Atmospheric Sciences Section of AGU Newsletter

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Interview with William K. M. Lau

Violeta E. Toma

Dr. Lau received his B. Sc. (Mathematics and Physics) in 1972, and B. Sc. Special (Applied Mathematics), in 1973 from University of Hong Kong, both with 1st Class Honors. He received his MS in Physics, and PhD in Atmospheric Sciences from the University of Washington, Seattle, Washington, USA. He is currently, Deputy Director for Atmospheres, Earth Science Division, NASA, Goddard Space Flight Center, which is a world class research center of over 250 PhD scientists, including government and university scientists.

Dr. William K. M. Lau (Recent photo).

He is an Adjunct Professor at the Department of Atmospheric and Oceanic Sciences U. of Maryland, and Adjunct Professor of Mathematics at the Hong Kong University of Science and Technology, and is a senior science advisor of the Hong Kong Observatory. He frequently visits international research and academic institutions in countries and regions including China, India, Southeast Asia, Taiwan, Hong Kong, North and South America, and Europe to present invited lectures, and keynote speeches to promote interests and awareness in regional impacts of climate change.

His research work spans more than three decades covering a wide range of topics in climate dynamics, tropical and monsoon meteorology, ocean-atmosphere interaction, aerosol-water cycle interaction, climate variability and climate change. He received many awards for his research and scientific leadership, including among others, the American Meteorological Society Meisinger Award for young scientist (1988), the NASA John Lindsay Award (1987), the Goddard Exceptional Achievement Medal

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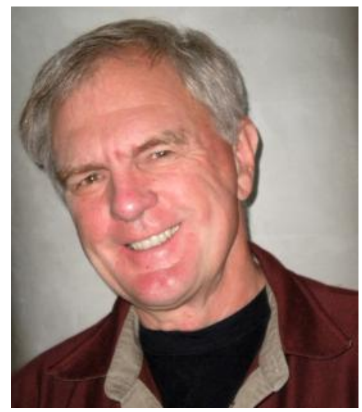
Note from the Section President: Peter J. Webster

Dear Atmospheric Science Section Members,



As we approach the 2013 San Francisco Fall meeting, I hope to meet with as many of you as possible. I encourage you to attend these AS-related events:

(i) There are a large number of AS sessions including both oral and poster presentations. I hope you will spend time at the poster sessions that are often frequented by young scientists and students. Remember that the AGU website has an excellent "scheduler" that provide some sanity in planning the talks/posters that you would like to see. It sure beats wandering around hoping for lucky enlightenment.

(ii) This year 12 AS members were elected as Union Fellows. This is a unique honor and, having served for a number of years on the AS Fellow's Committee, the chair (Prof. Kuo-Nan Liou of UCLA) needs special commendation. Thanks, to Kuo-Nan and the committee. Job well done!

(iii) The AS banquet will be held on Tuesday evening at the Empress of China (Grand Ballroom 838 Grant Avenue, San Francisco). For those of you who signed up, we will honor the student paper winners at last year's Fall meeting, this year's Ascent awardees (Sergey Nizkorodov, Mark Jacobson, Ping Yang, Cecilia Bitz and Paul Ginoux), the Holton awardee (Massimo Bollasina) and the Kaufman awardee (Samuel Oltmans).

(iv) The banquet is also a good place to meet our Charney and Bjerknes lecturers: Prof. Leonard A. Smith (London School of Economics and Oxford University) who will speak on predictability, and Dr. Judith Lean (Naval Research Laboratory), who will speak on solar variability and

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Join us at **the Atmospheric Sciences Banquet, 10 December 2013.** Be sure to sign up for the banquet when you register for the Fall Meeting.

AGU FALL MEETING
San Francisco | 9–13 December 2013

Dear Readers,

I would like to show appreciation to all contributors that make this newsletter possible.

We are looking for new contributions and we hope to hear from you if you have something you would like to share.

Please don't hesitate to contact us at vtoma@eas.gatech.edu

Thanks for reading,

Violeta E Toma , Editor-in-Chief
School of Earth & Atmospheric Sciences
Georgia Institute of Technology, USA

Section Officers

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climate. The size of the audience for both of these talks will be large and the number of attendees is strictly restricted due to the potential for fire hazard. Please make sure that you are there early. These two talks will be held consecutively starting at 10:20 and 11:20 Tuesday, December 10 in room 2022 Moscone West. For those of you who cannot attend, these talks will be recorded.

