2019 CFMIP Meeting on Clouds, Precipitation, Circulation, and Climate Sensitivity

Sep. 30 to Oct. 4, 2019 at the St. John Hotel, Mykonos, Greece

Agenda

Monday, September 30th

10:00 – 11:00am - Registration

Welcome Session
Chairs: Vasso Kotroni, Kostas Lagouvardos

11:00 – 11:30am – Welcome, logistics, local host presentation – Vasso Kotroni, Kostas Lagouvardos, George Tselioudis
11:30 –11:45am – State of CFMIP – Masahiro Watanabe, George Tselioudis
11:45 – 12:00pm – Introduction of CLIVAR Climate Dynamics Panel (CDP) – Shoshiro Minobe

2:00pm - Excursion to Delos (Optional)

Tuesday, October 1st

Session 1: Forcing, Feedbacks and Climate Sensitivity in CMIP5 and CMIP6
Chairs: Christian Jakob, Paulo Ceppi

9:00 – 9:15am - Climate feedbacks in the WCRP assessment on climate sensitivity – Steve Klein
9:15 – 9:30am - A preliminary assessment of forcing, feedbacks, and climate sensitivity in CMIP6 – Mark Zelinka
9:30 – 9:45am - Synthesizing CMIP experiments to understand CESM2’s high climate sensitivity – Brian Medeiros
9:45 – 10:00am - A physical mechanism for the relationship between climate sensitivity, low-level cloud feedback and double-ITCZ bias – Mark Webb
10:00 – 10:15am - Are cloud feedbacks linear with carbon dioxide forcing? – Jen Kay
10:15 – 10:30am - The cloud response to ENSO variability: mechanisms and implications for constraining climate sensitivity – Cristian Proistosescu

10:30 – 11:00am Coffee Break (Poster I posters up)

Session 1 continued
11:00 – 11:15am - The forced and unforced pattern effects in a large model ensemble – Andrew Dessler
11:15 – 11:30pm - Clouds and sensitivities across a hierarchy of GFDL models - Levi Silvers
11:30 – 11:45am - Low-level cloud response to global warming in CMIP6 models – Anna Lea Albright
11:45 – 12:00pm - Hadley cell expansion, Southern Ocean cloud radiative effect variability, and climate sensitivity in CMIP6 models – George Tselioudis

12:00 – 12:30pm – Discussion on Feedbacks and Climate sensitivity

12:30 – 2:00pm Lunch

2:00 – 3:00pm – Poster Session I

Session 2: State- and Time-Dependence of Climate Feedbacks
Chairs: Jen Kay, Steve Klein

3:00 - 3:15am - Inter-model spread in CMIP5 feedback kinkiness traced to surface warming patterns – Yue Dong
3:15 – 3:30am - Tropical Pacific SST pattern changes in observations and models: How can we reconcile? – Masahiro Watanabe
3:30 – 3:45pm - Equilibrium Climate Sensitivity is Sensitive to Changes in Poleward Ocean Heat Transport – Hansi Singh
3:45 – 4:00pm - Limitations of the Green's function approach to analyzing spatial radiative feedbacks – Jonah Bloch-Johnson

4:00 – 4:30pm – Coffee break

4:30 – 4:45pm - Climate feedback strength: no historical period pattern effect when using HadISST data – Nicholas Lewis
4:45 – 5:00am - Equilibrium and transient state dependencies of climate sensitivity: are they important for climate projections? – Olivier Geoffroy
5:00 – 5:15pm - Decomposing atmospheric temperature response to CO2 at process level – Yi Huang
5:15 – 5:30pm - On the Causal Relationship between the Moist Diabatic Circulation and Cloud Rapid Adjustment to Increasing CO₂ – Tra Dinh

5:30 – 6:00pm Discussion on Space- and Time-Dependence of Climate Feedbacks

6:30pm – Welcome reception
**Wednesday, October 2nd**

**Session 3: Convective Processes and Radiative Convective Equilibrium**
*Chairs: Mark Webb, Thorsten Mauritsen*

9:00 – 9:15am - Observed modulation of the tropical radiation budget by convective organization and lower-tropospheric stability – **Sandrine Bony**
9:15 – 9:30am - Tropical high cloud–convection feedbacks in the Earth System – **Graeme Stephens**
9:30 – 9:45am - Impact of convective self-aggregation on tropical precipitation extremes – **Caroline Muller**
9:45 – 10:00am - Convective aggregation and precipitation extremes – **Brian Soden**
10:00 – 10:15am - What drives the lifecycle of tropical anvil clouds? – **Blaž Gasparini**
10:15 – 10:30am - Fixed anvil temperature feedback - positive, zero or negative? – **Masakazu Yoshimori**

