mar. **Postdoctoral Researcher**, Colorado Center for Astrodynamics Research, University of Colorado at Boulder, CO, USA.

Main responsibilities: **(i)** Investigate data-driven modeling of neutral mass density variability associated with upper atmosphere expansion and quantification of its impacts on the aerodynamic drag on spacecraft for accurate tracking and positioning. **(ii)** Produce relevant publications in peer-reviewed academic journals or conferences.

References: Prof. Dr. Jeffrey P. Thayer (jeffrey.thayer@colorado.edu).

2014 Jan.–2017 Jun. **Graduate Research Assistant**, Center for Astro-geodynamics, Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai, China.

Main responsibilities: **(i)** Research on non-conservative forces in Low Earth Orbiters. **(ii)** To attend and present papers at conferences. **(iii)** To fulfil tasks required by the supervisor as part of the project. **(iv)** To produce documents as part of the reporting process.

References: Prof. Dr. Shuanggen Jin (sgjin@shao.ac.cn).

2013 Jun.–2014 Jan. **Geomatics Engineer**, Remote Sensing and Geographic Information Systems, Rural Payments Agency, Department for Environment, Food and Rural Affairs, Government of the United Kingdom, London, UK.

Main responsibilities: Improvement and quality check of the positional accuracy of the land parcels held, and incorporation of additional real world changes by using the Ordnance Survey Master Map, Aerial Photography, and Remote Sensing information as basis for the intelligence of Land Change Detection.

References: Mr. Jon Graham (jon.graham@triad.co.uk).

2010 Sep.–2012 Jun. **Graduate Research Assistant**, Remote Sensing and Geographic Information Systems, Department of Geology, Geography and Environment Science, University of Alcalá de Henares, Madrid, Spain.

Main responsibilities: **(i)** Research on the improvement of geometric and thematic cartographic feature changes of a model based on Multi Criteria Evaluation (MCE) techniques and Geographical Information Systems (GIS). **(ii)** Generate a normative simulation model in order to produce scenarios showing changes of geographical data.

References: Prof. Dr. Montserrat Gomez Delgado (montserrat.gomez@uah.es).

2006 Oct.–2009 Jan. **Vice-Chief Engineer**, Empresa Constructora Familiar (EMCOFA) S.A., Igualada, Spain.

Main responsibilities: Organisational and supervisory role on civil engineering.

References: Mr. Javier Achiaga Alvarez (xachiaga@gmail.com)

2005 Jan.–2006 Oct. **Geomatics Engineer**, Land Surveying, Const. Inge. Serv. Gest. Agua (CISGA) S.A., Reus, Spain.

Main responsibilities: Competencies in data collection, analysis, and modeling, contouring and cut and fill volumes in civil engineering.

References: Mr. Jorge Perez (jorpean@gmail.com)

(c) Visiting Professor / Visiting Scientist

2024 Mar.–2024 Aug. Department of Surveying and Mapping Engineering, Henan Polytechnic University (HPU), Jiaozuo, China.

Main responsibilities: **(i)** Teaching and Research. **(ii)** To promote academic cooperation.

References: Prof. Dr. Shuanggen Jin (sgjin@hpu.edu.cn)

2021 Nov.–2021 Dec. Department of Physics and Mathematics, University of Alcalá, Madrid, Spain.

Main responsibilities: **(i)** Research on variability, impacts, and applications of radiation belt particles. **(ii)** To expand current international scholarly ties, facilitate academic cooperation, and promote mutual understanding.

References: Prof. Dr. Dolores Frias (dolores4.frias@gmail.com)

2021 Oct.–2021 Nov. ABR ADVEN LTD, United Kingdom.

Main responsibilities: **(i)** Analysis of the state of technology in the area of positioning and navigation using by accelerometers, gyroscopes, Global Navigation Satellite Systems (GNSS), etc.

References: Ms. Catherine M Jones (abradven@gmail.com)

2020 Mar.–2020 Oct. School of Topography, Geodesy, and Cartography Engineering, Universidad Politécnica de Madrid (UPM), Spain.

Main responsibilities: **(i)** Research on upper atmosphere effects on near-Earth satellites. **(ii)** To expand current scholarly ties between UPM and NUIST, facilitate academic cooperation, and promote mutual understanding.

References: Prof. Dr. Inigo Molina (inigo.molina@upm.es)

(d) Awards and Honors

1. 3rd prize of US$3,700 of the Geomatics on the move 2020 prize contest in the Integrated Geomatics category, *European GNSS Agency (GSA) and Council of European Geodetic Surveyors (CLGE)*, Europe, 2020.
2. Honorable mention at NASA Living With a Star Jack Eddy Postdoctoral Fellowship Program, *University Corporation for Atmospheric Research (UCAR), Cooperative Programs for the Advancement of Earth System Science (CPAESS), Heliophysics*, USA, 2017.
3. Excellent International Graduate, *Chinese Academy of Sciences*, China, 2017.
4. Honors in Mathematical Methods, *University of Alcalá*, Spain, 2009.

(e) Projects and Grants as a Principal Investigator (PI) or Co-Investigator (Co-I)

1. *Characterization of Plasma Depletions and Effects on Geodetic Applications,* US$1,000, PITHIA-NRF Trans-National Access Grant, PI, *HORIZON 2020*, Spain, 2022.
2. *Variability, Impacts, and Applications of Cosmic Ray and Radiation Belt Particles,* US$3,000, Giner de los Ríos Grant, PI, *University of Alcalá,* Madrid, Spain, 2021.
3. *Ionospheric Modelling and applications,* No.1411041901010, US$15,000, Talent Start-up Funding Project, PI, *Nanjing University of Information Science and Technology* , China, 2019-2021.
4. *Thermospheric neutral density variations from LEO accelerometers and precise orbits,* US$40,000, Scholarship for PhD, PI, *China Scholarship Council* , China, 2014-2017.
5. *Metodología para el análisis de incertidumbre de un modelo basado en técnicas de Evaluación MultiCriterio y Sistemas de Información Geográfica,* No. EDU/1799/2010, US$3,300, Grant for Collaboration Research, Co-I, *Ministry of Education,* Spain, 2010-2011.

(f) Participation in Other Projects

1. *Mad4Space: Development of enabling technologies for space studies in the Community of Madrid*, PUBLIC CALL PROJECTS, EUR 58,140, Luis del Peral Gochicoa (PI), *Community of Madrid*, Spain, 2025-2028. Participation: Scientist

2. *High-frequency water level monitoring technology and its application in the Yellow River Mainstream from BDS/GNSS-Reflectometry*, No. 241111520700, Shuanggen Jin (PI), *Henan International Science and Technology Cooperation Key Project*, Henan Polytechnic University, China, 2024-2026. Participation: Scientist

3. *Assessment on applications of ultra-intense ultrashort lasers*, ART. 83, US$6,500, Luis del Peral Gochicoa (PI), *Consortium for the Design, Construction, Equipment and Operation of the Ultrashort Pulsed Laser Center*, Spanish Center for Pulsed Lasers, Spain, 2023. Participation: Scientist

4. *Atmospheric, ocean and land remote sensing using GNSS*, No. R2018T20, US$283,000, Shuanggen Jin (PI), *Jiangsu Province Distinguished Professor Project* , China, 2018-2021. Participation: Scientist.