(v) There is a special session for newly-elected AS AGU fellows 10:20 to 12:20 Wednesday, December 11 in room 2022 Moscone West. Warren Washington, David Rind, Graham Feingold, Timothy Palmer, Lai-Yung Leung, Barbara Turpin and Paul Wennberg will present. (vi) A special thanks is needed for Mike Bettwy for taking on the role of AS Student coordinator for the Fall meeting. This is a very important job and quite demanding. Thank you as well to those who have volunteered to be judges.

Finally, we need to acknowledge **Ms. Danica Williams** of the AGU who keeps us all on track, is never flustered, and seems accepting of the past deadlines and the foibles of academia. **Thanks Danica!**

The winners of the 2013 Ascent Awards

The Atmospheric Sciences Ascent Award aims to reward exceptional mid-career (academic, government, and private sector) scientists in the fields of the atmospheric and climate sciences. The only criterion for the award is that the applicant demonstrates excellence in research and leadership in his or her field. The Atmospheric Sciences Section of the American Geophysical Union announces the winners of this year Ascent Awards:

Paul Ginoux of NOAA GFDL has been awarded the 2013 Ascent Award "**... for sustained pioneering work on aerosols**".

Cecilia Bitz of University of Washington has been awarded the 2013 Ascent Award "**.. for advancing our ability to model climate in numerous ways, especially relating to sea ice**".

Mark Jacobson of Stanford University has been awarded the 2013 Ascent Award "**... for his dominating role in the development of models to identify the role of black carbon in climate change**".

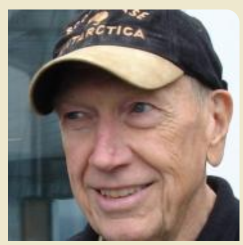
Sergey Nizkorodov of University of California, Irvine has been awarded the 2013 Ascent Award "**...for elucidating at the molecular level the formation, growth and reactions of organic molecules in the atmosphere**".

Ping Yang of Texas A&M University has been awarded the 2013 Ascent Award "**...for fundamental research in radiative transfer and remote sensing**".

Introducing the Winners of the 2013 Holton and Kaufman Awards

Anne Thompson

Dr. Massimo Bollasina, a post-doctoral scholar at NOAA's Geophysical Fluid Dynamics Lab (GFDL) through the Princeton University Atmospheric and Ocean Science Visitors Program, is this year's recipient of the James R. Holton Junior Scientist Award from AGU's Atmospheric Sciences Section. Named after a pioneer in atmospheric dynamics, the late James R. Holton of the University of Washington, since its inception in 2004, the Holton Award has become a highly sought honor. It recognizes the achievements and potential of junior an AGU member whose PhD was awarded within 3 years of the nomination deadline.Dr. Bollasina received his PhD from the University of Maryland Atmospheric and Oceanic Sciences (AOSC) Department in 2010 under the direction of Professor Sumant Nigam. His thesis, entitled "Surface and Aerosol Effects on the South Asian Monsoon Hydroclimate" won every award in the AOSC Department, including a Green Fund Foundation Fellowship for "his passion, excellence and achievements in doctoral research" to quote a letter from UMCP. The thesis led to six peer-reviewed publications. Since the PhD, Dr. Ballasina has continued in the general area of land-aerosol- precipitation interactions with a focus on tropical rainfall. To quote from one of the Dr. Bollasina's nominating letters: "At GFDL... he has carried out breakthrough studies on how aerosols and greenhouse gases, two of the man-made climate-altering agents, affect regional climate... The first-author paper (Science, 334, 502-505, 2011) finds that anthropogenic aerosols, not long-lived greenhouse gases, are the major causal factor in the observed decrease of the summer monsoon rainfall in northern India over the last few decades of the 20th century. That paper was honored with the highly competitive World Meteorological Organization Norbert Gerbier MUMM International Award." In summary, Dr. Bollasina is an innovative scientist, has made and will continue to make important contributions to monsoon dynamics and climate effects of aerosols. Dr. Bollasina is a future leader who is injecting fresh atmospheric dynamics—Holton's legacy—into the challenge of regional climate change research.