10:30 – 11:00am Coffee Break

**Session 3 continued**

11:00 – 11:15am - Tropical clouds and convection in RCE simulations – **Allison Wing**
11:15 – 11:30am - Climate sensitivity across the RCEMIP simulations – **Tobias Becker**
11:30 – 11:45pm - Is the net cloud radiative effect over the tropical warm pools constrained to be near-zero? – **Casey Wall**
11:45 – 12:00pm – Observation of the stability-iris effect with Calipso – **Marion Saint-Lu**

**12:00 – 12:30pm – Discussion on Convective Processes and RCE framework**

12:30 – 2:00pm Lunch

**Session 4: Coupling of Clouds with Atmospheric and Oceanic Circulation**
*Chairs: Sandrine Bony, Florent Brient*

2:00 – 2:15pm - The basic effect of cloud radiative effects on tropical sea-surface temperature variability – **Dave Thompson**
2:15 – 2:30pm - The influence of cloud radiative effects on extratropical-tropical and inter-basin teleconnection – **Yen-Ting Hwang**
2:30 – 2:45pm - Equatorial warming dominated by off-equatorial forcing – **Malte Stuecker**
2:45 – 3:00pm - Constraining the extent of solstitial Hadley cells in a wide range of climates and configurations – **Simona Bordoni**

**3:00 – 3:30pm Coffee Break (Poster II posters up)**

3:30 – 3:45pm - ITCZ-MIP: Understanding ITCZ width and its impacts on climate and circulation – **Angie Pendergrass**
3:45 – 4:00pm - Tightening of tropical ascent in observations and models – **Hui Su**
4:00 – 4:15pm - Subpolar radiative forcing in each hemisphere causes distinct tropical climate responses – Sarah Kang
4:15 – 4:30pm - On the remote impact of Southern Ocean cooling – Xiyue Zhang
4:30 – 4:45pm - Climatic impact and feedback response of mesoscale cellular convective clouds – Isabel McCoy
4:45 – 5:00pm - Changes of clouds and large-scale circulations due to global warming in multi-decadal global nonhydrostatic simulations – Akira Noda

5:00 – 5:30pm Discussion on Coupling of Clouds and Circulation

7:00pm Conference Dinner (Optional)

Thursday, October 3rd

Session 5: Extratropical Cloud Processes and Feedbacks
Chairs: Dave Thompson, Yen-Ting Hwang

9:00 – 9:15am - Understanding the meteorological controls on the Arctic low cloud annual cycle: Implications for Arctic cloud feedback – Patrick Taylor
9:15 – 9:30am - Isolating the influence of cloud radiative feedbacks on Arctic amplification through cloud-locking – Eleanor Middlemas
9:30 – 9:45am - The role of global versus regional cloud-radiative changes on the global warming response of the mid-latitude jet streams – Nicole Albern
9:45 – 10:00am - As cold clouds warm, their lifetime increases: a negative feedback underestimated in GCMs – Johannes Mülmenstädt
10:00 – 10:15am - Cloud controlling factors in the midlatitudes across cyclonic and anticyclonic regimes – Daniel McCoy

10:15 – 10:30am Discussion on Extratropical Cloud Processes and Feedbacks

10:30 – 11:00am Coffee Break

Session 6: Precipitation and Hydrological Sensitivity
Chairs: Graeme Stephens, Angie Pendergrass

11:00 – 11:15am – Understanding changes in regional precipitation variability across multiple timescales – Rob Chadwick
11:15 – 11:30am – Can climate models simulate the atmospheric heat budget and does it matter? – Christian Jakob
11:30 – 11:45am - ECS: A Tale of 2.5 Models – Yi Ming
11:45 – 12:00pm - Cloud regimes and relation to precipitation globally and over the Mediterranean region – Dimitra Konsta
12:00 – 12:15pm - Physical constraints and modeling uncertainties in the intensification of the global hydrologic cycle – Benjamin Fildier

12:15 – 12:30pm – Discussion on Precipitation and Hydrologic Sensitivity
12:30 – 2:00pm Lunch