5. *Ionospheric-plasmaspheric variations and mechanism from multi-satellite space-based GNSS measurement* , No. 4176113409, Shuanggen Jin (PI), *National Natural Science Foundation of China-German Science Foundation (NSFC-DFG)*, China, 2018-2023. Participation: Scientist.

6. *GNSS-Reflectometry and its applications in land and ocean remote sensing*, No. 2243141801036, Shuanggen Jin (PI), *Startup Foundation for Introducing Talent of NUIST*, China, 2018-2021. Participation: Scientist.

7. *Ensemble Kalman filter for OpenGGCM*, US$80,000, Raeder, J. (PI), T. Matsuo, and J. L. Anderson (PIs, Co-Is), *AFOSR Space Science Program*, USA, 2015-2018. Participation: Scientist.

8. *Atmospheric disturbances and anomalous behaviors detected by ground and space-based GNSS*, No. 2012-1508, Shuanggen Jin (PI), *Open Research Fund of the Academy of Satellite Application, CASC*, China, 2012-2014. Participation: Scientist.

9. *Sewer of Pineda de Bages, Manresa,* No. 68-05-602P, US$1,200,000, *Government of Spain*, 2008. Participation: Vice-Chief Engineer.

10. *Expansion and New Bus Station, Olot,* No. TA-03468.R, US$4,500,000, *Government of Spain*, 2008. Participation: Vice-Chief Engineer.

11. *Remodeling of Eduardo Torroja square, Barcelona,* No. 05437, US$5,600,000, *Government of Spain*, 2008. Participation: Vice-Chief Engineer.

12. *Development and Remodelling Llull Street, Barcelona* No. E-0301.3, US$4,500,000, *Government of Spain*, 2007. Participation: Vice-Chief Engineer.

13. *Esplus Large-scale Irrigation System, Huesca* US$7,800,000, *Government of Spain*, 2006. Participation: Geomatics Engineer.

14. *Alforja large-scale irrigation system, Tarragona*, US$1,000,000, *Government of Spain*, 2006. Participation: Geomatics Engineer.

15. *Rasquera Large-scale Irrigation System, Tarragona* No. ER-02906, US$13,400,000, *Government of Spain*, 2006. Participation: Geomatics Engineer.

16. *Perello Large-scale Irrigation System, Tarragona* No. ER-02906, US$12,300,000, *Government of Spain*, 2005. Participation: Assistant Engineer.

(g) Synergistic Activities

1. **Community Service:** **(vii)** Executive Committee member of the *Young Earth System Scientists (YESS)*, 2025-2026. **(vi)** Chair of the *Join Study Group 4: 'Atmospheric Coupling Studies'* of the *International Association of Geodesy Global Geodetic Observing System Focus Area Geodetic Space*

Weather Research. 2024–2028. **(v)** Member of the of the Low Latitude Ionospheric Research Working Group (LLWG) of the *Asia Oceania Geosciences Society (AOGS)*. 2022-now. **(iv)** Member of the *Join Working Group 2: 'Improvement of thermosphere models'* of the *International Association of Geodesy Global Geodetic Observing System Focus Area Geodetic Space Weather Research*. 2018–now. **(iii)** Chair of the *Join Study Group 1: 'Coupling processes between magnetosphere, thermosphere, and ionosphere'* of the *International Association of Geodesy Global Geodetic Observing System Focus Area Geodetic Space Weather Research*. 2019–2023. **(ii)** Council member of the *Young Earth System Scientists (YESS)*, 2021-2024. **(i)** Regional Representative for South West Pacific, *Young Earth System Scientists (YESS)*, 2021-2022.

2. **Editorial Service:**
   (vii) Guest Editor, Special Issue "Innovative Approaches to Atmospheric Coupling for Geodetic Space Weather Research", *Frontiers in Astronomy and Space Sciences*, Frontiers, IF=2.6/Q2/SCIE, 2025-2027. **(vi)** Editorial Board Member, *Journal of Geodesy and Geoinformation Science*,2023-now, IF=xx/xx/SCIE. **(v)** Review Editor, *Frontiers in Astronomy and Space Sciences*, Frontiers, IF=4.055/Q2/SCIE, 2022-now. **(iv)** Guest Editor, Special Issue "SoOP-Reflectometry or GNSS-Reflectometry: Theory and Applications", *Remote Sensing*, MDPI, 2022-2024, IF=5.3/Q2/SCIE. **(iii)** Guest Editor, Special Issue "Advances on upper-atmosphere characterization for geodetic space weather research and applications", *Frontiers in Astronomy and Space Sciences*, Frontiers, IF=4.05/Q2/SCIE, 2021-2023. **(ii)** Guest Editor, Special Issue "GNSS-Reflectometry and Remote Sensing of Soil Moisture", *Remote Sensing*, MDPI, 2021-2022, IF=5.3/Q2/SCIE. **(i)** Assistant Editor, *Journal of Geodetic Science,* , De Gruyter, 2018–now.

3. **Conference Service:** **(xiii)** Session Chair, *Geodesy for a changing environment, International Association of Geodesy (IAG) Scientific Assembly 2025* , 1 to 5 Sept, 2025, Rimini, Italy. **(xii)** Session Chair, *Enhancing Understanding of Upper Atmosphere Coupling Processes and Their Societal Impacts, Asia Oceania Geosciences Society (AOGS), 22nd Annual Meeting*, 27 Jul to 1 Aug, 2025, Singapore. **(xi)** 2 x Session Chair, *International Symposium on Satellite Navigation (ISSN 2023)*, 20-22 November 2023, Jiaozuo, China. **(x)** Volunteer and Session Chair, *XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG)*, 11-20 July 2023, Berlin. **(ix)** Member of Scientific Committee. *X Hotine-Marussi Symposium 2022*, Politecnico di Milano, Milan, Italy, 13-17 June 2022. **(viii)** Forum Panelist: Meet the Scientists & Careers in Space. *Seventh International Conference on Aerospace Science Engineering 2021 (ICASE2021)* , December 14-16, 2021, Islamabad, Pakistan. **(vii)** Panel Discussion Panelist: Space Weather and GNSS. *ICASE2021*. **(vi)** Keynote Speaker. *ICASE2021*. **(v)** Exhibitor booth for NUIST at the *Asia Oceania Geosciences Society (AOGS)*, 16th Annual Meeting, 28 Jul to 2 Aug, 2019, Singapore. **(iv)** Volunteer, *2019 Workshop on Smart Navigation and Applications and Annual Meeting of Jiangsu Engineering Center for Navigation*, Nanjing, China, 11-13 January 2019. **(iii)** Volunteer and Session Chair, *The 1st International Conference on GNSS+* (ICG+2016), July 27-30, 2016, Shanghai, China. **(ii)** Volunteer and Session Chair, *14th Proceeding of Progress In Electromagnetics Research Symposium (PIERS2016)*, Shanghai, China. August 8–11, 2016. **(i)** Volunteer, *Proceedings of the 3rd International Gravity Field Service (IGFS)*, Shanghai, China, June 30 - July 6, 2014.

