

## **Dr. Sudip Chakraborty**

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512-993-0547

### **BIOGRAPHY**

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I am a civil engineering major and I come from India. I did my PhD. from the University of Texas at Austin in 2016. I analyze satellite data to understand many unknown processes related to the dynamics of the aerosol transport, moistening of the upper troposphere due to the convective systems, global precipitation, and the wet season onset mechanisms. Other than at work, you will find me working out, cooking, and watching movies or college football.

### **RESEARCH INTERESTS**

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- Detection of atmospheric aerosol and trace gas rivers and exploring associated global climate impacts. Transport of aerosols to the upper troposphere by the deep convective clouds.
- Investigating the upper tropospheric water vapor biases in CMIP6 models using satellite measurements.
- Relative influence of meteorological conditions and aerosols on the wet season onset, shallow to deep convective evolution over the Amazon and Congo rainforests using NASA A-train satellites and climate models.
- Understanding the influence of meteorological conditions and aerosols on rainfall and lifetime of the mesoscale convective systems using observations from NASA A-train satellites.

### **CURRENT POSITION**

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10/2018-Present    Postdoctoral Fellow, Jet Propulsion Laboratory, Pasadena, California.

### **PRIOR EXPERIENCE**

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06/2016-12/2016    Postdoctoral Fellow. Jackson School of Geosciences, the University of Texas at Austin.

01/2017-10/2018    Postdoctoral Fellow. Department of Atmospheric and Oceanic Sciences, the University of California, Los Angeles.

2009-2016            Graduate Research and Teaching Assistant. Jackson School of Geosciences, the University of Texas at Austin.

### **EDUCATION**

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Ph.D. Geological Sciences, Jackson School of Geosciences, the University of Texas at Austin.

Master of Technology, Indian Institute of Technology, Kanpur, India.

Bachelor of Engineering, Civil Engineering, Government Engineering College, Jalpaiguri, India.

## TEACHING AND MENTORING EXPERIENCE

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- California Institute of Technology      Mentored two Students in the Freshman Summer Research Institute (FSRI) program in summer 2020.
- California State University, Los Angeles      An introductory undergraduate level class on satellite and ground-based measurements. Guest Lecture.
- UCLA      Statistical prediction of drought events, Department of Atmospheric and Oceanic Sciences, the University of California, Los Angeles. Guest lecture.
- UT Austin      I was a teaching assistant and helped Dr. William Fisher for a graduate course: Reservoir Geology and Advanced Recovery.
- IIT Kanpur      I worked as a teaching assistant and was responsible for teaching and taking labs on water and wastewater quality testing, grading, and proctoring examinations for undergraduate level courses with 50 students in the Department of Civil Engineering, Indian Institute of Technology, Kanpur.

## PUBLISHED ARTICLES

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- Chakraborty, S, Jiang, J. H., Su, H., & Fu, R. (2021). On the Role of Aerosol Radiative Effect in the Wet Season Onset Timing over the Congo Rainforest during Boreal Autumn. *Atmospheric Chemistry and Physics Discussions*, 2021, 1–27. <https://doi.org/10.5194/acp-2020-1138>
- Chakraborty, Sudip, Guan, B., Waliser, D. E., da Silva, A. M., Uluatam, S., & Hess, P. (2021). Extending the Atmospheric River Concept to Aerosols: Climate and Air Quality Impacts. *Geophysical Research Letters*. <https://doi.org/10.1029/2020GL091827>
- Worden, S., Fu, R., Chakraborty, S., Liu, J., Worden, J. (2021). Where Does Moisture Come from for Rainfall over the Congo Basin. *JGR Biogeosciences*.
- Chakraborty, Sudip, Jiang, J. H., Su, H., & Fu, R. (2020). Deep Convective Evolution From Shallow Clouds Over the Amazon and Congo Rainforests. *Journal of Geophysical Research: Atmospheres*. <https://doi.org/10.1029/2019JD030962>
- Fernando, D. N., Chakraborty, S., Fu, R., & Mace, R. E. (2019). A process-based statistical seasonal prediction of May–July rainfall anomalies over Texas and the Southern Great Plains of the United States. *Climate Services*, 16, 100133. <https://doi.org/https://doi.org/10.1016/j.cliser.2019.100133>
- Chakraborty, Sudip, Schiro, K. A., Fu, R., & David Neelin, J. (2018). On the role of aerosols, humidity, and vertical wind shear in the transition of shallow-to-deep convection at the Green Ocean Amazon 2014/5 site. *Atmospheric Chemistry and Physics*. <https://doi.org/10.5194/acp-18-11135-2018>
- Chakraborty, Sudip, Fu, R., Rosenfeld, D., & Massie, S. T. (2018). The Influence of Aerosols and Meteorological Conditions on the Total Rain Volume of the Mesoscale Convective Systems Over Tropical Continents. *Geophysical Research Letters*, 45(23), 13,13-99,106. <https://doi.org/10.1029/2018GL080371>
- Wright, J. S., Fu, R., Worden, J. R., Chakraborty, S., Clinton, N. E., Risi, C., et al. (2017). Rainforest-initiated wet season onset over the southern Amazon. *Proceedings of the National Academy of*

- Sciences of the United States of America*. <https://doi.org/10.1073/pnas.1621516114>
- Chakraborty, Sudip, Fu, R., Massie, S. T., & Stephens, G. (2016). Relative influence of meteorological conditions and aerosols on the lifetime of mesoscale convective systems. *Proceedings of the National Academy of Sciences of the United States of America*. <https://doi.org/10.1073/pnas.1601935113>
- Chakraborty, Sudip, Fu, R., Wright, J. S., & Massie, S. T. (2015). Relationships between convective structure and transport of aerosols to the upper troposphere deduced from satellite observations. *Journal of Geophysical Research*. <https://doi.org/10.1002/2015JD023528>
- Fu, R., Yin, L., Li, W., Arias, P. A., Dickinson, R. E., Huang, L., et al. (2013). Increased dry-season length over southern Amazonia in recent decades and its implication for future climate projection. *Proceedings of the National Academy of Sciences of the United States of America*. <https://doi.org/10.1073/pnas.1302584110>