2:00 – 3:00pm Poster Session II

Session 7: Observations and Model Evaluation for Process-level Understanding
Chairs: Masa Watanabe, Allison Wing

3:00 – 3:15pm - Diurnal variations of clouds and water vapor profiles observed across the tropics with recent satellites, comparison with climate models – Hélène Chepfer
3:15 – 3:30pm - Shallow cumulus and stratocumulus cloud feedbacks inferred from CALIPSO and CloudSat observations – Gregory Cesana
3:30 – 3:45pm - Using CERES observations to assess CMIP6 climate model simulations of changes in Earth’s radiation budget during and after the global warming “hiatus” – Norm Loeb
3:45 – 4:00pm - Observed radiative flux changes during the A-Train satellite era – Ryan Kramer

4:00 – 4:30pm Coffee Break

4:30 – 4:45pm - Distribution and covariation of water vapor and clouds in the trades – Ann Kristin Naumann
4:45 – 5:00pm - Climatological controls on the response of tropical clouds and relative humidity to greenhouse gas forcing – Stephen Po-Chedley

5:00 – 5:30pm Discussion on Observations and Model Evaluation

Friday, October 4th

Session 8: Low Cloud Processes, Feedbacks, and Adjustments
Chairs: Sarah Kang, George Tselioudis

9:00 – 9:15am - Regionally resolved, observationally constrained marine low cloud feedbacks – Tim Myers
9:15 – 9:30am - Trade-wind cumulus cloud feedback in the ICON large eddy model (LEM) – bridging the gap to cloud resolving models – Thorsten Mauritsen
9:30 – 9:45am - Object-oriented identification of coherent structures: A multi-case analysis of boundary-layer Large-Eddy Simulations – Florent Brient
9:45 – 10:00am - Investigating the role of stratocumulus to cumulus transitions in the extratropical cloud optical depth feedback – Ivy Tan
10:00 – 10:15am – Substantial cloud brightening from shipping in subtropical low clouds – Rob Wood

10:15 – 10:45am Coffee Break
Session 8 continued

10:45 – 11:00am - A detailed look at the cumulus-valve mechanism and its potential implications for cloud-base cloudiness – Raphaela Vogel

11:00 – 11:15am - Improving the consistency between vertical subgrid-scale heterogeneity and cloud overlap parameterizations for low-level clouds in GCMs and RCMs – Jean-Louis Dufresne

11:15 – 11:45am Discussion on Low Cloud Processes, Feedbacks, and Adjustments

11:45 – 1:00pm Discussion on CFMIP Future Plans, including informal MIP reports
**Poster Session I**

A1. The role of dynamic and thermodynamic processes for the propagation of organized convection in a large-scale flow - *Ann Kristin Naumann*

A2. The variability of clouds and water vapor in CMIP6 models - *Axel Lauer*

A3. Cold pool collisions and its role in convective organization - *Bettina Meyer*

A4. Can low cloud feedback be explained based on low cloud indices? - *Tsuyoshi Koshiro*

A5. The lightness of water vapor can stabilize Earth's climate - *Da Yang*

A6. Differences in convection over warmer and cooler tropical oceans associated with climate sensitivity in CMIP5 - *Nagio Hirota*

A7. Examining the sensitivity of low cloud mesoscale morphology to environmental variables - *Tianle Yuan*

A8. Using a Neural Network model for feedback assessment - *Yi Huang*

A9. Enhanced Oceanic Dynamical Control on Atlantic SST with Absence of Pacific mode Variability - *Aixue Hu*

A10. Model-dependent cloud radiative kernels: derivations and applications - *Xianglei Huang*

A11. Evaluating the bulk mass-flux approach for shallow convective momentum transport and its impact on near-surface winds - *Beatrice Saggiorato*

A12. The Impacts of Bias in cloud-radiation-precipitation-circulation coupling on Pacific Seasonal and El Niño Simulations in Contemporary GCMs – *Juilin Li*

A13. CMIP6 Climate Model Improvements in Clouds and Water Vapor Simulations - *Jonathan Jiang*

A14. Convective Heating Leads to Self-Aggregation by Generating Available Potential Energy - *Da Yang*

A15. Exploring uncertainty in model representation of atmospheric convection through Universal Structural Parameterisation - *Hugo Lambert*

A16. Observed and Simulated Influence of SST on the Tropical Atmospheric Water Cycle - *Erik Högård-Olsen*