Dr. Samuel (Sam) Oltmans, an AGU Fellow since 2007, was head of the NOAA Global Monitoring Division Ozone and Water Vapor group for 30+ years. He is currently a Senior Research Scientist at the Cooperative Institute for Research in the Environmental Sciences (CIRES) of the University of Colorado - Boulder.

To quote from one of his nomination letters, "Sam's long-term record of surface ozone measurements is the single most important measurement series in atmospheric chemistry and that field's equivalent of the Mauna Loa carbon dioxide time series. Sam and colleagues have been the 'Johnny Appleseeds' of ozonesondes, providing vertical profiles for measurement campaigns around the world... Sam's network of Dobson Spectrophotometers has been crucial to the WMO/UNEP Ozone Assessments for more than 25 years.

"Sam's achievements go way beyond the monitoring activity that alone would merit the Yoram Kaufman award. All of his data, some dating back to the 1960s, are shared openly with the scientific community. Although Sam's publications number in the hundreds (most appeared in AGU journals), in dozens of other papers and international Assessments, Sam's data are used without credit. As one of his letters states: "Without [Sam's] records the world's atmospheric science would be immeasurably diminished.

"Sam's has built up a unique international legacy in two ways. First is the technical skill mix that underlies his data record. "It is hard to explain," one nominator states, "how much persistence and patience, qualities Sam has in abundance, are required... Sam's mastery of research and calm discourse lead the community to agree on solutions for ever higher quality data."

The second part of his legacy is mentoring scientists, both in his NOAA lab and at stations around the world, to become experts and full partners in monitoring the health of the ozone layer. When stations experience technical problems, he uses always tight funds to send someone from his Lab to make repairs. Sam pioneered working with collaborators in China and jointly publishing in JGR years before this was easy or fashionable.

In summary, the Yoram Kaufman award for "international collaborations and unselfish cooperation in research" is presented to Sam Oltmans for being the preeminent leader of in-situ monitoring of tropospheric and stratospheric ozone and water vapor while multiplying the impact of this work through unmatched national and international collaborations.

The 2013 Class of AGU-AS Fellows

Graham Feingold, The National Aeronautics and Space Administration

Lai-Yung Leung, Pacific Northwest National Laboratory

Peter S. Liss, University of East Anglia

Natalie M. Mahowald, Cornell University

Tim Palmer, Univeristy of Oxford

David H. Rind, The National Aeronautics and Space Administration

James M. Russell III, Hampton University

Barbara J. Turpin, Rutgers University

Bin Wang, University of Hawaii

Warren M. Washington, The National Center for Atmospheric Research

Paul O. Wennberg, California Institute of Technology

Warren J. Wiscombe, The National Aeronautics and Space Administration

Chile – a Country of Climate Sensitive Locations, Persevering in the Near Term, and Leading the Way in Adaptation for a Changing Climate

Mark Jelinek, Georgia Institute of Technology

Photo 1: Mapocho River flowing through eastern Santiago

Santiago, Chile: modern city, thriving city, growing city, but could it also become a leader in how a major metropolis can adapt to shifts in future climate? A study released earlier this year[1] highlights specifically the likelihood that Santiago will get both hotter and drier as we head toward the middle of this century. This study reiterated a major future climate study of Chile undertaken by the Department of Geophysics at the University of Chile within recent years.[2] These projections of more heat and drier conditions are not unique to central Chile, but they come on top a situation that is already highly sensitive to current weather behavior.

Santiago, Chile is nestled up against the Andes Mountains. Its summers are generally marked by warm days and pleasant nights with low humidity. The winters bring with it the rainy season in the lower elevations and key snow events to the Andes. This results in Santiago, like the rest of central Chile, being very dependent on sufficient winter precipitation to supply its water needs during the remainder of the year through snow melt. Add to the mix a city whose population has grown from roughly 4.5M to nearly 7M in the last 30 years[3], and a country whose electricity production mix has traditionally depended on hydroelectric production[4]. Additionally, significant irrigation based agricultural production occurs within close proximity to the city including the vast majority of wines for which Chile has become well known in recent years.

