Summer School on Multiscale Convection
of the Severe Weather International Consortium
(SWIC)

Organized by Zhiyong Meng from Peking University
and Fuqing Zhang from Pennsylvania State University

27–30 May, 2019

Department of Atmospheric and Oceanic Sciences

School of Physics, Peking University
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<th>Session</th>
<th>Speaker</th>
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<td>08:10-08:30</td>
<td>Opening address and introduction</td>
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<tr>
<td>08:30-10:00</td>
<td>Convection and weather</td>
<td>Fuqing Zhang</td>
<td>Pennsylvania State University</td>
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<td>10:00-10:30</td>
<td>Group Photo &amp; Break</td>
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<tr>
<td>10:30-12:20</td>
<td>Convection and climate</td>
<td>Ruby Leung</td>
<td>Pacific Northwest National Laboratory</td>
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<td>12:20-13:30</td>
<td>Lunch</td>
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<td>13:30-15:00</td>
<td>Coupling of gravity waves and convection</td>
<td>Fuqing Zhang</td>
<td>Pennsylvania State University</td>
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<td>15:00-15:20</td>
<td>Break</td>
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<tr>
<td>15:20-16:50</td>
<td>Modeling of convective precipitation in regional and global climate models</td>
<td>Ruby Leung</td>
<td>Pacific Northwest National Laboratory</td>
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<td>16:50-17:20</td>
<td>Emergence of convectively coupled synoptic-scale disturbances from the Asian monsoon basic state</td>
<td>William Boos</td>
<td>University of California, Berkeley</td>
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<td>17:20</td>
<td>Discussion</td>
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Tuesday, 28 May 2019

Venue: W301 School of Physics, Peking University

08:40-10:10  Impacts of aerosol-cloud and land-atmosphere interactions on hydroclimate  
Ruby Leung, Pacific Northwest National Laboratory

10:10-10:30  Break

10:30-12:00  Limits of atmospheric predictability  
Fuqing Zhang, Pennsylvania State University

12:00-13:30  Lunch

13:30-15:00  Ensemble Data Assimilation for Severe Storms with Radar and Satellite  
Yunji Zhang, Pennsylvania State University

15:00-15:20  Break

15:20-16:50  A Tutorial for Tornado Damage Survey  
Zhiyong Meng, Peking University; Lanqiang Bai, Sun Yat-Sen University

16:50  Discussion
**Wednesday, 29 May 2019**

**Venue: W301 School of Physics, Peking University**

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<td>08:40-10:10</td>
<td>Potential Vorticity (PV) Dynamics</td>
<td>Chris Davis</td>
<td>National Center for Atmospheric Research</td>
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<td>10:10-10:30</td>
<td>Break</td>
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<td>10:30-12:00</td>
<td>PV and Moist Convection</td>
<td>Chris Davis</td>
<td>National Center for Atmospheric Research</td>
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<td>13:30-15:00</td>
<td>Tropical Cyclone Data Assimilation</td>
<td>Robert Nystrom</td>
<td>Pennsylvania State University</td>
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<td>Tropical Cyclone Formation</td>
<td>Chris Davis</td>
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**Thursday, 30 May 2019**

**Venue: W301 School of Physics, Peking University**

08:40-10:10  Ordinary Convective Cells  
**Richard Rotunno,** National Center for Atmospheric Research

10:10-10:30  Break

10:30-12:00  Global distribution of convective systems from satellites  
**Chuntao Liu,** Texas A&M University - Corpus Christi

12:00-13:30  Lunch

13:30-15:00  Squall Lines  
**Richard Rotunno,** National Center for Atmospheric Research

15:00-15:20  Break

15:20-16:50  Supercells  
**Richard Rotunno,** National Center for Atmospheric Research

16:50  Discussion

**End of Summer School**
3rd International Workshop of the Severe Weather International Consortium (SWIC)
Organized by Zhiyong Meng from Peking University and Fuqing Zhang from Pennsylvania State University

31 May–2 June, 2019

Department of Atmospheric and Oceanic Sciences
School of Physics, Peking University
Friday, 31 May 2019
Venue: W301 School of Physics, Peking University