A17. The effect of convective momentum transport on tropical cyclones - *Paul Vaillancourt*
A18. The tropical temperatures of the Last Glacial Maximum as an emergent constraint of climate sensitivity in a Bayesian framework - Martin Renoult


A20. Review of heat flows in the Gulf of Mexico - Miriam Alin Calva

A21. Role of interactive ocean and diurnal cycle in the clustering of deep convection – Adrian Tompkins

A22. What is the fate of detrained ice in the tropical western Pacific? - Blaž Gasparini

A23. Analysis of cloud structures and cloud controlling processes for the estimation of precipitation from mesoscale convective systems with the use of satellite data and neural networks – Costas Cartalis

A24. Exploring the impact of GNSS data assimilation to improve precipitation forecasting - Vasso Kotroni

A25. Observational Evidence that Radiative Heating Modifies the Life Cycle of Tropical Anvil Clouds – Casey Wall

A26. Tropopause instability the real driver for climate change viewed through cosmogenic radioisotopes - Lucrezia Terzi

A27. How do ocean warm anomalies favor the aggregation of deep convective clouds? - Sara Shamekh

A28. The spread of climate states in CMIP5 and its links to atmospheric convective types - David Fuchs

A29. The “too few too bright” biases still present in CMIP6 models. Dimitra Konsta

A30. Attribution of Earth’s energy imbalance to changes in radiative forcings and feedbacks - Chen Zhou

**Poster Session II**

B1. The Cumulus and Stratocumulus CloudSat-CALIPSO Dataset (CASCAD) - Gregory Cesana

B2. A New Convective Trigger for Better Capturing the Diurnal Cycle of Precipitation in Weather and Climate Models: Observational Evidence and Modeling Results - Shaocheng Xie
B3. Nonlinear response of extreme precipitation to warming in CESM1 - Angeline Pendergrass

B4. Using paleoclimates to narrow down on mixed phase cloud feedbacks - Navjit Sagoo

B5. Significance of precipitation process in determining the aerosol indirect forcing - Kentaroh Suzuki

B6. Evaluation of AGCM cloudiness and radiative effects using cloud vertical structures - Lazaros Oreopoulos

B7. A new perspective on the equatorial Atlantic seasonal cycle - Noel Keenlyside

B8. Global Marine Low Cloud-Radiative Sensitivity to Perturbations in the Large-Scale Environment - Ryan Scott

B9. Diurnal cycles of precipitation and lightning in the tropics observed by TRMM3G68, LIS and WWLLN - Shoshiro Minobe

B10. Aerosol-cloud adjustments hidden beneath scavenging - Daniel McCoy

B11. Impact of ESA CCI SST dataset on cloud regimes in atmosphere-only simulations at two horizontal resolutions - Yoko Tsushima

B12. Estimating the shallow convective mass flux from the sub-cloud layer mass budget - Raphaela Vogel

B13. Convective and large-scale precipitation in models - Hideaki Kawai

B14. Automatic Lidar and Ceilometer Framework (ALCF) - Peter Kuma

B15. The Role of Thermodynamic Phase Shifts in Cloud Optical Depth Variations With Temperature – Ivy Tan

B16. Comparison of Observed & Modeled Top of the Atmosphere Intensities - William van Wijngaarden


B18. Impact of Turbulence Parameterization on Global Low Level Cloud Feedbacks - Clare Flynn

B19. AIRS Obs4MIPs V2 Dataset and CMIP6 Model Temperature and Humidity Biases - Baijun Tian

B20. A New Cloud Climate Dataset - Dave Winker
B21. A new method for understanding inter-model difference in low cloud feedback - *Tomoo Ogura*

B22. The impact of shallow convection on boundary layer winds in ICON-LEM hindcasts over the North Atlantic - *Kevin Helfer*

B23. Updates & Trends in COSP CloudSat and MISR Observational Datasets - *Roj Marchand*

B24. At what model resolution does Scu-top entrainment become reasonable - *Johannes Mülmenstädt*

B25. Response of resolved polar cloud to idealized climate change - *Xiyue Zhang*

B26. Timescales of precipitation response to CO2 forcing – *Paulo Ceppi*

B27. Improving the short-wave radiation biases in climate models - *Vidya Varma*

B28. On the relationship between precipitation extremes and convective organization - *Addisu Semie*

B29. The Sensitivity of Tropical Extreme Precipitation to Warming in a Nonhydrostatic Model - *Alejandro Uribe*