

# CURRICULUM VITAE

**Judit Muraközy**

(September 02, 2024)

## Personal data:

name: Judit Muraközy

place and date of birth: Hajdúnánás, January 8, 1979

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## Education:

- |      |   |
|------|---|
| 2014 | <i>Eötvös Loránd University, Physics Doctor School, Particle physics and astronomy program, PhD</i><br>title of PhD thesis: "Napfoltmozgások és -eloszlások kapcsolata szoláris sebességterekkel" |
| 2002 | <i>University of Debrecen, Physicist</i><br>title of thesis: "Korrekciós eljárás a debreceni spektrográf műszerprofiljára"  |
| 1997 | <i>Péchy Mihály Polytechnic High-school, Architect specialist, High-school graduation</i>   |

## Foreign languages:

english (intermediate level)

spanish (basic level)

## Professional skills:

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|-------------|--|
| 2023 –      | senior research fellow, <i>HUN-REN Institute of Earth Physics and Space Science</i><br>tasks: research, teaching   |
| 2021 – 2023 | research fellow, <i>Institute of Earth Physics and Space Science (ELKH-EPSS)</i><br>tasks: research, teaching  |
| 2014 – 2021 | research fellow, <i>Research Centre for Astronomy and Earth Sciences, Konkoly-Thege Miklós Astronomical Institute (Heliophysical Observatory) ELKH,</i><br>tasks: research, teaching |
| 2004 – 2014 | assistant researcher, <i>Heliophysical Observatory of Research Centre for Astronomy and Earth Sciences, HAS,</i><br>tasks: research, observation                                     |

## Grants, travelling supports, cooperations:

2022	One month cooperation at the California State University Northridge (USA)
2018	OTKA FK129137 → FK141895 grant (2018-2024), PI
2018	MTA Youth International Conference Application 2018/2. travel grant (for participation on Tenth Workshop Solar Influences on the Magnetosphere, Ionosphere and Atmosphere) - 132.000 HUF
2018	Hungarian Academy of Sciences Individual Mobility Application 2018 (for participation on Tenth Workshop Solar Influences on the Magnetosphere, Ionosphere and Atmosphere) - 320 EUR
2017	Hungarian Academy of Sciences International Conference Application 2017/2. travel grant (for participation on the United Nations/United States of America Workshop on the International Space Weather Initiative: The Decade after the International Heliophysical Year 2007) - 300.000 HUF
2017	United Nations Outer Space Office travel grant (for participation on United Nations/United States of America Workshop on the International Space Weather Initiative: The Decade after the International Heliophysical Year 2007)
2014	Heliophysics Summer School grant (for participation on the 8th Heliophysics Summer School) - 3.000 USD
2012	NSO Travel Support (for participation on the 26th NSO Workshop) - 500 USD
2010	NSF Travel Grant (for participation on the IAU 273 Symposium) - 1.100 USD
2008	MTA-Academy of Scientific Research and Technology of Egypt two-sided contract two weeks study in the National Research Institute of Astronomy and Geophysics (Helwan, Egypt)

## Research interesting:

- connections of solar magnetic and velocity fields (Coriolis effect on sunspot groups, connections between distributions of sunspots and torsional waves)
- N-S asymmetry in the distribution of sunspot groups
- forecast of solar activity
- development and morphology of sunspot groups
- decay of sunspot groups

## Scientific projects:

- OTKA FK141895 2018-2024 (PI)
- ESA Contract No. 4000121800/17/D/MRP 2017-2020 (participant researcher)
- eHEROES FP7, Grant agreement No. 284461, 2012-2015 (participant researcher)
- SOTERIA FP7, Grant agreement No. 218816, 2008-2011 (participant researcher)

## Lectures:

- 2016/17 – Introduction to astronomy – lectures (University of Debrecen)

## Membership:

2022 –	European Astronomical Society (EAS) : ordinary member
2020 –	Scientific Data (Nature) : editorial board member
2016 –	ISWI : Hungarian Coordinator
2015 –	IAU : individual membership
2014 –	HAS : Public body member
2014 – 2023	SCOSTEP : Scientific Discipline Representative

## Professional activity:

Reviewer for Solar Physics, Advances in Space Research, Scientific Data, Journal of Atmospheric and Solar-Terrestrial Physics, Astronomy and Astrophysics, The Astrophysical Journal, Discover Space