This combination of conditions makes the Santiago region highly sensitive to weather and climate behavior, not only in future decades but also here in the present. In late January, a summer rain event in the Andes just east of Santiago created flash flooding and increased stream sediment levels. This led the largest water supplier in Santiago to shut down processing for nearly a day. Roughly 2 million people in Santiago had to scramble to meet water needs[5] on a day when temperatures reached 33C when given only a few hours of warning. The impacts can also be more prolonged when shortfalls in winter precipitation combine with warmer than normal summers to create severe strains on water supply and electrical systems with respect to both production and demand. This has led to power rationing[6] and even extending daylight savings time[7] in hopes of lowering energy demand.

Improving the ability to foresee short-term extreme events is also particularly challenging for Santiago and Chile in general. The country's average width is roughly 175km. Its 4000+ km expanse from south to north is bordered by the Pacific Ocean on the west and quickly rises into Andes toward the east. This can result in outputs from global forecasting models which provide limited value. Additionally, there are very few in situ measurement locations spread across Chile's vast south to north expanse. Trying to extract viable temperature and precipitation forecasts in this environment is no easy task, but for over 50 years[8] that is what Meteorology Group at the University of Chile has been doing. As their research has advanced our understanding of the atmospheric dynamics in this complex environment, they have also looked for ways to apply that understanding in improved accuracy and extended lead times of forecasts in the region.

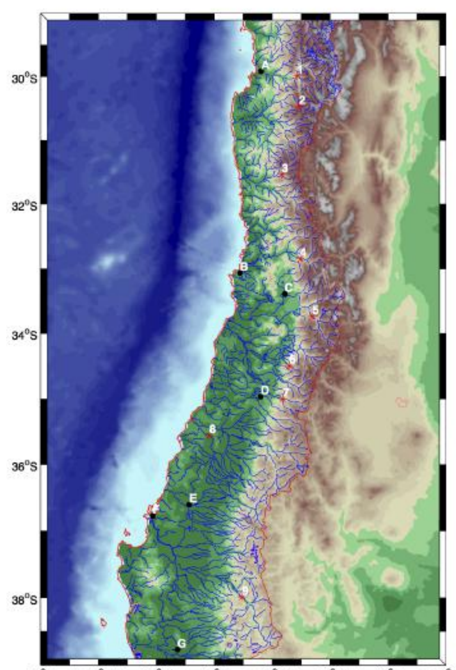


Figure 1: Topography for Central Chile with key streams and cities (letters). Santiago is located at C.

Forecasting anomalous water and energy stresses on scales of days to weeks requires combining the ability to accurately foresee the combination of temperatures, precipitation and existing snowpack. Addressing the snowpack issue has been particularly complicated. Chile does not have the benefit of extensive measurement station networks seen in other snowpack dominate regions. The spatial and temporal resolution of traditional satellite products is insufficient to provide snow melt information inside of a month. However, new tools like MODIS provide an opportunity to follow snow cover changes much closer to real-time. Development of tools that utilize high-resolution snow cover products derived from MODIS[9] outputs have provided a major leap in being able to accurately translate snow melt behavior with corresponding downstream flow rates. Matching this data with meteorological forecasts provides a real opportunity to predict high water volume and flood events. As the flooding impacts from

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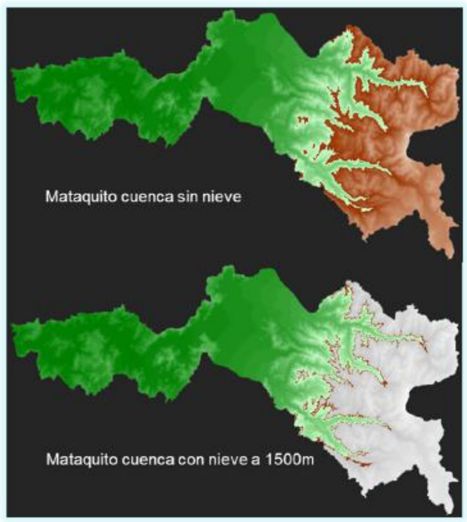

Figure 2: Basin snow cover - Mataquito River drainage basin shown both with and without snow. Snow cover example at 1500 m covering roughly 35% of total basin area.

earlier this year highlighted, translating the links between meteorological forecasts and extreme events into an improved understanding of risks associated hydrological cycle is particularly important. A recent study[10] spearheaded at Center for Global Change[11] focused on improving our understanding between the metrological triggers and hydrological exposures. This type of research helps a broader audience better understand real world impacts of different meteorological behaviors and hopefully allows them to become better positioned to respond when such events are forecast

