Sahra Kacimi

Scientist, Jet Propulsion Laboratory, California Institute of Technology.

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Professional experience

2021-present   **Scientist:** *Remote sensing and analysis of the sea ice system. Retrievals of snow depth, ice thickness, ice kinematics from various instruments. Study of sea ice processes and ice-ocean interactions.*
Jet Propulsion Laboratory (Caltech /NASA)

2017-2021   **Scientific applications software engineer:** *Analysis and treatment of satellite, airborne and ground measurements for precipitation and snow depth retrievals.*
Jet Propulsion Laboratory (Caltech /NASA)

2015-2016   **Visiting assistant researcher:** *Development of a data-assimilation approach for AIRS infrared brightness temperatures in cloud and rain.*
Joint Institute For Regional Earth System Science and Engineering (UCLA); Jet Propulsion Laboratory (Caltech /NASA)

2012-2015   **Postdoctoral fellow:** *Improving the vertical profiling of precipitation using passive microwave radiometers for the GPM mission.*
Jet Propulsion Laboratory (Caltech /NASA)

Education

2009-2012   **Ph.D. degree in Meteorology, Oceanography and Environment,** UVSQ - University Versailles Saint Quentin en Yvelines, Versailles, France.

2007-2008   **M.S. degree in Physical Methods in Remote sensing,** University Paris 7 Denis Diderot, France.

Honors, Awards and Fellowships

2024:   NASA Exceptional Scientific Achievement Medal

2022:   JPL Charles Elachi Award for outstanding estimation of Arctic and Antarctic snow depth and ice thickness by combining observations from lidar and radar satellite altimeters. (Jet Propulsion Laboratory)

2012-2015   NASA postdoctoral fellowship at Jet Propulsion Laboratory.

2009-2012   PhD fellowship, CNES (Centre National des Etudes Spatiales) /EADS-Astrium, France.

Peer-reviewed publications

Magruder, L. A., Farrell, S. L., Neuenschwander, A., Duncanson, L., Csatho, B., **Kacimi, S.**, & Fricker, H. A. (2024). Monitoring Earth's climate variables with satellite laser altimetry. *Nature Reviews Earth & Environment*, 1-17.

Kacimi, S. and Kwok, R. (2022). Arctic snow depth, ice thickness, and volume from ICESat-2 and CryoSat-2: 2018–2021. *Geophysical Research Letters*, 49, e2021GL097448. https://doi.org/10.1029/2021GL097448

Kwok, R., Petty, A. A., Bagnardi, M., Kurtz, N. T., Cunningham, G. F., Ivanoff, A., and **Kacimi, S.**: Refining the sea surface identification approach for determining freeboards in the ICESat-2 sea ice products, The Cryosphere, 15, 821–833, https://doi.org/10.5194/tc-15-821-2021, 2021

Kacimi, S. and Kwok, R.: The Antarctic sea ice cover from ICESat-2 and CryoSat-2: freeboard, snow depth, and ice thickness, The Cryosphere, 14, 4453–4474, https://doi.org/10.5194/tc-14-4453-2020, 2020

Kwok, R., Cunningham, G. F., **Kacimi, S.**, Webster, M. A., Kurtz, N. T., & Petty, A. A. (2020). Decay of the snow cover over Arctic sea ice from ICESat-2 acquisitions during summer melt in 2019. Geophysical Research Letters, 47, e2020GL088209. https://doi.org/10.1029/2020GL088209

Kwok, R., **Kacimi, S.**, Webster, M. A., Kurtz, N. T. and Petty, A. A. (2020), Arctic snow depth and sea ice thickness from ICESat-2 and CryoSat-2 freeboards: A first examination. Journal of Geophysical Research: Oceans, 125(3), e2019JC01600

Kwok, R., **Kacimi, S**., Markus, T., Kurtz, N.T., Studinger, M., Sonntag, J.G., Manizade, S.S., Boisvert, L.N., and Harbeck, J.P., 2019: ICESat-2 surface height and sea-ice freeboard assessed with ATM lidar acquisitions from Operation IceBridge, Geophysical Research Letters 46.20: 11228-11236