Reviews for: the Czech Scientific Found (2020), the Belgian Research Programm (2022)

Member of jury: XXXIII. OTDK – Physics subsection

Participation in PhD proceedings (ELTE)

## Publications:

- (28) Muraközy, Judit: 2024, "Variation in the polarity separation of sunspot groups throughout their evolution", *Astronomy and Astrophysics*, **accepted for publication** (Q1)
- (27) Muraközy, Judit: 2024, "Lifetime of Long-Lived Sunspot Groups", *Universe (Solar and Stellar Activity: Exploring the Cosmic Nexus)*, **10(8)**, 318, 24pp (Q1)
- (26) Velasco Herrera, Victor Manuel; Soon, Willie; Babynets, Nelya; Muraközy, Judit; Tlatov, Andrey G.; Nagovitsyn, Yury A.; Qiu, Shican; Švanda, Michal; Velasco Herrera, Policarpo Arol: 2024, "Reconstructing daily group sunspot numbers since the maunder minimum with objective inter-calibration algorithms", *Advances in Space Research*, **73 (5)**, 2788, 28pp (Q1)
- (25) Muraközy, Judit: 2022, "Variations of the Internal Asymmetries of Sunspot Groups During Their Decay", *The Astrophysical Journal*, **925**, 87, 6pp (Q1)
- (24) Velasco Herrera, Víctor Manuel; Soon, Willie ; Hoyt, Douglas V. ; Muraközy, Judit: 2022, "Group Sunspot Numbers: A New Reconstruction of Sunspot Activity Variations from Historical Sunspot Records Using Algorithms from Machine Learning", *Solar Physics*, **297 (1)**, 8, 48pp (Q2)
- (23) Muraközy, Judit: 2021, "On the Decay of Sunspot Groups and Their Internal Parts in Detail", *The Astrophysical Journal*, **908 (2)**, 133, 11pp (Q1)
- (22) Muraközy, Judit: 2020, "Study of the Decay Rates of the Umbral Area of Sunspot Groups Using a High-resolution Database", *The Astrophysical Journal*, **892 (2)**, 107, 7pp (Q1)

- (21) Muraközy, J.: 2019, "Connection Between Solar Hemispheric Toroidal Cycles and Geomagnetic Variations", *Solar Physics*, **294**, 46, 7pp (Q2)
- (20) Muraközy, J.: 2016, "Phase Relationships of Solar Hemispheric Toroidal and Poloidal Cycles", *The Astrophysical Journal*, **826** (2), 145, 8pp (Q1)
- (19) Muraközy, J.; Baranyi, T.; Ludmány, A.: 2016, "An alternative measure of solar activity from detailed sunspot datasets", *Solar Physics*, **291**, 2941-2950 (Q2)
- (18) Muraközy, J.; Baranyi, T.; Ludmány, A.: 2014, "Sunspot Group Development in High Temporal Resolution", *Solar Physics*, **289** (2), 563-577 (Q2)
- (17) Muraközy, J.; Ludmány, A.: 2012, "Phase lags of solar hemispheric cycles", *Monthly Notices of the Royal Astronomical Society*, **419** (4), 3624-3630 (Q1)
- (16) Muraközy, J.; Ludmány, A.: 2008, "Cycle dependence of the latitudinal -longitudinal sunspot motion correlation", *Astronomy and Astrophysics*, **486** (3), 1003-1007 (Q1)
- (15) Muraközy, J.: 2015, "North- south differences during cycles 7-10", *Central European Astrophysical Bulletin*, **39** (1), 29-33 (refereed)
- (14) Muraközy, J.; Baranyi, T.; Ludmány, A.: 2012, "Development and morphology of leading-following parts of sunspot groups", *Central European Astrophysical Bulletin*, **36** (1), 1-8 (refereed)
- (13) Baranyi, T.; Gyenge, N.; Györi, L.; Korsós, M.; Ludmány, A.; Muraközy, J.: 2012, "Változó naptevékenység", *Magyar Geofizika*, **53** (3), 171-176
- (12) Baranyi, T.; Györi, L.; Ludmány, A.; Muraközy, J.: 2012, "A naptevékenység vizsgálata növekvő felbontásban", *Magyar Tudomány*, **173** (12), 1413-1418
- (11) Muraközy, J.; Ludmány, A.: 2011, "Correlations of magnetic features and the torsional pattern", *Physics of Sun and Star Spots Proceedings of IAU Symposium*, **273**, 394-398
- (10) Muraközy, J.; Ludmány, A.: 2011, "Considerations on the Spörer-diagram – torsional wave relationship", *Central European Astrophysical Bulletin*, **35** (1), 45-49 (refereed)
- (9) Muraközy, J.; Ludmány, A.: 2010, "North-South differences of solar cycle", *Central European Astrophysical Bulletin*, **34** (1), 99-107 (refereed)
- (8) Muraközy, J.; Ludmány, A.: 2008, "Temporal variations of Coriolis-turns in the photosphere", *Central European Astrophysical Bulletin*, **32** (1), 133-139 (refereed)
- (7) Muraközy, J.; Ludmány, A.: 2006, "Connection of sunspot's distribution with the torsional wave", *Publications of the Astronomy Department of the Eötvös University*, **17**, 23-28