(h) Teaching Appointments. Total: +850h

1. Mathematics (in Spanish), BSc in Architecture and Urban Planning, University of Alcala, Spain. (150 students/Autumn), 2023-24(90h), 2024-25(120h) Total: 210h.
2. Linear Algebra (in English), BSc in Telecommunications, University of Alcala, Spain. (20 students/Autumn), 2023-24(58h), 2024-25(86h) Total: 144h.

3. Advances in Surveying Science and Technology (in English), Ph.D. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(36h), Total: 36h.
4. Advances in Frontiers Disciplines (in English), M.Sc. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(36h), Total: 36h.
5. Navigation Technology and Applications (in English), M.Sc. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(16h), Total: 16h.
6. Modern Measurement Data Processing (in English), M.Sc. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(36h), Total: 36h.
7. Space Geodesy (in English), B.Sc. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(16h), Total: 16h.
8. Professional English for Surveying Engineers (in English), B.Sc. in Surveying and Mapping Science and Technology, Henan Polytechnic University, China, 2023-24(16h), Total: 16h.
9. Calculus I (in English), BSc in Telecomunications, University of Alcala, Spain. (20 students/Autumn), 2023-24(58h) Total: 58h.
10. Practicum III (in Spanish), BSc in Magisterium, University of Alcala, Spain. 5 students 2022-23(32,4 h/Spring). Total: 32,4 h.
11. Statistics (in Spanish), BSc in Environmental Sciences, University of Alcala, Spain. (130 students/Spring), 2022-23(18h), 2023-24(52h), Total: 70 h.
12. Calculus and Statistics (in Spanish), BSc in Chemistry, University of Alcala, Spain. (30 students/Spring), 2022-23 (13 h). Total: 13 h.
13. Physics I (in Spanish), BSc in Geomatics, Technical University of Madrid, Spain. (70 students/Autumn), 2022-23(80 h) Total: 80 h.
14. Global Navigation Satellite Systems I (in English), BSc in Surveying and Mapping Engineering, Nanjing University of Information Science and Technology, China. (50-60 students/Autumn), 2018-2021. Total: 4 h.
15. Applied Geodesy (in English), MSc of Surveying and Mapping Science and Technology, Nanjing University of Information Science and Technology, China. (20-40 students/Autumn), 2018-2021. Total: 48 h.
16. Principle and application of Global Navigation Satellite Systems II (in English), BSc in Surveying and Mapping Eng., Nanjing University of Information Science and Technology, China. (54 student/Spring), 2020-2021. Total: 2 h.
17. Applied Geodesy for research (in English), PhD in 3S Integration and Meteorology Applications, Nanjing University of Information Science and Technology, China. (2 students/Spring), 2020-2021. Total: 32 h.

(i) Mentoring/Examiner:

1. Expert in the evaluation of the Competitive Call for Grants for Applied Research and Experimental Development Projects, Agencia para la Calidad Científica y Universitaria de Andalucía (ACCUA), Consejería de Universidad, Investigación e Innovación, JUunta de Andalucia, Spain, June 2025.
2. BSc Thesis Supervisor at University of Alcala: (1) Ana Maria Sanchez, June 2023, (2) David Lopez, June 2023, (3) Alejandro Lazaro, Sept. 2023. Total: 6 h.
3. Technical Panel Reviewer. Promotion of Dr. Muhammad Shakir for Associate Professor with Tenure,

Institute of Space Technology, Islamabab, Pakistan, January 2022.

4. PhD Panel Examiner. PhD evaluation of Mr. Changyong He, Royal Melbourne Institute of Technology, Australia, June 2019.

(j) Teaching Material

1. **Calabia, A** (2024), Systems of Linear Ordinary Differential Equations. Zenodo. https://zenodo.org/records/14188350
2. **Calabia, A** (2024), Proyección Ortogonal sobre un Subespacio. Zenodo. https://zenodo.org/records/13957689
3. **Calabia, A** (2024), English Proficiency for Mapping and Surveying Engineering. Zenodo. https://zenodo.org/records/11215468
4. **Calabia, A** (2023), Funciones Reales de Varias Variables: Cálculo Integral. Zenodo. https://zenodo.org/records/10256675
5. **Calabia, A** (2023), Funciones Reales de Varias Variables: Cálculo Diferencial. Zenodo. https://zenodo.org/records/10256604
6. **Calabia, A** (2023), Funciones Reales de Una Variable: Calculo Integral. Zenodo. https://zenodo.org/records/10127628
7. **Calabia, A** (2023), Funciones Reales de Una Variable: Calculo Diferencial. Zenodo. https://zenodo.org/records/10127589
8. **Calabia, A** (2023). Fundamentos de Estadistica. Zenodo. https://doi.org/10.5281/zenodo.15113920
9. **Calabia, A** (2023). Fundamentos de Álgebra y Cálculo. Zenodo. https://doi.org/10.5281/zenodo.15115531
10. **Calabia, A** (2019, September), Course on GNSS - 1. Satellite Positioning. Zenodo. http://doi.org/10.5281/zenodo.3387038
11. **Calabia, A** (2020, September), Course on GNSS - 2. GNSS Errors. Zenodo. http://doi.org/10.5281/zenodo.4055699
12. **Calabia, A** (2020, November), Course on GNSS - 3. Receiver position. Zenodo. http://doi.org/10.5281/zenodo.4171655
13. **Calabia, A** (2020, November), Course on GNSS - 4. Precise ephemeris. Zenodo. http://doi.org/10.5281/zenodo.4171659
14. **Calabia, A** (2020, November), Course on Geodesy - 1. Oblate Ellipsoid. Zenodo. http://doi.org/10.5281/zenodo.4171649
15. **Calabia, A** (2019, July), Course on Geodesy - 2. Time System. Zenodo. http://doi.org/10.5281/zenodo.3266466
16. **Calabia, A** (2019, July), Course on Geodesy - 3. Gravity System. Zenodo. http://doi.org/10.5281/zenodo.3524688
17. **Calabia, A** (2019, November), Course on Geodesy - 4. Coordinate System. Zenodo. http://doi.org/10.5281/zenodo.3524685

(k) Data and Software Products

1. **Calabia, A**, S Jin (2021, July 7). CASSIOPE GNSS-based thermospheric mass densities from 325 to 425 km at intervals of 25 km. Zenodo.
   https://zenodo.org/record/5079186
   Content: GNSS-based thermospheric mass densities from CASSIOPE-GNSS. Densities from 325 to 425 km at intervals of 25 km.
2. **Calabia, A**, S Jin (2019, December 5). Supporting Information for "New modes and mechanisms of long-term ionospheric TEC variations from Global Ionosphere Maps (GIMs)". Zenodo.
   http://doi.org/10.5281/zenodo.3563463
   Content: MATLAB scripts corresponding to TEC model derived from 2003-2018 GIMs.
3. **Calabia, A**, S Jin (2019, May 29). Supporting Information for "Solar-cycle, seasonal, and asymmetric dependencies of thermospheric mass density disturbances due to magnetospheric forcing". Zenodo.
   http://doi.org/10.5281/zenodo.3234582
   Content: (a) MATLAB scripts corresponding to thermospheric mass density model; (b) Thermosphere mass density estimates (kg/m^3) along orbit at 3 min interval, normalized to 475 km altitude.

