Benjamin Johnston

Joint Tenth COSMIC Tenth Data Users' Workshop and IROWG-6 Meeting

Introduction

My name is Benjamin Johnston and I am a Ph.D. candidate in the Department of Physical and Environmental Sciences at Texas A&M University – Corpus Christi. Prior to attending TAMUCC, I received my B.S. in Meteorology from California University of Pennsylvania in 2009 and my M.S. in Atmospheric Science from the University of Maryland in 2012. My interest in meteorology began when I was a young child living in Pennsylvania and experienced the Blizzard of 1993. After receiving over two feet of snow, I was amazed that something like that was possible and continued to follow the weather closely every day until I realized in high school that I genuinely loved learning about the weather enough to want to make it my career. Some of my interests outside school include playing and watching sports, video games, and visiting National Parks.

Scientific Experience

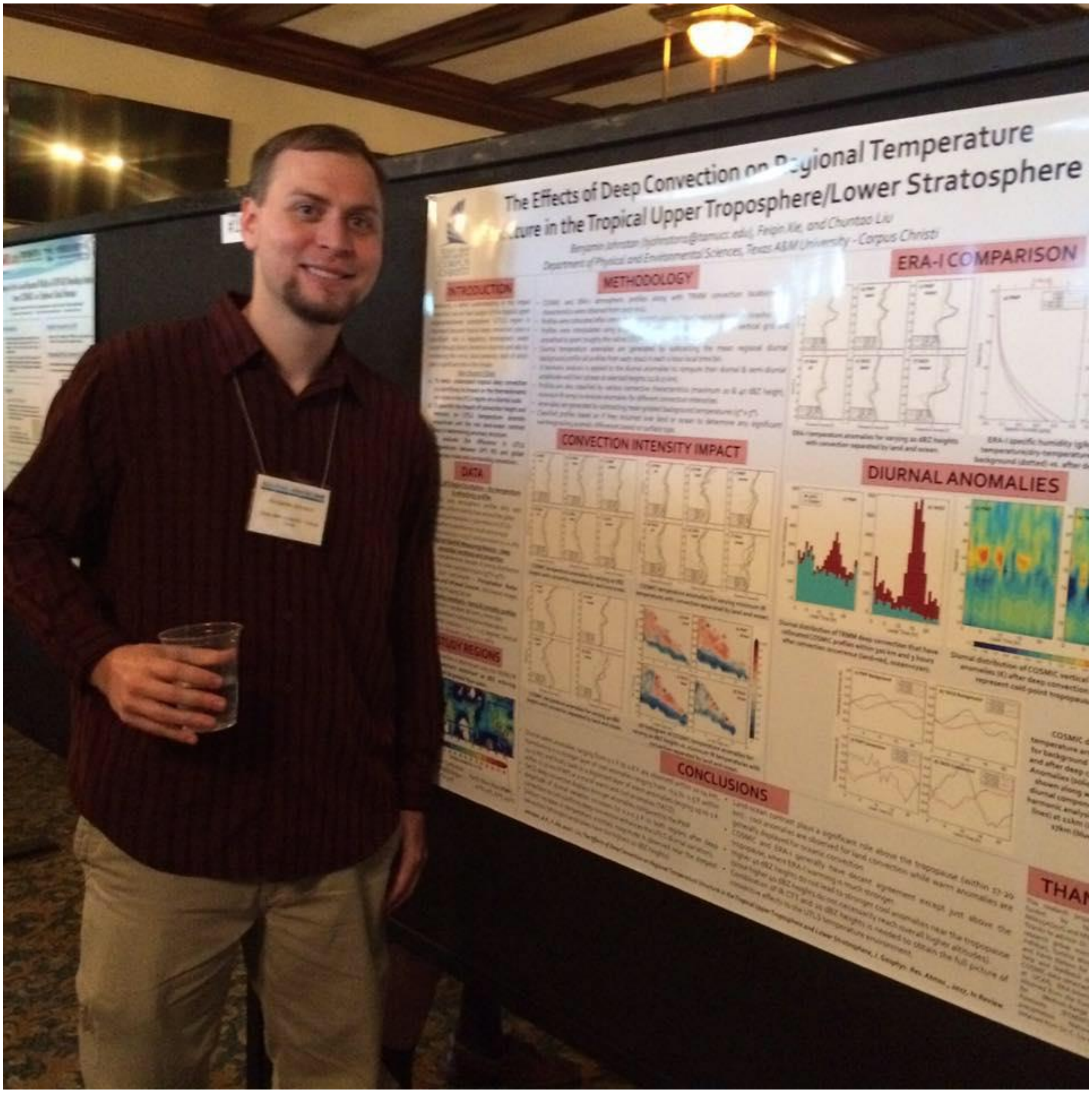
My general research interests include topics such as convection dynamics and thermodynamics, boundary layer processes, and satellite meteorology. The focus of my dissertation research is on "Quantifying the Impact of Convection on the Temperature Structure in the Tropical and Midlatitudinal Upper Troposphere and Lower Stratosphere". The convective heat budget in the upper troposphere/lower stratosphere plays a significant role in climate regulation by controlling stratospheric water vapor through direct convective injection and also by enhancing thin cirrus cloud presence. The use of COSMIC GPS RO soundings allows for unprecedented study of this topic by offering global observations of UTLS temperatures with a high vertical resolution in all-weather conditions, even inside convective clouds. I was extremely interested in attending this workshop to share my initial findings on this topic, receive feedback from some of the leading experts on this data, and listen to many unique talks on different emerging research topics using this data to help me continue to find places that I can direct my research towards in the near future.