Steward, J., Haddad, Z., Hristova-Veleva, S., **Kacimi, S.**, and Seo, E. K. ,2018: Variational Deconvolution of Conically Scanned Passive Microwave Observations With Error Quantification. IEEE Transactions on Geoscience and Remote Sensing, 57(2), 1001-1014

Kwok, R. and **Kacimi, S.**, 2018: Three years of sea ice freeboard, snow depth, and ice thickness of the Weddell Sea from Operation IceBridge and CryoSat-2. The Cryosphere 12, 2789-2801

Kwok, R., Pang, S.S. and **Kacimi, S.**, 2017: Sea ice drift in the Southern Ocean: Regional patterns, variability, and trends. *Elem Sci Anth, 5*

Haddad, Z.S., Sawaya, R.C., **Kacimi, S.**, Sy, O.O., Turk, F.J. and Steward, J. 2017: Interpreting millimeter-wave radiances over tropical convective clouds*, J. Geophys. Res. Atmos.,* 122, 1650–1664, doi:10.1002/2016JD025923

Kacimi S., N. Viltard and P-E. Kirstetter, 2013: A new methodology for rain identification from passive microwave data in Tropics using neural networks. *Quarterly Journal of the Royal Meteorological Society: Special Issue on the Megha-Tropiques mission*, **139**, 912-922. doi: 10.1002/qj.2114

Non-peer-reviewed publications

Kacimi, S., Vaze, P., Brown, S., Markus, T., Gardner, A., Colliander, A., & Nilsson, J. (2023, March). Using mm-wave observations to maximize the CRISTAL mission cryosphere science applications. In 2023 IEEE Aerospace Conference (pp. 1-8). IEEE.

Haddad Z. S., Sawaya R. S., **S. Kacimi**, Sy O. O., and Steward J. L. "Quantifying and monitoring convection intensity from mm-wave sounder observations", Proc. SPIE 9882, Remote Sensing and Modeling of the Atmosphere, Oceans, and Interactions VI, 98820M (3 May 2016); https://doi.org/10.1117/12.2228186

Haddad, Z., **Kacimi, S.** and D. Short, 2015: A parametrization of vertically-variable horizontal non-uniformity of rain within the GPM-DPR beams. *Geoscience and Remote Sensing Symposium (IGARSS), 2015 IEEE international*, 5131-5133. doi: 10.1109/IGARSS.2015.7326988

Tapiador F., **Kacimi S.**, Castro M. Levizzani, V., Katsanos, D. and García-Ortega E. (2015). Precipitation Science: Observations, Retrievals, and Modeling. Advances in Meteorology. 2015. 10.1155/2015/843403

Conferences

Kacimi, S., Webster, M., & Kwok, R. Antarctic snow depth, ice thickness and ice volume variability in the context of the 2022 and 2023 record minimum extent. *Oral presentation at the Southern Ocean Observing System Symposium, Hobart,* Australia (14-18 August 2023)

Kacimi, S., Webster, M., & Kwok, R. The Seasonal Cycle of Arctic Snow Depth: Linkages to ICESat-2 Summer Freeboards and Albedo. *Oral presentation at the American Geophysical Union (AGU) Fall Meeting, Chicago,* USA (12-16 December 2022)

Kacimi S. and Kwok R.: Three years of snow depth and ice thickness from ICESat-2 and CryoSat-2. *Oral presentation at the American Geophysical Union (AGU) Fall Meeting*, New Orleans, USA (13-17 December 2021)

Kacimi S. and Kwok R.: A look at the Antarctic sea ice cover from combined measurements of ICESat-2 and CryoSat-2 ". **Invited** *oral presentation at the virtual American Geophysical Union (AGU) Fall Meeting* (1-17 December 2020)

Kacimi S. and Haddad Z.-S.: Using the Megha-Tropiques SAPHIR sounder for rain: "Detection, forward observation operator (for DA), and retrievals". *Poster presentation at the 7th IPWG Workshop on Precipitation Measurements*, Tsukuba, JAPAN. (17-21 November 2014)