The opportunity for improving our understanding of the meteorological/hydrological connection is not limited to the short-term. Like much of the west coast of the U.S., central Chile's climate and weather are dominated by the cold currents that traverse its coastline and the behavior of ENSO. Traditionally, this has provided at least a first order forecast of drought behavior in Chile. However, the technique has not always proven accurate and can't always properly capture the magnitude of a drought. Research conducted at the University of Chile evaluated new predictive approaches that combine atmospheric and streamflow related predictors. The results uncovered the ability to provide improved seasonal scale water quantity forecasts for the main rivers in central Chile that supply water resources for over two-thirds of Chile's population and that drives over 50% of the region's electricity production. These types of seasonal forecasts have the potential to allow regional stakeholders, both in the public and private sectors, the opportunity to better prepare, adapt and hopefully mitigate the risks associated with pronounced droughts. As we look to the long-term future, hopefully the aforementioned adaptation plan will provide regional authorities solid and viable ways to successfully move Chile forward in an area where resources are already stressed. However, continued research and planning at a local level will clearly be necessary to prepare, educated, and assist members of both the public and private sector traverse the challenges ahead. Fortunately, local efforts such as the newly formed Center for Climate and Resilience Research (CR2)[12] and the aforementioned Center for Global Change are here to assist. These centers look to break down traditional institutional and discipline barriers to help drive research that will result in viable adaptation and mitigation approaches and practices. Recognizing that adaptation itself will be an adaptive process, the continued advances made here in Chile will hopefully provide a prosperous future not only for Santiago, but also provide a successful model from which others around the world can look to for inspiration and emulation.

Photo 2: Strong summer rains in 2013 over the Andes created mudslides and highly turbid water in central Chile. Photo from http://www.24horas.cl (@AoLaonline).

[1]http://www.ufz.de/index.php?en=31273
[2]http://www.dgf.uchile.cl/ACT19/COMUNICACIONES/OtrosTextos/folleto_baja.pdf
[3]http://www.censo.cl/2012/08/resultados_preliminares_censo_2012.pdf
[4]http://www.eoearth.org/article/Energy_profile_of_Chile#gen14
[5]http://www.foxnews.com/world/2013/01/22/about-2-million-chileans-lose-water-service-after-heavy-rains-cause-landslides/
[6]http://m.foxbusiness.com/quickPage.html?page=32811&content=48121071&pageNum=-1
[7]http://www.timeanddate.com/news/time/chile-extends-dst-2011.html
[8]http://www.dgf.uchile.cl/MedioSigloMet/
[9]http://modis.gsfc.nasa.gov/
[10]S. Vicuña et al., 2013, Exploring possible connections between hydrological extreme events and climate change in central south Chile, Hydrological Sciences Journal, 58 (8)
[11]http://www.cambioglobal.uc.cl/
[12]http://www.dgf.uchile.cl/CR2/

2012 Fall Meeting OSPA Winners

Sumi Wren, University of Toronto - Photochemical Chlorine Activation From Artificial Saline Snowpacks

Siyuan Wang, University of Colorado, Boulder - Sources and Sinks of OVOCs in the Tropical Free Troposphere during TORERO

Sarah Styler, University of Toronto - Heterogeneous Photochemistry of Fluorotelomer Alcohols: An Unexplored Loss Pathway

Miranda Ko, University of California, San Diego - Preliminary Strategies to Automate Data Quality Control of USArray Transportable Array Stations

Jonathan Yee, Leland Stanford Junior University - Characterizing Nonspecular Trails and the Signal Dependence with Aspect Angle

Jim Walker, University of Bristol - A new instrument for measuring the evolving light extinction by single aerosol particles

Jeremy Smith, University of California, Davis - Light Absorption by Secondary Organic Aerosol Produced from Aqueous Reaction of Phenols with an Organic Triplet Excited State and Hydroxyl Radical

Jacob Scheff, University of Washington - Robust future precipitation declines in CMIP5 largely reflect the poleward expansion of model subtropical dry zones

Greg Wentworth, University of Toronto - Atmosphere-Surface Exchange of Reactive Nitrogen and its Implications for PM2.5