(l) Lectures and Seminar Talks

1. **Calabia, A**, (2024, June 10), Introduction to General Relativity in Geodesy. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11572737
2. **Calabia, A**, (2024, May 27), Advances on GNSS Reflectometry (GNSS-R) for Soil Moisture Estimation. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11364471
3. **Calabia, A**, (2024, May 13). Fundamentals on Remote Sensing, Geografical Information Systems, and Multi-Criteria Evaluation. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11186072
4. **Calabia, A**, (2024, April 22). Thermospheric Mass Density Variations and Applications. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11186040
5. **Calabia, A**, (2024, April 8). Ionospheric Electron Density Variations and Applications. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11185946
6. **Calabia, A**, (2024, March 25). Geodetic Space Weather Research. Invited Lecture at Henan Polytechnic University.
   https://doi.org/10.5281/zenodo.11185890
7. **Calabia, A**, (2023), Characterization of Plasma Depletions and Effects on Geodetic Application. Invited Talk. *Online PITHIA-NRF TNA User Meeting*. 20 Feb. 2023.
8. **Calabia, A**, (2022), Recent Trends and Applications in Space Weather. Invited Lecture. *GNSS Winter School on Space Weather and Applications at Institute of Space Technology* Islamabad, 19-20 Oct. 2022.
9. **Calabia, A**, (2022), Introduction to upper atmosphere coupling and advances thermospheric mass density retrieval. Invited Seminar Talk. *AOGS-RAC AOGS-RAC LLWG Online Seminar Series No. 2*. 17 Oct. 2022.

10. **Calabia, A**, (2022), Monitoring Earth's Surface Properties with GNSS-R Reflectometry, Invited Seminar Talk, *Department of Meteorology, Reading University*, Reading, UK.
11. **Calabia, A**, (2022), Geodetic Space Weather Research: Thermospheric Mass Density Estimates from GNSS Precise Orbits, Invited Seminar Talk, *Department of Meteorology, Reading University*, Reading, UK.
12. **Calabia, A**, Space Geodesy Techniques (4 hours teaching activity), *Geospatial International Technologies Training*, Deqing iSpatial Co., Ltd, Deqing, China, 2020.
13. Molina, I, **A Calabia** (2021), Earth Remote Sensing using GNSS Signals of Opportunity - GNSS-Reflectometry, Oral presentation at the International seminar on *Remote Sensing of Changing Climate*, Czech University of Life Sciences Prague, March 12, 2021.
14. **Calabia, A**, T Matsuo, and SG Jin (2018), GRACE-TIEGCM thermospheric mass density assimilation through sequential non-linear regression and optimal interpolation analyses, Internal report, *University of Colorado*, Boulder, CO, USA.
15. **Calabia, A**, Thermospheric neutral density variations from LEO accelerometers and Precise Orbits, *4th Annual Smead Aerospace Research-Palooza*, Boulder, CO, US, 8 September 2017.

(m) Books and Chapters

1. **Calabia, A**, and SG Jin (2023), *Upper Atmospheric Mass Density Variations and Space Weather Responses from GNSS Precise Orbits*, in: 3S Technology Applications in Meteorology: Observations, Methods and Modelling, Taylor Francis Group/CRC Press, Boca Raton, FL, USA, 300pp. ISBN: 9781032425139. DOI:10.1201/9781003363118-8
2. **Calabia, A**, and SG Jin (2020), *Characterization of the Upper Atmosphere from Neutral and Electron Density Observations*, in: International Association of Geodesy Symposia. Springer, Berlin, Heidelberg. doi:10.1007/1345_2020_123
3. **Calabia, A** (2017), *Thermospheric neutral density variations from LEO accelerometers and precise orbits*, May 2017, Ph.D. Dissertation, Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai, China. doi: 10.13140/RG.2.2.31146.62409/1 http://calabia.eu/documents/Calabia2017PhD.pdf
4. **Calabia, A**, and SG Jin (2015), GPS-based non gravitational accelerations and accelerometer calibration, in S. Jin (Ed.), *Satellite Positioning: Methods, Models and Applications*, in Tech-Publisher, Rijeka, Croatia, ISBN: 978-953-51-1738-4, pp. 47-72. doi:10.57772/59975
5. Gómez, M, W Plata, JP Oran, **A Calabia**, and P. Barreira (2012), Procedimientos de validación de modelos de crecimiento urbano futuro , in *Análisis de la dinámica urbana y simulación de escenarios de desarrollo futuro con tecnologías de la información geográfica*, in Ra-Ma (Ed.), Paracuellos de Jarama, Madrid, Spain, ISBN: 978-84-9964-125-6, pp. 237-274.
6. **Calabia, A** (2011), *Metodología para el análisis de incertidumbre de un modelo basado en técnicas de Evaluación MultiCriterio y Sistemas de Información Geográfica*, M.Sc. Thesis, Universidad de Alcalá de Henares, Madrid, Spain. Available at: http://calabia.eu/documents/2011.pdf
7. **Calabia, A** (2009), *Estudio de la desembocadura del Llobregat mediante teledetección de media resolución*, B.Sc. Thesis, Universidad Politecnica de Barcelona, Barcelona, Spain. Available at: http://upcommons.upc.edu/pfc/handle/2099.1/7890

(n) SCI Journal Articles as a First Author

1. **Calabia, A**, N Imtiaz, D Altadill, Y Yasyukevich, A Segarra, FS Prol, B Adhikari, L del Peral, D Rodriguez Frias, and I Molina (2024), Uncovering the Drivers of Responsive Ionospheric Dynamics to Severe Space Weather Conditions: A Coordinated Multi-Instrumental Approach, *J. Geophys. Res. Space Phys.*, 129 doi: 10.1029/2023JA031862 (IF=2.8/Q2/SCIE)
   Highlights: During the 2014 geomagnetic storm, GNSS errors doubled and ionospheric corrections reached ±20 meters due to plasma depletions. These depletions, likely caused by sudden ionospheric drifts, propagated northeast and caused an ionospheric uplift of 100 km. This phenomenon, influenced by equatorial electric current variations, enhanced the "fountain effect" and shifted the Equatorial Ionospheric Anomaly crests to higher latitudes.
2. **Calabia, A**, G Lu, OS Bolaji (2023), Editorial: Advances on upper-atmosphere characterization for geodetic space weather research and applications. *Frontiers in Astronomy and Space Sciences*, 10:1211582, doi:10.3389/fspas.2023.1211582 (IF=3.0/Q2/SCIE)
   Highlights: This Research Topic includes five manuscripts that focus on a range of research topics related to the latest advancements in algorithms, methodologies, and techniques for characterizing the upper atmosphere in the context of geodetic space weather research and applications.
3. **Calabia, A**, C Anoruo, S Munawar, C Amory-Mazaudier, Y Yasyukevich, C Owolabi, and S Jin (2021), Low-Latitude Ionospheric Responses and Coupling to the February 2014 Multiphase Geomagnetic Storm from GNSS, Magnetometers, and Space Weather Data. *Atmosphere*, 13, 518. doi:10.3390/atmos13040518 (IF=3.11/Q3/SCIE)
   Highlights: The low-latitude ionosphere responses and coupling mechanisms to the February 2014 multiphase geomagnetic storm are investigated from space weather indices, magnetometer and TEC data from ground stations, and ionospheric models. The findings show light on how geomagnetic activity can affect the low-latitude ionosphere through a coupled magnetosphere-ionosphere system.
4. **Calabia, A** and S Jin (2021), Thermospheric mass density disturbances due to magnetospheric forcing from 2014-2020 CASSIOPE precise orbits, *J. Geophys. Res. Space Phys.*, 126, doi:10.1029/2021JA029540 (IF=3.111/Q2/SCIE)
   Highlights: The validation of the first data set of high-resolution thermospheric mass densities inferred from commercialoff-the-shelf GNSS receivers. The density disturbances due to magnetospheric forcing are investigated for correlations and time-delay responses to models and indices.
5. **Calabia, A**, and SG Jin (2021), Upper-atmosphere mass density variations from CASSIOPE precise orbits. Space Weather, 19, e2020SW002645. doi:10.1029/2020SW002645 (IF=4.288/Q2/SCIE)
   Highlights: Thermospheric mass densities are estimated from CAScade SmallSat and IOnospheric Polar Explorer precise orbits. The detailed thermospheric mass density responses are obtained during the February 2014 geomagnetic storm. CASSIOPE-derived thermospheric mass density is better than the NRLMSISE-00 model to reflect responses to the storm.
6. **Calabia, A**, and SG Jin, (May 2020) New modes and mechanisms of long-term ionospheric TEC variations from Global Ionosphere Maps, *J. Geophys. Res. Space Phys.*, 125(6), doi:10.1029/2019JA027703 (IF=2.811/Q2/SCIE)
   Highlights: Long-term ionospheric TEC variations and characteristics are investigated and modeled from Global Ionosphere Maps. The solar and the magnetospheric forcing are the main driver of non-periodic ionospheric TEC variations. Main periodic contributions to TEC variations are related to the frequencies of the solar rotation, annual, and sub-harmonics. TEC anomaly has been found near the South magnetic dip at the night-side.
7. **Calabia, A**, G Tang, and SG Jin (March 2020), Assessment of new thermospheric mass density model