Kacimi S. and Haddad Z.-S.: Improving the instantaneous vertical profiling of precipitation from spaceborne radiometers using high sensitivity ground-based radar measurements. *Poster presentation at the 31st Conference on Hurricanes and Tropical Meteorology*, San Diego, USA. March 30-April 4, 2014

Kacimi S., Haddad Z.-S. and Turk J.-F.: Improving the instantaneous vertical profiling of precipitation using ground-based radar measurements. *Oral presentation at the 1st international Megha-Tropiques ground validation workshop*, Toulouse, France. November 25-27, 2013

Kacimi S. and Haddad Z.-S.: Improving the resolution of over-sampled radiometer and radar measurements for rain retrieval algorithms. *Poster presentation at the American Geophysical Union (AGU) Fall Meeting*, San Francisco, USA. December 3-7, 2012

Kacimi S., Haddad Z.-S. and Viltard N.: Status of BRAIN algorithm for the Megha Tropiques mission. *Oral presentation at the 4th TRMM/GPM science conference*, Tokyo, Japan. November 13-16, 2012

Kacimi S., Viltard N. and Kirstetter P-E.: Optimization of a rain retrieval algorithm using microwave data from satellites. *Oral presentation at the European Geophysical Union (EGU) meeting*, Vienna, Austria. April 3-8, 2011

Kacimi S., Viltard N. and Kirstetter P-E.: Reduction of a rain retrieval algorithm database using Self Organizing Maps. *Poster presentation at the PMM (Precipitation Measurement Missions) meeting*, Seattle, USA. November 1-5, 2010

Media activities

2022 Research highlighted in an American Geophysical Union press release "New observations from ICESat-2 show remarkable Arctic sea ice thinning in just three years"- **https://news.agu.org/press-release/new-observations-from-icesat-2-show-remarkable-arctic-sea-ice-thinning-in-just-three-years/**.

2022 Research insights interview for the nonprofit environmental news site Mongabay "Multiyear ice thinner than thought as Arctic sea ice reaches winter max: Studies" - https://news.mongabay.com/2022/03/multiyear-ice-thinner-than-thought-as-arctic-sea-ice-reaches-winter-max-studies/.

Editorial / Review activities

Journals:
- Earth and Space Science
- The Cryosphere Journal
- Nature
- Journal of Geophysical Research - Oceans
- Journal of Hydrometeorology- 2014-2016
- IEEE: Transactions on Geoscience and Remote Sensing- 2015

Editor:
- Guest editor for the special issue: "Precipitation science: Observations, Retrievals, and Modeling". Advances in Meteorology - 2015

Proposal panel review:
- Future Investigators in NASA Earth and Space Science and Technology – 2021
- NASA The Science of Terra, Aqua, and Suomi-NPP call – 2020
- NASA Remote sensing theory for Earth science call – 2019

Funded proposals

2024-2027 **PI: The evolution of the summer sea ice surface: albedo, snow cover and surface type.** *ROSES 2023 Cryospheric science.*

2023-2026 **PI: Advancing knowledge of the sea-ice systems and drivers of their variability through recent satellite records.** *ROSES 2022 Studies with ICESat-2.*

2022-2023 **PI: The seasonal cycle of Arctic snow depth from ICESat-2: linkages to summer freeboards and albedo**. *Unsolicited proposal, ICESat-2 2022 Summer Field Campaign.*

2021-2024 **Co-I: Coastal altimetry at the Antarctic margins**. *ROSES 2020 Studies with ICESat-2 [PI: Andrew Thompson].*

2020-2023 **Co-I: Snow depth over sea ice from differencing ICESat-2 and CryoSat-2 freeboards**. *ROSES 2019 Studies with ICESat-2 [PI: Ron Kwok].*

Field experiments

Megha-Tropiques mission validation campaign, Niamey, Niger, August 2010

Skills

Languages French (native), English (fluent), Spanish (fluent)
Computer Windows, Linux / Unix, Mac OS, Fortran, Matlab, IDL, GMT, Microsoft Office