- (6) Muraközy, J.; Mező, G.; Ludmány, A.; Győri, L.: 2005, "Search for possible connections of sunspot features and torsional waves", *Hvar Observatory Bulletin*, **29**, 31-37 (refereed)
- (5) Győri, L.; Baranyi, T.; Muraközy, J.; Ludmány, A.: 2005, "Recent advances in the Debrecen sunspot catalogues", *Memorie della Societa Astronomica Italiana*, **76**, 981-984
- (4) Győri, L.; Baranyi, T.; Muraközy, J.; Ludmány, A.: 2005, "Comparison of sunspot area data determined from ground-based and space-borne observation", *Memorie della Societa Astronomica Italiana*, **76**, 985-988
- (3) Mező, G.; Muraközy, J.; Baranyi, T.; Győri, L.: 2005, "East-West asymmetry on the solar disk", *Hvar Observatory Bulletin*, **29**, 99-107 (refereed)
- (2) Mező, G.; Baranyi, T.; Muraközy, J.; Győri, L.: 2004, "Statistical study of the East-West asymmetry of sunspots", *Multi-Wavelength Investigations of Solar activity Proceedings of IAU Symposium*, **223**, 285-286
- (1) Muraközy, J.; Vince, I.; Ludmány, A.: 2003, "Instrumental profile of the Debrecen Solar Spectrograph", *Serbian Astronomical Journal*, **167**, 81-85

**Conferences, participation on schools:** 31 talks (2 invited), 18 posters, 4 schools

- [55] 16th Workshop on Solar Influences on the Magnetosphere, Ionosphere and Atmosphere, Primorsko, 2024 (**poster** - "Dynamics and lifetime of solar active regions")
- [54] The 2023 Asia-Pacific Regional IAU Meeting, Koriyama, 2023 (**poster** - "Variation of tilt angle and polarity separation during the evolution of solar active regions")
- [53] Asia Oceania Geosciences Society, 20th Annual Meeting, Singapore, 2023 (**talk** - "In Detail About the Regression of Sunspot Groups")
- [52] IUGG, The 28th General Assembly, Berlin, 2023 (**talk** - "Emergence and decay of sunspot groups")
- [51] Hungarian Space Research Forum 2023, Sopron, 2023 (**talk** - "Napfoltcsoportok visszafejlődésének dinamikája")
- [50] 13rd Workshop, Solar Influences on the Magnetosphere, Ionosphere and Atmosphere, Primorsko (online participation), 2022 (**talk** - "Variations of the Sunspot Groups Separation Distance and Tilt Angles During the Decay")
- [49] Magyar Űrkutatási Fórum, Budapest (online participation), 2021
- [48] XVIIth Hvar Astropysical Colloquium, Zoom meeting, 2021 (**talk** - "Internal dynamics of sunspot groups during their decay")
- [47] Twelfth Workshop, Solar Influences on the Magnetosphere, Ionosphere and Atmosphere, Primorsko (online participation), 2021 (**talk** - "Details of sunspot groups' decay")
- [46] 43rd COSPAR Scientific Assembly, Sydney (online participation), 2021 (**invited talk** - "Evolutionary and decaying processes of solar active regions")
- [45] 16th. European Space Weather Week, Liege, 2019 (**posters** - "Solar North-South asymmetry and its connection with the geomagnetic activity"; "Complex flare forecast

program using data of sunspots and line-of sight magnetic fields”)