Bonne Ford, Colorado State University - Aerosol loading in the Southeastern United States: Reconciling surface and satellite observations

Aryeh Drager, Dartmouth College - CloudSat-derived Morphology of Deep Convection over Tropical Oceans

Andrew Ballinger, Princeton University - Influence of the zonal mean circulation on tropical cyclone frequency

Gabriel Isaacman, University of California, Berkeley - Heterogeneous OH oxidation of motor oil particles causes selective depletion of branched and less cyclic hydrocarbons

Jeremy Reich, Villanova University - Photochemistry of Tetrabromobisphenol A in Frozen and Liquid Aqueous Solutions

Myung Kim, University of Waterloo - Assessing CO2 emissions from Canada's oil sands developments - an inversion approach combined with stable isotope data

Douglas Collins, University of California, San Diego - Chemical and Biological Influences on the Organic Composition and Cloud Activity of Sea Spray Aerosol

Tobias Bischoff, California Institute of Technology - Impact of ocean heat transport variations on the zonal mean circulation in an idealized moist GCM

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(1991), the William Nordberg Award in Earth Science (1999).
He is a Goddard Senior Fellow, a fellow of the American Meteorological Society, and a fellow of the American Geophysical Union. He has served on numerous international science steering group and expert panels, including among others, the WMO Monsoon Climate Expert Panel, the GEWEX Science Steering Group, the ACPC (Aerosol-Cloud- Precipitation-Climate) Science Working Group, and the Committee on Himalayan Glacier and Impacts on Downstream Population, National Research Council, US National Academy of Sciences.

Dr. Lau, you started your studies in Physics & Mathematics in Hong Kong, but later changed to Atmospheric Sciences and received your Ph.D from the University of Washington. Do you recall what made you decide to pursue graduate studies and turn towards Atmospheric Sciences?

I spent the first two years of my graduate work in the Department of Physics, University of Washington in the early 1970's, planning to do research on theoretical high-energy, or solid state physics. I was much inspired in my high school and college years by Yang and Lee (the Chinese-American Nobel Physics Laureates), and Richard Feymann. I quickly discovered that I was way over my head to compete in the field of theoretical physics. Also, the outlook of the job market for physics graduate in theoretical physics was really bad at that time. Graduate students were staying in school, because they could not find a job. The average time for getting the PhD at UW was like 7 years. A ninth year graduate student started from single to having a family of three and on welfare. That was too much for me. In my first year class, at least 50% were foreign students mostly from Taiwan or Middle East. I was the only one from Hong Kong. After the first year, half of them transferred out of the department. All changed to more practical fields such as material science, or engineering. I was also caught up in this panic rush to change field. The problem was that I really did not know what I wanted to do. I had an inkling that I should be doing something a bit more practical than theoretical physics. Then someone told me that UW had a really good Atmospheric Sciences Department. I had no idea what atmospheric science was. I was thinking about going into air pollution studies, mostly because I thought I could find a job back in Hong Kong after graduation. It is amusing that after more than 30 years of monsoon research, I am actually doing aerosol-climate research these days. In any case, at that time, I never thought that atmospheric science was my calling, but I did not have much choice. I started taking classes at the Atmosphere Science Department in the second year in graduate school. I met and learned from great professors like Jim Holton, Mike Wallace, Convey Leovy, and Peter Webster (my PhD thesis advisor), and many others. I found out that much I learned in physics and mathematics could easily be applied to atmospheric science. I switched to the Atmospheric Department at the end of my second year in graduate school. The rest is history. The reason of my entry into the atmospheric sciences can be summed up in one word: "Serendipity".

Photo 2: William, 4 years old.

Photo3: William, graduate student at the University of Washington.

You have done a lot of work on regional impacts of climate change, and you are co-author of the Intergovernmental Panel on Climate Change (IPCC) AR5. Do you think that we currently have a solid picture of what is "climate change" versus "climate variability"? Do you think we are at a point where we understand what percent of the observed changes are due to anthropogenic activity?

