Shaoyue (Emily) Qiu

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EDUCATION:

Ph.D. 2018 **Department of Hydrology and Atmospheric Science, University of Arizona**
Ph.D. Degree in Atmospheric Sciences
Minor degree in Hydrology
Advisor: Xiquan Dong. Minor advisor: Hoshin V. Gupta

M.S. 2013 **Department of Atmospheric Science, University of North Dakota**
M.S. Degree in Atmospheric Sciences
Advisor: Xiquan Dong

B.S. 2009 **School of Geography, Beijing Normal University**
B.S. Degree in Geography
Project: Diurnal and seasonal variability of latent heat and CO_2 flux data over an urban green space in Beijing, using ground-based observation with the Eddy-covariance Technique.

PHD MASTER THESIS:

- Dissertation title: Arctic Mixed-phase Cloud Properties Using Ground-based and Satellite Remote Sensing
- Thesis title: Improving the palmer drought severity index by incorporating snow and frozen ground

In this study, we incorporate the snow and frozen soil effect into the PDSI calculation. With the new PDSI, we study the duration, severity and area of drought events over the continental United States.

PEER-REVIEWED PUBLICATION:

- **Qiu, S.**, B. Xi and X. Dong (2019), Evaluation of cloud fraction, cloud phase and cloud height retrievals by CloudSat CALIPSO and CERES-MODIS with ground-based observations at ARM NSA, **(In preparation)**
- **Qiu, S.**, B. Xi and X. Dong (2018), Influence of wind direction on thermodynamic properties and Arctic mixed-phase clouds in autumn at Utqiaġvik, Alaska, *J. Geophys. Res. Atmos.,* 123, 9589-9603, doi: 10.1029/2018JD028631

In this study, we find that the Arctic mixed-phase cloud occurrence frequency is 20-30% lower during a southerly wind when compared to other wind directions in September and October. Negative correlations are found between the cloud occurrence frequency and atmospheric temperature (T), specific humidity (q) and stability; and a positive correlation with the RH_i. When surface is snow-free, the southerly wind T, q and RH_i profiles are warmer, moister and less saturated than those during the northerly wind, which explain the lower cloud occurrence frequency under the southerly wind. When there is a northerly wind, mixed-phase clouds have stronger precipitation, which is possibly due to the cleaner air mass from the ocean during a northerly wind.

- Yiyi H., X. Dong, B. Xi, E. Dolinar, R. Stanfield, and **S. Qiu** (2017), Quantifying the Uncertainties of Climatological Mean State of Reanalyzed Arctic Cloud and Radiation Properties using Satellite-surface Observations, *J. Clim.*, 30, 8007–8029.
- Dong X., B. Xi, **S. Qiu,** P. Minnis, S. Sun, and F. Rose (2016), A Radiation Closure Study of Arctic Stratus Cloud Microphysical Properties using the collocated satellite-surface data and Fu-Liou Radiative Transfer Model, *J. Geophys. Res. Atmos.,* 121,10175-10198, doi:10.1002/2016JD025255.

  In this study, Arctic stratus cloud microphysical properties retrieved from the Clouds and the Earth's Radiant Energy System Edition 2 and Edition 4 (CERES Ed2 and Ed4) algorithms are compared with the ground-based retrievals at the ARM NSA site. The CERES Ed2 and Ed4 optical depth (τ) and liquid water path (LWP) retrievals from both Terra and Aqua are almost identical with ARM retrievals. Most of the radiative transfer model calculated $SW\downarrow_{sfc}$ and $SW\uparrow_{TOA}$ fluxes by using the ARM and CERES cloud retrievals and the domain mean albedos as input agree well with the ARM and CERES flux observations within 10 Wm^{-2}.

- **Qiu, S.,** X. Dong, and B. Xi (2015), Characterizing Arctic mixed-phase cloud structure and its relationship with humidity and temperature inversion using ARM NSA observations, *J. Geophys. Res. Atmos.,* 120, 7737-7746. doi:10.1002/2014JD023022.

  In this study, we find that ceilometer retrieved cloud base represents the liquid layer in the Arctic mixed-phase clouds while MPL cloud base represents the ice layer in the clouds. We suggest using both cloud bases to characterize the cloud vertical structure. And mixed-phase cloud occurrence frequency increases with stronger humidity inversion intensity in winter, which indicates that moisture inversions near the clouds serve as a moisture source for the Arctic mixed-phase clouds in winter.