**Opening Ceremony**
Chair: Zhiyong Meng, Peking University
08:30-09:00 Opening address and introduction

**Session 1** Convection Predictability
Chair: Zhiyong Meng, Peking University
09:00-09:30 Predictability of Convection
Richard Rotunno, National Center for Atmospheric Research (Keynote)
09:30-10:00 A new theoretical framework for understanding multi scale atmospheric predictability
Fuqing Zhang, Pennsylvania State University (Keynote)
10:00-10:20 Improving analysis and probabilistic prediction of a severe thunderstorm event using remote-sensing observations with an ensemble Kalman filter
Yunji Zhang, Pennsylvania State University
10:20-10:50 Group Photo & Coffee Break

**Session 2** Convection Forecast
Chair: Shuguang Wang, Nanjing University & Columbia University
10:50-11:20 Predictor Reconstitution Method for Weather Forecasting in the Alpine Region
Pingwen Zhang, Peking University (Keynote)
11:20-11:40 Review of Severe Convective Weather Prediction over China since 1950
Xiaoling Zhang, National Meteorological Center
11:40-12:00 Convective Storm Nowcasting Using a Deep Learning Approach
Lei Han, Ocean University of China
12:00-13:30 Lunch Break

**Session 3** Convection Modeling
Chair: Jianhua Sun, Institute of Atmospheric Physics
13:30-14:00 Large-eddy Simulation of Extreme Updrafts in the Tropical Cyclone Eyewall
Liguang Wu, Fudan University (Keynote)
14:00-14:20 The aerosol-cloud interaction in deep convective systems
Huiwen Xue, Peking University
14:20-14:40  Key Elements of Turbulence Closures for Simulating Deep Convection at Kilometer-Scale Resolution  
**Xiao Ming Shi**, Hong Kong University of Science and Technology

14:40-15:00  Beyond Traditional Limits of Gravity Wave Parameterizations  
**Junhong Wei**, Sun Yat-Sen University

15:00-15:20  Progresses of CMA GRAPES Mesoscale Ensemble Prediction System  
**Jing Chen**, Numerical Weather Prediction Center, CMA

15:20-15:40  Coffee Break

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**Session 4  Convection Climatology**  
Chair: **Yunji Zhang**, Pennsylvania State University

15:40-16:10  The effects of boundary layer inertial oscillation on precipitation diurnal cycles in different parts of China  
**Ming Xue**, University of Oklahoma (Keynote)

16:10-16:30  Hailstorms in China: climatology, long-term trend and predictability  
**Qinghong Zhang**, Peking University

16:30-16:50  Organizational Modes of Severe Wind-producing Convective Systems over North China  
**Jianhua Sun**, Institute of Atmospheric Physics

16:50-17:10  A Database of Convection Initiation in South China  
**Lanqiang Bai**, Sun Yat-Sen University

17:10-17:30  How Boundary Layer Convergence Lines and Their Associated Convection Respond to Sharp Vegetation Contrast: A Five-Year Summertime Radar Climatology  
**Yipeng Huang**, Xiamen Meteorological Bureau
Saturday, 1 June 2019
Venue: W301 School of Physics, Peking University

Session 5 Convection Environment

Chair: Yali Luo, Chinese Academy of Meteorological Sciences

08:30-09:00  Mesoscale Convective Systems and Their Large-Scale Environments
Ruby Leung, Pacific Northwest National Laboratory (Keynote)

09:00-09:30  Large-scale thermodynamic environments favoring intense convection: A perspective from satellite observations
Chuntao Liu, Texas A&M University - Corpus Christi (Keynote)

09:30-09:50  Deep convection and flow regimes over tropical islands
Shuguang Wang, Nanjing University & Columbia University

09:50-10:10  The Mid-latitude influences on the formation of the monsoon gyre in August 1991
Xuyang Ge, Nanjing University of Information Science & Technology

10:10-10:30  Coffee Break

Session 6 Heavy Rainfall I

Chair: Kun Zhao, Nanjing University

10:30-11:00  Urbanization and extreme rainfall
Dalin Zhang, Maryland University (Keynote)

11:00-11:20  Synoptic analysis of extreme hourly precipitation in China mainland and Taiwan
Yali Luo, Chinese Academy of Meteorological Sciences

11:20-11:40  Regional features of extreme precipitation: adiabatic forcing and diabatic feedback
Ji Nie, Peking University

11:40-12:00  Warm-sector heavy rainfall and LLJ
Zhiyong Meng, Peking University

12:00  Lunch Break
Session 7  Heavy Rainfall II

Chair: Guixing Chen, Sun Yat-Sen University

13:30-14:00  A comparison of the rainfall forecasting skills of the WRF ensemble forecasting system using SPCPT and other cumulus parameterization error representation schemes
Jinzhong Min, Nanjing University of Information Science & Technology (Keynote)