[44] Space Climate Symposium 7, Orford, 2019 (**posters** - “Evolution of sunspot groups studied on a large statistical sample”; “Effects of the solar hemispheric asymmetry on the interplanetary and geomagnetic field”)

[43] Eleventh Workshop, Solar Influences on the Magnetosphere, Ionosphere and Atmosphere, Primorsko, 2019 (**talk** - “Sunspot decay on a large statistical sample by using high-resolution data base”; **poster** - “Effects of the hemispheric solar cycles on the IMF and geomagnetic fields”)

[42] Magyar Űrkutatási Fórum 2019, 2019 (**talk** - “Foltcsoportok bomlása nagy felbontású adatsoron”; **poster** - “A félgömbi napfoltciklusok kapcsolata az interplanetáris és a geomágneses terekkel”)

[41] Tenth Workshop, Solar Influences on the Magnetosphere, Ionosphere and Atmosphere, Primorsko, 2018 (**invited talk** - “Solar activity from detailed sunspot database- An alternative measure”; **talk** - “Long-term cyclicity in the hemispheric solar activity”)

[40] N/US International Space Weather Initiative Workshop: The Decade after the International Heliophysical Year 2007, Boston (MA), 2017 (**posters** - “*Impact of the solar hemispheric asymmetry on the variations of the interplanetary current sheet*”, “*Space weather activities in Hungary*”)

[39] Space Climate Symposium 6, Levi, 2016 (**talk** - “*Asymmetry in the solar hemispheric poloidal and toroidal cycles*”)

[38] Magyar Űrkutatási Fórum, Sopron, 2015 (**talk** - “*Szoláris félgömbi aszimmetria vizsgálata*”)

[37] Sunspot formation: theory, simulation and observations, Stockholm, 2015 (**talk** - “*Study of sunspot group evolution on a large statistical sample*”)

[36] Annual eHEROES Meeting, Leuven, 2015

[35] XIIIth Hvar Astrophysical Colloquium, Hvar, 2014 (**talk** - “*Extended study of the solar hemispheric asymmetry*”)

[34] 8th Heliophysics Summer School, Boulder (CO), 2014 (participant)

[33] Magyar Csillagászok Találkozója 2013, Galyatető, 2013 (**talk** - “*Foltcsoportok fejlődése és morfológiája*”)

[32] XXVIII. Ionoszféra- és Magnetoszférafizikai Szeminárium, Kecskemét, 2013 (**talk** - “*Napfoltcsoportok fejlődése nagy felbontásban*”)

[31] 3rd SSN Workshop, Tucson (AZ), 2013

[30] 26th NSO Workshop, Solar origins of space weather and space climate: Connecting the interior to the corona, Sunspot (NM), 2012, (**talk** - “*Detailed view of sunspot group development*”)

[29] MTA KTM CsKI Intézeti Szeminárium, Budapest, 2011 (**talk** - “*Szoláris félgömb-ciklusok fáziskülönbségeinek hosszútávú variációja*”)

[28] 5th Central European Solar Physics Meeting, Bairisch Kölldorf, 2011 (**talk** - “*Development and morphology of leading-following parts of sunspot groups*”)

[27] 3rd SOTERIA General Meeting, Leuven, 2011

[26] MTA KTM CsKI Intézeti Szeminárium, Budapest, 2011 (**talk** - “*Vizsgálatok a 24. napciklus előrejelzésére vonatkozóan*”)