CONFERENCE PRESENTATION:

- Dong, X., B. Xi, **S. Qiu**, P. Minnis, S. Mack, and F. Rose (2018), A Radiation Closure Study of Arctic Stratus Cloud Microphysical Properties Using the Collocated Satellite-Surface Data and Fu-Liou Radiative Transfer Model, AMS Annual Meeting, Austin, TX, USA. (Invited Talk)
- **Qiu, S.,** X. Dong, and B. Xi (2017), Arctic atmosphere thermodynamic properties and its relationship with cloud frequency occurrence, phase and structure in autumn season, AGU Fall meeting, New Orleans, LA, USA. (Poster)
- **Qiu, S.**, B. Xi, X. Dong, S. Mack, P. Minnis, and W. Smith (2017), Detectability of Arctic Mixed-Phase Clouds using both ground-based and satellite remote sensing, CERES Fall Meeting, San Diego, CA, USA. (Talk)
- Dong, X., B. Xi, **S. Qiu**, S. Mack, B. Smith, and P. Minnis (2016), Dependence of satellite retrieved cloud optical depth and effective radius on solar and viewing zenith angles by comparing ARM ground-based retrievals, CERES Fall Meeting, Reading, UK. (Talk)
- Xi, B., X. Dong, **S. Qiu**, E. Dolinar, S. Mack, P. Minnis, F. Rose and N. Leob (2016), CERES Cloud properties at ARM site, CERES Spring Meeting, Hampton, VA, USA. (Talk)

- **Qiu, S**., X. Dong, and B. Xi (2015), Arctic mixed phase cloud and its relationship with humidity and temperature inversions using ARM NSA observations, Arctic Observing Open Science Meeting, Seattle, WA, USA. (Talk)
- Dong, X., **S. Qiu**, B. Xi, P. Minnis, S. Mack, S. Kato, F. Rose (2015), A Radiation closure study of Arctic cloud properties using the Fu-Liou RTM, CERES Spring Meeting, Hampton, VA, USA. (Talk)
- **Qiu, S**., X. Dong, and B. Xi (2015), Characterizing Arctic mixed-phase cloud structure and its relationship with humidity and temperature inversion using ARM NSA observations, AMS Annual Meeting, Phoenix, AZ, USA. (Poster)
- **Qiu, S**., X. Dong, B. Xi, P. Minnis, and S. Mack (2013), Validation of CERES-MODIS Ed4 and Ed2 derived cloud fractions during Polar night using ARM NSA data, CERES Fall Meeting, San Diego, CA, USA. (Talk)
- **Qiu, S**., X. Dong, B. Xi, and A. D. Kennedy (2012), Improving Palmer Drought Severity Index by incorporating snow and frozen soil, AGU Fall meeting, San Francisco, CA, USA. (Poster)
- **Qiu, S**., X. Dong, B. Xi, and A. D. Kennedy (2011), Spatial and temporal characteristics of drought over the continental United States, AGU Fall meeting, San Francisco, CA, USA. (Poster)

PROFESSIONAL EXPERIENCE:

2019 – Present	Post-Doctoral Fellow, Lawrence Berkeley National Lab (LBNL), Climate and Ecosystem Sciences Division (CESD).
2016 – 2018	Graduate Research Assistant, Department of Hydrology and Atmospheric Sciences, University of Arizona, AZ, USA
2015	Atmospheric Radiation Measurement (ARM) Summer training workshop, University of Oklahoma, OK, USA
2010 – 2016	Graduate Research Assistant, Department of Atmospheric Sciences, University of North Dakota, ND, USA
2010 – 2011	SNOwD UNDER Student Project (**S**tudent **N**owcasting & **O**bservations **w**ith the **D**OW at **UND**: **E**ducation through **R**esearch) Department of Atmospheric Sciences, University of North Dakota, ND, USA
2008 – 2009	Undergraduate Research Assistant, School of Geography, Beijing Normal University, Beijing, P.R.China.

PROFESSIONAL AFFILIATION:

- American Geophysical Union
- American Meteorological Society

COMPUTER PROGRAMMING SKILL:

- Knowledgeable of Linux system
- Proficient in IDL, Fortran and Python, with a working knowledge of C, GrADS, WRF model, ArcGIS