

Banff Workshop:

Stochasticity and Organization of Tropical Convection

General Goal:

The main objective of this workshop is to discuss our understanding and capabilities to simulate large-scale features of organized tropical convection such as the Madden-Julian oscillation (MJO). The main theme is to view this multiscale physical phenomenon as a unique process that has both stochastic/highly chaotic and organized/fairly deterministic components, which may actually be intimately linked and strongly interact with each other. The following five discussion points have been identified.

- 1) Mathematical tools that may help the analysis of new field observations such as the CINDY/DYNAMO/AMIE data
- 2) Stochastic models that can assess the effects of chaotic dynamics in the initiation and maintenance of the MJO
- 3) Development of cumulus parameterizations including both convective stochasticity and organization aided by mathematical tools and field observations
- 4) Large-eddy simulations (LES)/cloud resolving models (CRM) that target specific geographic areas to help understand the stochastic dynamics of convection and its dynamical role in MJO initiation
- 5) Representation of key mechanisms responsible for the initiation of primary MJOs and the dynamics of MJO wave trains, e.g. large-scale forced organization versus bottom up self-organization (aggregation) of convective cells due to internal dynamics.

The agenda is thus prepared with these five points in mind, so that the participants can effectively address and thoroughly discuss them. Each participant (except the organizers) gives a general talk of 30 or 15 minutes (including 10 minutes for questions for the 30 minutes talks) and participates in one of five breakout/discussion groups revolving around these five points.

Group discussions (what is expected?)

Each group discussion will revolve on one of the five points above. Each participant will be assigned to a group prior to the workshop to get a chance to prepare accordingly. Each group will elect a chair and rapporteur. Each group is asked to address their assigned theme (or point) and prepare a short report with these three sections

- I. Scientific and practical issues associated with their theme
- II. State-of-art and recent advances
- III. Challenges and recommendations

Also, participants are requested to address the following questions during their discussion as applicable to their theme.

- a. How should convective stochasticity and organization be quantified in observations and model simulations so they can be directly compared to each other?
- b. How does the perception or definition of convective stochasticity and organization depend on time and spatial scales?
- c. How do convective stochasticity and organization depend on the large-scale environment?
- d. How different are interactions of the large-scale environment with organized convection vs. non-organized convection?
- e. To what degree can organized and non-organized convection be parameterized in global climate models?
- f. Can satellite and ground radar observations provide consistent information of the degree of stochasticity of convection?

We have tentatively assigned each participant to a group (see below). Please let us know as soon as possible if you would rather be in a different group.

Groups (38):

- I. Tools(7): Gianakis, Ajayamohan, De La Chevrotirere, Ogrosky, Pauluis, Schumacher, C. Zhang

- II. Stochastic models(7): Stechmann, N. Chen, Deng, Yang, Tung, Craig, Thual,
- III. Parameterization(6): G. Zhang, Mukhopadhyay, Christensen, Park, Brenowitz, Khouider
- IV. LES/CRM simulations(8): Austin, Waite, Boing, Moncrieff, Hagos, Bellenger, Siebesma, Slawinska
- V. MJO initiation(7): Kiladis, Shuyi Chen, Johnson, Goswami, Stachnik, Majda, Shengqian Chen

Group Merging and Switching:

After the first (prelim) reports (Tuesday afternoon), participants will be encouraged to switch to other groups and if desired/there is need some groups can be merged together, e.g. II+III, I+IV+V or I+V, II+III+IV...

Program Schedule

Monday

8:45 – 9:00 Welcome remarks by BIRS manager and organizers

9:00—10:30 Talks

Chair: Boualem Khouider

9:00-9:30 Moncrieff

9:30-10:00 Johnson

10:00-10:15 Hagos

10:15-10:30 Bellenger

10:30-11:00 Coffee break

11:00 –12:00 Talks

Chair: Boualem Khouider

11:00-11:30 Deng

11:30-12:00 Ajayamohan

12:00 –13:30 Lunch

13:00 Tour of Banff Centre Campus (May need to have quick lunch to join the tour)

14:00 Group photo

14:00--15:00 Breakout sessions—groups will meet and start discussing their themes.