The biggest benefit of the workshop for me was the poster session held during the first evening of the workshop. This was a wonderful opportunity for me to discuss my research with many individuals and provided me with long-lasting benefits by allowing me to think critically about my project in ways that I had not done before. For example, I had reached an impasse recently in coming up with possible explanations for some of the results I've found, but after discussion with a fellow scientist, I have come up with some new ideas to research to help explain these results. Additionally, lengthy discussions with another scientist have helped steer me towards some of the science questions I would like to answer in the next step of my dissertation. These discussions have also shown me that there are other great scientists out there with similar interests as myself which will likely lead to many future collaborations.

Additionally, the focused nature of the conference allowed me to listen to the many fascinating presentations given. I found the talk given by Joan Alexander to be particularly remarkable, especially given its relevance to my area of research. Her discussion on studying tropical waves in the upper troposphere and stratosphere using COSMIC temperature profiles is likely a future topic I would like to explore in more detail, given that these waves are mainly forced by convective latent heat release. Until recently, the study of these waves has been very difficult, so it was great to see the different ways COSMIC can be used to analyze and improve the understanding of tropical waves. William Randel's discussion on tropical upper troposphere and lower stratosphere temperature variations was quite interesting as well, and it was remarkable to see the relationships shown between wave amplitudes, phase speeds, and background winds using COSMIC data. Finally, it was very eye-opening listening to many of the talks on the history of the COSMIC-I and II missions, how GPS RO data has been improved over the years, and the funding challenges that lie ahead. As a student, many of these issues and challenges are not fully realized, and it was great to see how so many people have put so much time and effort into making this great satellite data available.

Conclusions

I very much appreciate the opportunity to attend the Tenth COSMIC Tenth Data Users' Workshop and IROWG-6 Meeting as it truly was a wonderful and valuable experience. This was the first COSMIC workshop I could attend and the differences with other typical large-scale conferences are appreciable. Many conferences are so large that you almost feel lost in the shuffle at times. However, this workshop had a much more intimate feel, where you genuinely feel like you are part of a close-knit group of people that you can get to know well, not just on a scientific level, but on a personal level as well. I was able to absorb so much more in this type of setting, and I know the amount of information that I learned and connections that I made in just one short week will last me a lifetime. I look forward to attending the next COSMIC workshop to share my research progress and discuss the developments the community has made.


The Effects of Deep Convection
gional Temperature
ture in the Tropical Upper Troposphere/Lower Stratosphere
Benjamin Johnston (bjohnston@tamucc.edu), Feiqin Xie, and Chuntao Liu
Department of Physical and Environmental Sciences, Texas A&M University - Corpus Christi
INTRODUCTION
METHODOLOGY
ERA-I COMPARISON
CONVECTION INTENSITY IMPACT
DIURNAL ANOMALIES
DATA
CONCLUSIONS