using NRLMSISE-00 model, GRACE, Swarm-C, and APOD observations, *J. Atmos. Solar Terrest. Phys*, 199, 105207, doi: 10.1016/j.jastp.2020.105207 (IF=1.735/Q3/SCIE)
Highlights: A new Thermospheric Mass Density (TMD) model is presented and assessed by NRLMSISE-00 model, GRACE, Swarm-C, and APOD observations. The performance of TMDM is assessed in a dynamic orbital propagation analysis showing similar deviations than that given by NRLMSISE-00 and in-situ estimates.

8. **Calabia, A**, I Molina, and SG Jin (Jan. 2020), Soil Moisture Content from GNSS Reflectometry using Dielectric Permittivity from Fresnel Reflection Coefficients, *Remote Sens.*, 12(1), 122, doi: 10.3390/rs12010122 (IF=4.848/**Q1**/SCIE)
Highlights: We retrieve soil moisture from GNSS-Reflectometry by estimating the dielectric permittivity from Fresnel reflection coefficients. We employ Cyclone GNSS data and effectively account for the effects of bare soil roughness and vegetation optical depth. The achieved results demonstrate the optimal capability and potential of this new method.

9. **Calabia, A**, and SG Jin (Oct. 2019), Solar cycle, seasonal, and asymmetric dependencies of thermospheric mass density disturbances due to magnetospheric forcing, *Ann. Geophys.*, 37(5), 989-1003, doi: 10.5194/angeo-37-989-2019 (IF=1.49/Q3/SCIE)
Highlights: An unexpected dependence on the solar cycle, seasonal variation, and hemispheric asymmetry is found in the magnitude of high-frequency thermospheric mass density disturbances due to magnetospheric forcing. The seasonal variation produces lower disturbances during the June solstice, and the hemispheric asymmetry produces higher variability in the South Polar Region. Correlation analysis is conducted to provide time-lag values for the currently employed magnetospheric proxies (Am, Em, and Dst) and the high-frequency disturbances have been parameterized.

10. **Calabia, A**, and SG Jin (Feb.2017), Thermospheric density estimation and responses to the March 2013 geomagnetic storm from GRACE GPS-determined precise orbits, *J. Atmos. Solar Terrest. Phys*. 154, 167-179, doi: 10.1016/j.jastp.2016.12.011 (IF=1.492/Q3/SCIE)
Highlights: Thermospheric mass densities are estimated from GRACE GPS-determined precise orbits, and investigated following the March 2013 storm. Density variations better correlate with Dst and k-derived geomagnetic storm indices.

11. **Calabia, A**, and SG Jin (Nov.2016), New modes and mechanisms of thermospheric mass density variations from GRACE accelerometers, *J. Geophys. Res. Space Physics*, 121(11), 11191-11212, doi: 10.1002/ 2016JA022594 (IF=2.733/Q2/SCIE)
Highlights: Thermospheric density variations are investigated from GRACE accelerometers. New periodic contributions are found at the frequencies of the radiational tides. Thermospheric mass density variations are mainly driven by radiational waves.

12. **Calabia, A**, and SG Jin (Feb.2016), Assessment of conservative force models from GRACE accelerometers and precise orbit determination, *Aerosp. Sci. Technol.*, 49, 80-87, doi: 10.1016/ j.ast.2015.11.034 (IF=2.057/**Q1**/SCIE)
Highlights: The conservative-force model deficiencies are investigated via Principal Component Analysis (PCA) using 4 years of GRACE measurements (2006-2009). The deficiencies are assessed by comparing the accelerometer readouts with the differences between the conservative force-model and the precise orbit accelerations. Our new approach for orbital force-models validation can be considered crucial for the current state-of-the-art of precise orbit determination (POD) and Time-Varying Gravity (TVG) modeling.

13. **Calabia, A**, SG Jin, and R Tenzer (Sept.2015), A new GPS-based calibration of GRACE accelerometers using the arc-to-chord threshold uncovered sinusoidal disturbing signal, *Aerosp. Sci. Technol.*,

45, 265-271, doi: 10.1016/j.ast.2015.05.013 (IF=1.751/**Q1**/SCIE)
Highlights: A better calibration of the GRACE accelerometers is achieved from the instantaneous GPS-based non-gravitational accelerations. The first derivatives of the precise-orbit velocity are computed under an a priori arc-to-chord threshold, while the modelled time-varying forces of gravitational origin and reference-system rotations are computed according to current conventions (including sub-daily tide variations). The resulting accelerations serve as a reliable reference for accelerometer calibration.

(o) Other SCI Journal Articles

1. Wang, P, Z Lian, MA Núñez-Andrés, **A Calabia**, Y Tian, M Wang, Z Yue, and H Mu, (2024), Application of the Least Squares Adaptive Vector Projection Iteration Algorithm to Ultra-Wideband Positioning, IEEE Sensors Journal, https://doi.org/10.1109/JSEN.2024.3461155 (IF=4.3/Q1/SCIE)
Highlights: The paper presents an algorithm called LS-AVPI to improve the accuracy of UWB indoor positioning. It uses the SSA to find optimal parameters, which are then used to train a CNN for predicting positions. This method significantly enhances positioning accuracy, outperforming other techniques by up to 0.657.