14:00-14:20  Developing atmospheric large-scale forcing data for single-column and loud resolving modeling and precipitation processes
Donghai Wang, Sun Yat-Sen University

14:20-14:40  Impacts of mesoscale orography on the summer precipitation in East China
Xin Xu, Nanjing University

14:40-15:00  How do weak or dry landfalling tropical cyclones produce heavy rainfall over China
Shoujuan Shu, Zhejiang University

15:00-15:20  Coffee Break

Session 8  Heavy Rainfall III

Chair: Chuntao Liu, Texas A&M University - Corpus Christi

15:20-15:50  A progress about WMO/UPDRAT
Yuan Wang, Nanjing University (Keynote)

15:50-16:10  Influence of Synoptic Pattern and Low-Level Wind Speed on Intensity and Diurnal Variations of Summer Rainfall along the Coast of South China
Kun Zhao, Nanjing University

16:10-16:30  Diurnal cycle of the successive MCSs in response to large-scale circulation over East Asia
Guixing Chen, Sun Yat-Sen University

16:30-16:50  Impact of Gravity Waves on Diurnal Cycle of Rainfall near the Coasts
Yu Du, Sun Yat-Sen University

16:50-17:10  Impact of moisture and surface wind on the diurnal variability of precipitation over Hainan Island
Lei Zhu, Nanjing University of Information Science & Technology

17:10-17:30  Predictability, Uncertainties and Underlying Dynamics in the Limited Predictability of the Record-Breaking Intensification of Hurricane Patricia (2015)
Robert Nystrom, Pennsylvania State University
Sunday, 2 June 2019
Venue: W301 School of Physics, Peking University

Session 9  Tropical Cyclone I
Chair: Qinghong Zhang, Peking University

08:30-09:00  The Basic Mechanism of Tropical Cyclone Formation
Chris Davis, National Center for Atmospheric Research (Keynote)

09:00-09:30  The Air-Sea Interaction and Formation of the Secondary Eyewall in Typhoon Sinlaku of 2009
Hancheng Lu, National University of Defense Technology (Keynote)

09:30-09:50  The diurnal cycle and gravity waves during the formation of Typhoon Megi (2010)
Juan Fang, Nanjing University

09:50-10:10  Impacts of the Diurnal Radiation Contrast on the Formation, Intensification and Structure of TC
Xiaodong Tang, Nanjing University

10:10-10:30  Coffee Break

Session 10  Tropical Cyclone II
Chair: Juan Fang, Nanjing University

10:30-11:00  Intensification Variability of Tropical Cyclones in Directional Shear Flows: Vortex Tilt-Convection Coupling
Zhemin Tan, Nanjing University (Keynote)

11:00-11:30  Why is the progress in improving tropical cyclone intensity forecast so slow, and any hope?
Yuqing Wang, Hawaii University (Keynote)

11:30-11:50  Targeted observing to improve typhoon forecasts using FY-4A satellite
Wei Han, National Meteorological Center

11:50  Lunch Break

End of the Workshop
Traffic Instructions

From Beijing Capital International Airport to School of Physics, Peking University
1. By taxi: The distance between the airport and Peking University is about 30 kilometers. It takes about 45 minutes and costs about ¥120.

2. By subway: Take the Beijing Subway Airport Express (costs ¥25) to Sanyuanqiao (三元桥) Station, transfer to Line 10 (costs ¥3 ~¥5) to Haidian Huangzhuang Station (海淀黄庄), then transfer to Line 4 (towards Anheqiao North Station (安河桥北)) and get off at the East Gate of Peking University Station (北京大学东门). Exit from the Exit B to the School of Physics.

From high-speed railway station to School of Physics, Peking University
1. Beijing Station: Take Line 2 (inner ring) to the Xuanwu Gate Station (宣武门), transfer to Line 4 (towards Anheqiao North Station (安河桥北)) and get off at the East Gate of Peking University Station (北京大学东门). Exit from the Exit B to the School of Physics.

2. Beijing South Railway Station (北京南站): Take Line 4 and get off at the East Gate of Peking University Station (北京大学东门). Exit from the Exit B to the School of Physics.

3 Beijing West Railway Station (北京西站): Take Line 9 to the National Library Station (国家图书馆), transfer to Line 4 (towards Anheqiao North Station (安河桥北)) and get off at the East Gate of Peking University Station (北京大学东门). Exit from the Exit B to the School of Physics.