15:00--15:30 Coffee break

15:30 –17:00 Breakout discussions continue (possibility short 5 min presentations within breakout sessions to put the groups up to speed)

17:00 – 17:30 General discussion: Remarks and comments, possible consultations across groups.

Tuesday

9:00—10:30 Talks

Chair: Andy Majda

Speakers:

9:00-9:30 Schumacher

9:30-10:00 Stechmann

10:00-10:15 Thual

10:15-10:30 Nan Chen

10:30-11:00 Coffee break

11:00 –12:30 Talks

Chair: Andy Majda

Speakers:

11:00-11:30 Austin

11:30-12:00 Siebsma

12:00-12:15 Waite

12:15-12:30 Boing

12:30 –13:30 Lunch

13:30--15:00 Breakout sessions

15:00--15:30 Coffee break

15:30 –16:00 Breakout sessions (continue)
16:00 – 17:00 Group preliminary reports (10 min each)
Chair: Chidong Zhang
17:00-17:30 General discussion, comments/feedback on prelim reports
Chair: Boualem Khouider

Wednesday (half day)

8:30—10:30 Talks
Chair: Chidong Zhang
Speakers:
8:30-9:00 Shuyi Chen
9:00-9:30 Kiladis
9:30-9:45 Shengqian Chen
9:45-10:00 Ogrosky
10:00-10:15 Brenowitz
10:15-10:45 Coffee break
10:45 –12:45 Talks
Chair: Chidong Zhang
Speakers:
10:45-11:15 G. Zhang
11:15-11:45 Mukhopadhyay

11:45-12:15 Christensen
12:15-12:30 Park
12:30-12:45 Slawinska

12:30 –14:00 Lunch
Afternoon: Free activities.

Thursday

9:00—10:30 Talks
Chair: Andy Majda
Speakers:
9:00-9:30 Pauluis
9:30-10:00 Craig
10:00-10:15 Goswami
10:15-10:30 Yang

10:30-11:00 Coffee break
11:00 –12:30 Talks
Chair: Chidong Zhang
Speakers:
11:00-11:30 Gianakis
11:30-12:00 Tung
12:00-12:12:15 De La Chevrotiere
12:15-12:30 Stachnik

12:30 –13:30 Lunch break
13:30--15:00 Breakout sessions
15:00--15:30 Coffee break
15:30 –17:00 Breakout sessions:
 Concluding and Report preparation

Friday (half day)

9:00—10:00 Group reports—final (20 min each)

Chair: Andy Majda

10:00-10:30 Coffee break

10:30 –12:30 Concluding discussion and wrap up

Chair: Boualem Khouider

12:30 –13:30 Lunch break

13:30 Workshop adjourns. Most people head back to Calgary airport.

MEALS

*Breakfast (Buffet): 7:00 – 9:30 am, Sally Borden Building, Monday – Friday

*Lunch (Buffet): 11:30 am – 1:30 pm, Sally Borden Building, Monday – Friday

*Dinner (Buffet): 5:30 – 7:30 pm, Sally Borden Building, Sunday – Thursday

*Coffee Breaks: As per daily schedule, 2nd floor lounge, Corbett Hall

Please remember to scan your meal card at the host/hostess station in the dining room for each meal.

MEETING ROOMS

All lectures will be held in **Max Bell 159 (Max Bell Building accessible by walkway on 2nd floor of Corbett Hall)**. LCD projector, overhead projectors and blackboards are available for presentations. Note that the meeting space designated for BIRS is the lower level of Max Bell, Rooms 155-159. Breakout rooms/space will be assigned. Please respect that all other space has been contracted to other Banff Centre guests, including any Food and Beverages in those areas.