2. Edokossi, K, SG Jin, **A Calabia**, I Molina, U Mazhar, (2024), Evaluation of SMAP and CYGNSS Soil Moistures in Drought Prediction Using Multiple Linear Regression and GLDAS Product, Photogrammetric Engineering and Remote Sensing, 90(5), 303-312(10), https://doi.org/10.14358/PERS.23-00075R2 (IF=1.3/Q4/SCIE)
Highlights: We assess the effectiveness of Soil Moisture Active Passive (SMAP) and Cyclone Global Navigation Satellite System (CYGNSS) soil moisture data in predicting drought conditions using multiple linear regression.

3. Imtiaz, N, T Dugassa, **A Calabia**, C Anoruo, and A Kashcheyev (2024), Westward PPEF plays important role in the suppression of postmidnight plasma irregularities: A case study of the November 2021 geomagnetic storm, Journal of Geophysical Research: Space Physics, 129, e2023JA032367, https://doi.org/10.1029/2023JA032367 (IF=2.8/Q2/SCIE)
Highlights: We use multiple instruments data to investigate the behavior of the equatorial and low-latitude ionosphere during the geomagnetically active and quiet period of November 1–6, 2021. The existence of westward Prompt Penetration Electric Field and the Equatorial Electrojet during the main phase, from midnight to noon, is clearly related with the constriction of plasma diffusion and the consequent suppression of plasma irregularities.

4. Edokossi, K, SG Jin, U Mazhar, I Molina, **A Calabia**, and I Ullah (2024), Monitoring the drought in Southern Africa from Space-borne GNSS-R and SMAP Data, Natural Hazards, https://doi.org/10.1007/s11069-024-06546-9 (IF=3.158/Q2/SCIE)
Highlights: Soil moisture data from SMAP and CYGNSS have demonstrated strong correlations and good RMSE values with GLDAS data. The validation of SMAP and CYGNSS soil moisture using GLDAS data as a reference value underscores the effectiveness of these satellite-based techniques in soil moisture monitoring.

5. Giri, A, B Adhikari, R Baral, C Idosa Uga, and **A Calabia** (2024), Wavelet Coherence Analysis of Plasma Beta, Alfven Mach Number, and Magnetosonic Mach Number during Different Geomagnetic Storms, Scientific World Journal, 1335844, 11, doi:10.1155/2024/1335844 (IF=2.9/Q2/SCIE)
Highlights: CIR-associated storms, large amplitude waves occur preferentially with show rising Alfven Mach number and plasma beta. The magnetosonic Mach number lacks variability during the storms caused by shock on the arrival of Earth's environment. This is different for CME-driven

storms, where the variations of the magnetosonic Mach number do not show much fluctuation compared to the Alfven Mach number and plasma beta.

6. Adhikari, B, V Klausner, CMN Candido, P Poudel, HM Gimenes, A Siwal, SP Gautam, **A Calabia** and M Shah (2024), Lithosphere–atmosphere–ionosphere coupling during the September 2015 Coquimbo earthquake. J Earth Syst Sci 133, 35. doi: 10.1007/s12040-023-02222-x (IF=1.9/Q3/SCIE)
Highlights: The study investigates the 2015 Coquimbo earthquake, using wavelet transform techniques to analyze seismic data, interplanetary parameters, and geomagnetic indices. It identifies post-seismic events in the Brazilian region, suggesting a seismogenic nature. However, differentiating these from solar storm effects in geomagnetic records remains challenging, necessitating further research.

7. Shahzad, R, M Shah, M. Arslan Tariq, **A Calabia**, A Melgarejo-Morales, P Jamjareegulgarn, Libo Liu (2023), Ionospheric-Thermospheric responses to June 2015 and August 2018 Geomagnetic Storms from Multi-Instrument Geodetic Space Weather Data, *Remote Sens*, 15, 2687. doi:10.3390/rs15102687 (IF=5.4/Q1/SCIE)
Highlights: We analyze upper atmosphere variations during the geomagnetic storms of June 2015 and August 2018. Ionospheric plasma show to increase rapidly during the afternoon in the main phase of the storms. At nighttime, the ionosphere depicts an opposite behavior. The equatorial ionization anomaly crest expansion to higher latitudes is driven by prompt penetration of electric fields during daytime at the main and recovery phases of the storms.

8. Baral, R, B Adhikari, **A Calabia**, M Shah, RK Mishra, A Silwal, S Bohara, R Manandhar, L del Peral, and MD Rodriguez (2022), Spectral features of Forbush Decrease during Geomagnetic Storms, *J. Atmos. Solar Terrest. Phys*, 242, 105981, doi:10.1016/j.jastp.2022.105981. (IF=2.1/Q3/SCIE)
Highlights: A deep Forbush decrease was recorded in the galactic cosmic ray flux. Solar wind speed and geomagnetic Dst indices have significant correlation with cosmic ray flux. A possible dependence on solar wind proton density has been observed, which modulates the magnitude of Forbush decreases under similar solar wind velocity conditions.

9. Molina, I, **A Calabia***, SG Jin, K Edokossi, and X Wu (2022), Calibration and Validation of CYGNSS Reflectivity through Wetlands' and Deserts' Dielectric Permittivity, *Remote Sensing*, 14, 3262, doi:10.3390/rs14143262. (IF=5.481/Q1/SCIE)
Highlights:A successful procedure for GNSS-R reflectivity calibration is established using data from CYGNSS. The scale and bias parameters are estimated from the theoretical dielectric properties of water and dry sand, which are well-known and empirically validated values. The derived scale and bias parameters are applied to the CYGNSS dataset, and the retrieved SMC values through the Fresnel reflection coefficients are in excellent agreement with the SMAP SMC product.

10. Darrag, M, SG Jin, and **A Calabia**, and A Samy (2022), Determination of tropical belt widening using multiple GNSS radio occultation measurements,*Annales Geophysicae* , 40(3), 359–377, doi:10.5194/angeo-40-359-2022. (IF=2.19/Q3/SCIE)
Highlights: GNSS Radio Occultation (GNSS-RO) data from 12 missions are combined to examine the tropical belt expansion. The GNSS lapse rate tropopause (LRT) and cold point tropopause (CPT) heights have increased by 36m per decade and 60m per decade, respectively, since June 2001. There is a high correlation between the tropopause height and temperature, being 0.78 and 0.82 for LRT and CPT, respectively.

11. Shah, M, A Abbas, M Ehsan, **A Calabia**, B Adhikari, MA Tariq, J Ahmed, JF de Oliveira-Junior, J Yan, A Melgarejo-Morales, P Jamjareegulgarn (2021), Ionospheric–Thermospheric Responses in South America to the August 2018 Geomagnetic Storm Based on Multiple Observations, *Journal of*

Selected Topics in Applied Earth, IEEE, vol. 15, pp. 261-269, doi:10.1109/JSTARS.2021.3134495. (IF=4.715/Q1/SCIE)
Highlights: We employ GNSS derived vertical total electron content from International GNSS Service, magnetic field data, geomagnetic indices, global ionospheric maps, thermospheric mass density, and [O/N2] ratio measurement. Strong-ionospheric and upper-atmospheric disturbances affected the ionospheric variables with long duration during the storm recovery phase and following after.