## CONFERENCE PRESENTATIONS

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- American Meteorological Association, Virtual. January 2021. Extending the Atmospheric River Concept to Aerosols: Climate and Air Quality Impacts and Identifying the Role of Aerosol Radiative Effects on the Wet Season Onset Timing over the Congo Rainforest
- International Atmospheric Rivers Conferences, 2020, Chakraborty, Guan, Waliser, da Silva, Uluatum, Hess, Atmospheric Aerosol Rivers: Climate and Air Quality Impacts.
- AGU Fall Meeting, San Francisco. December 2019. Radiative cooling driven African jet and wet season onset over the Congo rainforest. Poster.
- AGU Fall Meeting, Washington DC. December 2018. Deep convective evolution from shallow clouds over the Amazon and Congo rainforests.
- AGU Fall Meeting, New Orleans. December 2017. The relative influence of aerosols and different meteorological conditions on the total volume of rainfall of the mesoscale convective systems.
- National Oceanic and Atmospheric Administration General Modelling Meeting and Fair. September 2018, A process based statistical seasonal prediction of May-July anomalies over the Southern Great Plains of the United States.
- American Meteorological Association, Seattle. January 2017. The relative influence of the meteorological and aerosol conditions on the total rain volume of mesoscale convective systems through their lifecycle over tropical continents
- PI Meeting of Go-Amazon Project, Vienna, VA. May 2016. Understanding the processes that control shallow to deep convection development and their representations in climate models using GO-Amazon data.
- AGU Fall Meeting, San Francisco. December 2015. Understanding the transition between shallow and deep convections using the Go-Amazon datasets.
- AGU Fall Meeting, San Francisco. December 2014. Change in deep convective ice water and rain rate as observed from Aura MLS, CloudSat, Aqua MODIS, TRMM, and ISCCP datasets.
- AGU Fall Meeting, San Francisco. December 2013. Convective invigoration and lifecycle enhancement by aerosols over the tropical region using the A-Train and ISCCP satellites datasets
- ACAM, Kathmandu. Nepal, June 2013. Aerosol transport and Influence on cloud microstructure by Coupling of aerosols and cloud field for deep convective clouds over the Indian monsoon region: A study using the joint use of Aura, A-Train and ISCCP satellites datasets.

American Meteorological Association, Austin. January 2013. Impact of Convective Lifecycles and associated dynamic and physical structure of deep convections on Vertical Aerosol Transport and cloud microphysics.

Water Forum II (Texas Drought and Beyond). The University of Texas at Austin. October 2012. Influence of forest fire aerosols on precipitation.

AGU Fall Meeting, San Francisco. December 2011. The connection between Mature Stages of Deep Convection and the Vertical Transport of Aerosols in the Upper Troposphere.

## **WORKSHOPS AND CERTIFICATES**

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| 2019 | E110, Principles of University Teaching in STEM, Caltech.   |
| 2013 | ACAM Workshop, Kathmandu, Nepal   |
| 2011 | Visiting student at National Center for Atmospheric Research (NCAR) in summer.                        |
| 2010 | Attended Advanced Study Program on Asia in the 21st century at NCAR                                   |
| 2007 | Training Program on Water Quality Testing Monitoring & Surveillance by the World Health Organization. |

## **OUTREACH, SERVICE, AND LEADERSHIP**

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| 2019      | Reviewer, NSPIRES Fellowship.   |
| 2018      | Volunteer, Career day, Clover Avenue Elementary School. I visited the school and met the students to talk about what scientists do. The event was organized by the school to encourage children to dream about their future.                                    |
| 2016      | Past Member, Language Proficiency Assessment Committee, Austin Independent School District. Assisted Austin Independent School district in evaluating the necessity of children from non-native background to learn English before entering kindergarten level. |
| 2013-2014 | Member, The University of Texas Shuttle Committee. Assisted the University and the capital metro bus service in organizing various shuttle and bus routes from different locations of the city of Austin to the University.                                     |
| 2012-2014 | Member, Tenant Advisory Board. Division of Housing and Food Services (DHFS), the University of Texas at Austin. Served as a board member to assist the tenants of the student housing and DHFS.   |
| 2012-2013 | Chair, Climate Brown Bag. Organized invited climate lectures.   |

## **MEDIA REPORTS**

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<https://www.scientificamerican.com/podcast/episode/air-pollution-gives-storm-clouds-a-stronger-longer-life/>  
<http://www.visiontimes.com/2016/06/15/aerosols-found-to-strengthen-storms.html>  
<http://thescienceexplorer.com/nature/cloud-feeding-aerosols-may-be-why-storms-are-getting-more-extreme>  
<http://www.dailytexanonline.com/2016/06/29/aerosols-strengthen-storm-clouds-create-longer-and-more-intense-storms>  
<https://www.sciencedaily.com/releases/2016/06/160613153420.htm>  
<https://www.futurity.org/clouds-aerosols-rain-1183002-2/>  
<https://patch.com/us/across-america/texas-researchers-find-cloud-feeding-aerosols-may-be-blame-more-extreme-weather>  
<https://phys.org/news/2016-06-aerosols-storm-clouds.html>

<https://www.newsweek.com/were-beginning-understand-how-rainstorms-get-so-extreme-469935>  
<https://news.utexas.edu/2016/06/13/aerosols-strengthen-storm-clouds-according-to-new-study/>