[25] Capacity Building Workshop, Brussels, 2011

- [24] International Advanced School on Space Weather Modelling and Applications, Miramare-Triest, 2010 (participant)
- [23] 2nd SOTERIA General Meeting, Debrecen, 2010
- [22] Xth Hvar Astrophysical Colloquium, The Active Sun, Hvar, 2010 (**poster** - “*Considerations on the Spörer-diagram – torsional wave relationship*”)
- [21] IAU Symposium 273, Ventura (CA), 2010 (**poster** - “*Correlations of solar magnetic features and the torsional pattern*”)
- [20] SCOSTEP’s Symposium, Berlin, 2010 (**poster** - “*Peculiarities at the start of solar cycle 24*”)
- [19] 1st SOTERIA General Meeting, Davos, 2010 (**talk** - “*Long-term photospheric variations*”)
- [18] Sixth European Space Weather Week, Brugge, 2009
- [17] Magyar Csillagászok Országos Találkozója a Csillagászat Nemzetközi Évében, Balatonlelle, 2009 (**talk** - “*Programok és projektek a Napfizikai Observatóriumban*”)
- [16] 4th Central European Solar Physics Meeting, Bairisch Kölldorf, 2009 (**talk** - “*Variations in the hemispheric predominance of solar activity*”)
- [15] IAGA 11th Scientific Assembly, Sopron, 2009 (**talk** - “*North- South asymmetries in solar cycle*”)
- [14] Space Climate Symposium, Saariselka, 2009 (**poster** - “*The number of spotless days as a predictive parameter*”)
- [13] National Research Institute of Astronomy and Geophysics, Helwan, 2008 (**talk** - “*The Debrecen Observatory and current sunspot studies*”)
- [12] 1st Arabic Conference, Cairo - Helwan, 2008
- [11] 3rd Central European Solar Physics Meeting, Bairisch Kölldorf, 2007 (**talk** - “*Cycle-dependent Coriolis effect*”)
- [10] Oslo Summer School on Radiative Transfer and Numerical MHD, Oslo, 2007 (participant)
- [9] Országos Csillagászati Szeminárium, Budapest, 2007 (**talk** - “*Coriolis-hatások napfoltokon*”)
- [8] XXV. Ionosféra- Magnetoszférafizikai Szeminárium, Sopron, 2006 (**talk** - “*Napfoltok és szoláris sebességterek kapcsolatának vizsgálata*”)
- [7] VIIIth Hvar Astrophysical Colloquium, Dinamical Processes in the Solar Atmosphere, Hvar, 2006 (**poster** - “*Study of the impact of solar rotation on sunspot groups*”)
- [6] Workshop on Solar Flares and Initialisation of CME’s, Tatraska Lomnica, 2006 (**poster** - “*Study of correlations between sunspot distributions and motion fields*”)
- [5] Fiatal Csillagász és Asztrofizikus Kutatók IV. Találkozója, Budapest, 2006 (**talk** - “*Napfolt-eloszlások kapcsolata a torziós hullámmal*”)
- [4] Solar Variability and Earth Climate, Rome, 2005 (**poster** - “*Recent advances in the Debrecen sunspot catalogues*”, “*Comparison of sunspot area data determined from ground-based and space-borne observation*”)
- [3] 3rd ESMN School on Solar Magnetometry and Solar Magnetism, Tatraska Lomnica, 2004 (participant)

[2] XXIV. Ionoszféra Magnetoszféra Szeminárium, Űridőjárás és következményei, Debrecen, 2004 (**talk** - "A torziós oszcilláció és a napfoltok kapcsolatainak keresése")

[1] VIIIth Hvar Astrophysical Colloquium, Solar Activity Cycle and Global Phenomena, Hvar, 2004 (**poster** - "Search for possible connections of sunspot features and torsional wave")

### **Other lecture, outreach:**

[7] Seminář k relevantnosti kreseb v moderní době, Uherský Brod, 2023 "Long-term asymmetric studies"

[6] Ondřejov Observatory Seminar, Ondřejov, 2023 "Emergence and decay of sunspot groups in high resolution"

[5] FI szeminárium, Sopron, 2022 "Foltcsoportok visszafejlődése"

[4] Reménység Katolikus Általános Iskola, Gyál (Online talk), 2021 "A csillagos ég"

[3] Debreceni SzC Péchy Mihály Építőipari Technikum - Péchysek Baráti Köre, Debrecen, 2017 "Központi csillagunk, a Nap"

[2] Konkoly Seminar, Budapest, 2011 "Szoláris félgömbciklusok fáziskülönbségeinek hosszútávú variációja"

[1] Konkoly Seminar, Budapest, 2011 "Vizsgálatok a 24. nappciklus előrejelzésére vonatkozóan"