12. Garzon, J, I Molina, J Velasco, and **A Calabia** (2021), A Remote Sensing Approach for Surface Urban Heat Island Modeling in a Tropical Colombian City Using Regression Analysis and Machine Learning Algorithms, *Remote Sens.*, 13, 4256, doi:10.3390/rs13214256 (IF=5.349/Q1/SCIE)
Highlights: Land surface temperature from satellite data are used to investigate the Surface Urban Heat Islands phenomenon in Cartago, Colombia, for the period 2001-2020. We employ Principal Component Analysis, Multiple Linear Regression, and weighted Naive Bayes Machine Learning techniques to model areas prone to extreme temperatures .

13. Wu, X, **A Calabia**, J Xu, W Bai, and P Guo (2021), Forest canopy scattering properties with signal of opportunity reflectometry: theoretical simulations, *Geosci. Lett.* 8, 25 doi:10.1186/s40562-021-00195-7, (IF=4.375/Q2/SCIE)
Highlights: We develop a bistatic scattering model with various polarizations at different frequency bands, based on the first-order radiative transfer equation and the wave synthesis technique. The model can be used for circular polarization signals in bistatic radar systems, e.g. GNSS-R. The simulation results show a great potential for monitoring of canopy parameters.

14. Jin, SG, C Gao, L Yuan, P Guo, **A Calabia**, H Ruan, and P Luo (Jan. 2021), Long-term variations of plasmaspheric total electron content from topside GPS observations on LEO satellites, *Remote Sens.*, 13(4), 545, doi:10.3390/rs13040545 (IF=5.349/Q1/SCIE)
Highlights: Here, long-term variations of plasmaspheric TEC are studied from 11-year COSMIC GPS observation. The PTEC in the daytime is higher than that in the nighttime, and highest in spring for the northern hemisphere and lowest in summer for the northern hemisphere, regardless of the state of the solar activity.

15. Wu, X, W Ma, J Xia, W Bai, S Jin, and **A Calabia** (Dec. 2020), Spaceborne GNSS-R Soil Moisture Retrieval: Status, Development Opportunities, and Challenges, *Remote Sens.*, 13, 45, doi:10.3390/rs13010045 (IF=4.848/Q1/SCIE)
Highlights: Based on a review of the current state-of-the-art of soil moisture retrieval using GNSS-R, this paper points out the limitations of existing research in observation geometry, polarization, and coherent and non-coherent scattering.

16. Shah, M, A Ahmed, M Ehsan, M Khan, M A Tariq, **A Calabia**, ZU Rahman (Oct. 2020), Total electron content anomalies associated with earthquakes occurred during 1998 - 2019, *Acta Astronautica*, doi:10.1016/j.actaastro.2020.06.005 (IF=2.413/Q1/SCIE)
Highlights: Lithosphere ionosphere coupling for earthquakes during 1998-2019. Sharp anomalies occur with high magnitude and low depth.Geomagnetic storm also causes anomalies. Pre-earthquake anomalies are more prominent.

17. Edokossi, K, **A Calabia**, SG Jin, and I Molina (Jan. 2020), GNSS-Reflectometry and Remote Sensing of Soil Moisture: A Review of Measurement Techniques, Methods, and Applications, *Remote Sens.*, 12(4), 614, doi: 10.3390/rs12040614 (IF=4.848/Q1/SCIE)
Highlights: A detailed review on the current soil moisture measurement techniques, retrieval approaches, products, and applications, particularly the new and promising GNSS-Reflectometry tech-

nique. Recent advances, future prospects and challenges are given and discussed.

18. Shah, M, **A Calabia**, MA Tariq, J Ahmed, A Ahmed (March 2020), Possible ionosphere and atmosphere precursory analysis related to Mw >6.0 earthquakes in Japan, *Remote Sensing of Environment* 239, 111620, doi: 10.1016/j.rse.2019.111620 (IF=10.164/Q1/SCIE)
Highlights: Earthquakes ionospheric and atmospheric anomalies are investigated. Possible Seismo Ionospheric Anomalies (SIA) occurred during UT=10-12. The Remote Sensing data supports the evidences of SIA in different parameters. The main findings show the coupling of lithosphere atmosphere ionosphere.

19. Tang, GS, X Li, J Cao, S Liu ,G Chen,M Haijun, X Zhang, S Shi, J Sun, Y Li, and **A Calabia** (Feb 2020), APOD mission status and preliminary results, *Sci. China-Earth Sci.*, 63, 257-266, doi: 10.1007/s11430-018-9362-6 (IF=4.368/Q1/SCIE)
Highlights: We compare the GNSS precise orbit products of APOD mission with co-located SLR observations, and the results reveal the great potential of the on-board micro-electro-mechanical system (MEMS) GNSS receiver. We calibrate the estimates of the atmospheric density detector with precise orbit products, and the accuracy is assessed with empirical models.

20. Yuan, LL, SG Jin, and **A Calabia** (Mar.2019), Distinct thermospheric mass density variations following the September 2017 geomagnetic storm from GRACE and SWARM precise orbits, *J. Atmos. Solar Terrest. Phys.*, 184, 30-36, doi: 10.1016/j.jastp.2019.01.007. (IF=1.5/Q3/SCIE)
Highlights: Distinct thermospheric variations during the September 2017 storm are observed from GRACE and Swarm. Swarm observations show symmetric variations with a slightly stronger density enhancement in Southern Hemisphere.

21. Jin, SG, **A Calabia**, and LL Yuan (Feb.2018), Thermospheric Variations From GNSS and Accelerometer Measurements on Small Satellites, in *Proc. IEEE*, vol. 106, no. 3, pp. 484-495, doi: 10.1109/JPROC.2018.279608 (IF=10.694/Q1/SCIE)
Highlights: An overview of past and present developments and efforts in sensing and modeling thermospheric density and wind variations is presented, as well as the future challenges and perspectives for GNSS and accelerometers on small satellites.

(p) SCI Journal Articles under review

1. Owolabi, C, et al. (2024) Global Ionospheric Current Response to the Annular Solar Eclipse on 21 June 2020: Observation and Modeling.

2. Anoruo, CM, FN Okeke, KCh Okpala, and **A Calabia** (2023),Characterization of the mid- and low-latitude ionosphere in the African sector using local time during the 2012 July and March storms. JGR

3. Owolabi, C, V. Sai Gowtam, A Calabia (2023) Swarm's Thermospheric Mass Density Modeling via Principal Component Analysis.

4. Rasim et al. (2021), Statistical comparison of TEC seasonal variability from GNSS and IRI models during 2019-2020 at Sukkur GNSS station in Pakistan.

5. Anoruo, CM, FN Okeke, KCh Okpala, B Rabiu, D Okoh, and **A Calabia** (2021), Total Electron Content Anomalies over African Region observed during the 19 February 2014 Geomagnetic Storm.

6. Poudel, P, RK Mishra , B Adhikari, and **A Calabia** (2021), On the relation between Solar Wind Energy Dynamics, Polar Cap Potential and Field Aligned Currents during Major Geomagnetic Storms.

7. Karki, M, A Silwal, NP Chapagain, P Poudel, SP Gautam, RK Mishra, B Adhikari, Y Migoya-Orue, and **A Calabia** (2021), GPS Observations of Ionospheric TEC Variations during the 2015 Mw 7.8 Nepal Earthquake.