Most people associate "climate variability" with natural causes, and "climate change" with anthropogenic activities. This distinction is useful as a first step in separating signal vs. noise, or forced vs. natural response of the climate system, Using this, we regard climate change due to anthropogenic effects as the signal, and climate variability the part that contributes to the uncertainty of the signal. However, this is an over-simplification. A strict adherence to this distinction may sometimes lead to confusion. Indeed, this is the root of many of the public debates about climate change. There is general consensus in the scientific community that climate variations up to interannual and decadal time scales are considered "climate variability", e.g. El Nino, and red noise from stochastic forcing, and time scales a century or beyond relegated to "climate change". In reality, there are natural variations in our climate system, involving the deep ocean, and the cryosphere operating on multi-decadal or longer time scales that are comparable to those in climate change. The better known of these are the Multi-Decadal Oscillations (MDO) such as the Atlantic Multi-decadal Oscillation (AMO) and the Pacific Decadal Oscillation (PDO). Typically when climate change trend is estimated, they are based on 50-100 years of available instrumental records. On these time scales, natural variability due to MDOs will interfere with the true trend due to anthropogenic effects. This may be one of the reasons the observed earth climate has experienced periods (~ decades) of apparent accelerated warming in the past, or reduced warming, such the now famous "hiatus" in the recent decade. On an even more fundamental level, climate variability and climate change can modulate each other. There are components of climate change that can be associated with temperature change, i.e., the thermodynamic response, and components that arise from dynamical feedback within the natural system. For example, climate change may induce multi-decadal modulation of frequency and intensities of El Nino, which in turn may contribute to the global climate trend. In addition, there is the possibility of the resonant excitation of MDOs in response to anthropogenic forcing, giving rise to patterns of sea surface temperature and surface pressure responses that resemble AMO and PDO. The climate system is extremely complex. Some of the observed changes such as the accelerated polar ice melting are consistent with model predictions. Others such as the Asian monsoon climate, observations suggests a much more complex picture of rainfall re-distribution, compared to that of a general increased Asian monsoon rainfall predicted by IPCC models. Are the models fundamentally wrong? Or the predicted trends are obfuscated by climate variability, and have yet to emerge in the real world? We are far from understanding how the different components of the climate system will react and interact among each other in response to anthropogenic forcing.

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Photo 4: C. P Chang, Peter Webster and William Lau - 1980, NPS.

Currently you have multiple appointments both in the US and Hong Kong and you are also actively collaborating with institutions in China, India, Southeast Asia, Taiwan, Hong Kong, North and South America, and Europe. Could you comment on the scientific progress in these countries (and U.S.), and their attitude towards regional impacts of climate change? If you were to make a comparison, how did their research capabilities changed throughout the years?
During the last decade, I have seen advances by leaps and bounds in geosciences, climate change research in many developing countries, particularly in Asia. Every international conference I attended in recent years, I saw large number of great papers by young scientists and leaders from Asian countries. There are all kinds of new programs established in universities and research institutions as a result of a rapid increase in investment dollar in R & D by the government in Asian countries. The attitudes there seem to be that climate change is already here, and we got to do something about it.

What do you think is the most important achievement of your career?
I am among the few lucky people who are paid to do the things they love to do. I enjoyed the diverse aspects of my career, from conducting data analysis, field work, computer model, science and project management and mentoring young scientists. I think the most important achievement of my career is that I can apply the knowledge I gain about the earth system, and give back to society in terms of building the national capacity, and nurturing the next generation of earth scientists to improve understanding and prediction of the earth's environment for the betterment of mankind. The most satisfying aspect of my career is that even through my research is based on complex physics in the form of equations and computer codes, and sophisticated remote sensing instruments, it is always possible for me to explain the end results of my research findings to ordinary people.

You are the President-Elect of AS-AGU. While there is a lot work associated with being an active part of AGU, it must be rewarding. Could you "advertise" your position to young scientists who might seek ways to play a more dynamic role in the AGU organization?
I am honored to be elected President-Elect of AS-AGU. AGU is the premier organization for earth and space sciences. AS is the largest section in AGU. We have some really excellent scientists working in our field and related disciplines under AGU. Being able to see the machineries and be a part of the organization is awesome. I am still learning the ropes. I definitely recommend the position to young scientists as a career goal.

What advice would you give a young student/recent graduate, who is passionate about atmospheric sciences?
Work hard and have fun. Participate in community service. Opportunities will come. You can seize them only when you are ready.

The opinions expressed in this interview do not necessarily represents those of the reviewer or the AGU.