(q) Conference Proceedings and Workshops

1. **Calabia, A** M Tzamali, SG Jin, MD Rodriguez Frias, and L del Peral (2025), Thermospheric Responses following the May 2024 Geomagnetic Storm from CASSIOPE GNSS-Based Non-Gravitational Accelerations. *International Association of Geodesy (IAG) Scientific Assembly 2025*, 1 to 5 Sept, 2025, Rimini, Italy.
2. **Calabia, A** and SG Jin (2025), Low Earth Orbit Non-Gravitational Accelerations from GNSS Precise Orbits. *International Symposium on Geodesy and Geodynamics (ISGG2025)*, 1 to 4 Aug, 2025, Xining (Qinghai), China.
3. **Calabia, A**, SG Jin, and L Hong (2025), Soil Moisture Monitoring and Flood Assessments by GNSS-R and SMAP/Sentinel-1. *Asia Oceania Geosciences Society (AOGS), 22nd Annual Meeting*, 27 Jul to 1 Aug, 2025, Singapore.
4. **Calabia, A** M Tzamali, SG Jin, MD Rodriguez Frias, and L del Peral (2025), Thermospheric Responses and Insights Into Space Weather from CASSIOPE Satellite GNSS Data 2023 Geomagnetic Storms. *Asia Oceania Geosciences Society (AOGS), 22nd Annual Meeting*, 27 Jul to 1 Aug, 2025, Singapore.
5. Sharma, LN, PJ Shakya, B Adhikari, **A Calabia**, A Panthi (2024). Ionospheric Variations in South Korea during the March and April 2023 Geomagnetic Storms. Journal of Nepal Physical Society, 10(1), 49–57. https://doi.org/10.3126/jnphyssoc.v10i1.72835
6. **Calabia, A**, and S.G. Jin (2023), Thermospheric variations and responses to space weather from LEO GNSS precise orbits, *1st International Symposium on Satellite Navigation (ISSN2023) - Advances, Opportunities and Challenges*, 20-22 November 2023, Jiaozuo, China.
7. Edokossi, K., S.G. Jin, **A. Calabia**, I. Molina, and N. Mohamed (2023), GNSS meteorology methods and applications: Current status and future challenges, *1st International Symposium on Satellite Navigation (ISSN2023) - Advances, Opportunities and Challenges*, 20-22 November 2023, Jiaozuo, China.
8. **Calabia, A** (2023), Recent Advances and Prospects of the JSG1: Coupling Processes between Magnetosphere, Thermosphere and Ionosphere, *GGOS Days*, 20-22 September 2023, Alcala de Henares, Spain.
   https://doi.org/10.5281/zenodo.8366206
9. **Calabia, A** (2023), Ionospheric Plasma Depletions and coupled Space Weather Processes during the Geomagnetic Storm of 27 February 2014, XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) (Berlin 2023).
   https://doi.org/10.57757/IUGG23-4265
10. Molina, I, **A Calabia**, L Sosa, and A Justel (2022), Monitoring agriculture, a remote sensing perspective, *TAE 2022 - 8th international conference on trends in agricultural engineering*, 20-23 September 2022, Prague, Czech republic.
11. **Calabia, A**, A Olabode, C Amory-Mazaudier, A Maute, Y Yasyukevich, G Lu, OS Bolaji, EA Ariyibi, A Chukwuma, OE Jimoh, M Shah, B Adhikari, PM Mehta, L Yuan, N Maruyama, TT Ayorinde, C Owolabi (2022), The Joint Study Group 1 (JSG T.27): Coupling processes between Magnetosphere, Ionosphere, and Thermosphere, Abstract and invited talk at the *2nd Symposium of IAG Commis-*

sion 4 "Positioning and Applications", 5-8 September 2022, Potsdam, Germany. doi:10.5194/iag-comm4-2022-48.
https://zenodo.org/record/8125337

12. Adhikari, B, A Giri, R Baral, and **A Calabia** (2022). Investigating solar wind plasma variability during major geomagnetic storms of solar cycle 23-24, ePoster at the XXXI General Assembly International Astronomical Union (IAUGA2022), August 2 - 11, 2022, BEXCO, Busan, Republic of Korea Online Platform.

13. Anoruo, CM, FN Okeke, KC Okpala, and **A Calabia** (2022). Low latitude ionosphere responses to solar wind forcing from GNSS data in March 2001. Oral presentation and per-reviewed paper at *4th Intercontinental Geoinformation Days (IGD 2022)*, Tabriz, Iran.
https://igd.mersin.edu.tr/wp-content/uploads/2022/07/IGD4v3.pdf

14. **Calabia, A**, I Molina, and C Jones (2022). GNSS-R of Soil Moisture Content in Khuzestan for Optimal Crop Distribution. Oral presentation and per-reviewed paper at *4th Intercontinental Geoinformation Days (IGD 2022)*, Tabriz, Iran. doi: 10.5281/zenodo.6674334
https://igd.mersin.edu.tr/wp-content/uploads/2022/07/IGD4v3.pdf
https://doi.org/10.5281/zenodo.6674334

15. **Calabia, A**, C Amory-Mazaudier, A Maute, Y Yasyukevich, G Lu, OS Bolaji, EA Ariyibi, AChukwuma, OE Jimoh, M Shah, B Adhikari, PM Mehta1, LL Yuan, N Maruyama, TT Ayorinde, C Owolabi, A Olabode (2022), Coupling processes between Magnetosphere, Ionosphere, and Thermosphere. Abstract, Poster, and Oral presentation at *Magnetic Interactions 2022*, Hosted by the University of St Andrews, Scotland, 6-7 January 2022.
https://www.magneticinteractions.co.uk/

16. **Calabia, A**, and I Molina (2021), Monitoring land surface properties with Galileo Reflectometry, Poster at *United Nations / Austria World Space Forum 2021 'Space4Climate Action'*, Virtual Conference 7-9 December 2021.
https://www.unoosa.org/oosa/en/ourwork/world-space-forum/2021/wsf-2021-virtual-poster-exhibition.html

17. **Calabia, A**, and I Molina (2021), Monitoring land surface properties with Galileo Reflectometry, Abstract at *United Nations / Austria World Space Forum 2021 'Space4Climate Action'*, Virtual Conference 7-9 December 2021.
https://www.unoosa.org/documents/pdf/WSF/2021/Paper/WSF2021_Book_of_Abstracts.pdf

18. **Calabia, A** (2021). Build Geodetic Space Weather Research: Coupling Processes Between Magnetosphere, Thermosphere and Ionosphere. GNSS Space Weather. Keynote talk at *Seventh International Conference on Aerospace Science Engineering 2021 (ICASE2021),December 14-16, 2021, Islamabad, Pakistan.* Zenodo.
https://doi.org/10.5281/zenodo.5774165

19. Blossfeld, M, M Schmidt, K Börger, E Forootan, **A Calabia**, F Prol, B Soja (2019), GGOS Focus Area on Geodetic Space Weather Research - Observation Techniques and Modeling Approaches, *AGU Fall Meeting Abstracts*, G13A-06, San Francisco, CA, 9-13 December 2019.

20. **Calabia, A**, and SG Jin, Upper Atmospheric Characterization through Neutral and Electron Density Observables. Oral presentation at *IUGG 2019 General Assembly*, Montreal, Canada, 8 to 18 July 2019.

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