

Comparative Climatology of Terrestrial Planets II: Understanding How Climate Systems Work
NASA Ames Research Center, Moffett Field, CA
September 8-11, 2015

PRELIMINARY DRAFT PROGRAM

Tuesday, September 8

8:30 – 8:45 Welcome, NASA ARC Center Director/Deputy Center Director (Tu, Edwards)

8:45 – 9:15 Keynote Address: Dr Ellen Stofan, NASA Chief Scientist

9:15 – 9:45 Charge for this Meeting (Glaze, Hollingsworth, Domagal-Goldman)

9:45-10:15 Break

10:15-11:25

Climate Systems I (Shawn Domagal-Goldman, Chair)

10:15 – 10:40 James Kasting (invited)
“Long-term evolution of Earth’s Atmosphere and Climate”

10:40 – 11:05 Colin Goldblatt (invited)
“The Inhabitance Paradox: how habitability and inhabitancy are inseparable”

11:05 – 11:20 Eric Hebrard
“Modeling chemical uncertainties in planetary atmospheres”

11:25-1:00 Lunch

1:00-2:30

Climate Systems II (James Kasting, Chair)

1:00 – 1:25 Kevin Zahnle (invited)
“Venus on the Verge”

1:25 – 1:50 Sarah Stewart (invited)
“The addition and removal of volatiles during terrestrial planet formation”

1:50 – 2:05 Lori Glaze
“Volcanic contributions to the atmosphere from ancient flood basalt eruptions”

2:05 – 2:30 Discussion (Moderators: Domagal-Goldman & Kasting)

2:30-3:00 Break

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Tuesday, September 8 (continued)

3:00-5:00

Paleostars and Stellar Activity (Madhulika [Lika] Guhathakurta, Chair)

- 3:00 – 3:25 Carolus Schrijver (invited)
“Solar spectral irradiance: lessons from the stars”
- 3:25 – 3:50 Vladimir Airapetian (invited)
“Space Weather Effects Mediated by the Paleo-Sun: Prospects for Early Earth Climate and Habitability”
- 3:50 – 4:15 John Tarduno (invited)
“The geodynamo and magnetopause during Earth's first billion years”
- 4:15 – 4:40 Antígona Segura (invited)
“Influence of chromospheric activity on the atmospheric chemistry of habitable planets around M dwarfs: The case of O₂”
- 4:40 – 5:00 Discussion (Moderator: Guhathakurta)

5:00-6:30 Posters and Collaboration “Hour”

- 01 Jeffery Hollingsworth “Traveling Weather Disturbances in Mars' Southern Extratropics: Sway of the Great Impact Basins”
- 02 Juan Lora “Atmospheric moisture transport on Earth and Titan”
- 03 Jeremy Schnittman “The Effect of Orbital Eccentricity on Climate and Habitability”
- 05 Christina Holstein-Rathlou “Inter-annual comparison and analysis of Martian North Polar dust events”
- 06 David Williams “Update and Status of the NASA Planetary Aeolian Laboratory”
- 07 Anthony Del Genio “Cumulus parameterization: Those who CAN remember the past are condemned to repeat it”
- 08 Shawn Domagal-Goldman “Aerosols in the Solar System and Beyond”
- 09 Yeon Joo Lee “Radiative forcing by the Venus clouds and its effects on atmospheric dynamics in the equatorial region”
- 10 Melinda Kahre “An Orbit-Driven Water Ice-Cloud Greenhouse on Mars?”
- 11 Timothy Titus “Mars Polar Regions as an Analog for Terrestrial Planets with Atmospheres in Vapor-Pressure Equilibrium with Surface Volatiles”
- 12 Alexey Pankine “Nighttime water ice clouds on Mars”
- 13 Edward Thiemann “The Impact of Solar Flare Heating of the Mars Thermosphere on Hydrogen Jeans Escape”

- 14 Vladimir Airapetian “Abiotic Nitrogen Fixation and the early Earth’s Climate Mediated By Paleo Space Weather”
- 15 Mark Giampapa “The Photometric Variability of Sun-like Stars”
- 16 Martin Airey “Volcanic events on Venus: Observations, modeling, and detection”
- 17 Ralph Lorenz “A History of Planetary Climate Studies”
- 18 Michael Way “Exploring the Inner Edge of the Habitable Zone”
- 19 Taylor Becker “Martian Atmospheric Methane Sourced from Subsurface Methane Clathrate Hydrate Structures”
- 20 Caitlin Caldwell “Influence of Comet and Asteroid Impacts on LHB-era Atmospheres of Venus, Earth, and Mars”

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Wednesday, September 9

8:00-10:00

Aerosols, Clouds, and Radiative Transfer I (Yuk Yung, Chair)

- 8:00 – 8:25 Eric Jensen (invited)
“Formation of Cirrus Clouds Near the Tropical Tropopause and their Implications for Stratospheric Humidity and Climate”
- 8:25 – 8:50 Michael Mischna (invited)
“Numerical Modeling of the Martian Global Dust Cycle Under the Influence of Orbit-Spin Coupling Accelerations”
- 8:50 – 9:05 Victoria Hartwick
“A Coupled Dust and Water Ice Cloud Microphysics Scheme for Mars”
- 9:05 – 9:20 Giada Arney
“Under an Orange Sky: The Many Implications of an Archean Haze for Planetary Habitability”

9:25-9:55 Break

9:55-11:55

Aerosols, Clouds, and Radiative Transfer II (Eric Jensen, Chair)

- 9:55 – 10:20 Yuk Yung (invited)
“Is the low frequency variability of the atmosphere of Venus caused by coupled chemistry, radiation, and dynamics?”
- 10:20 – 10:35 Yeon Joo Lee
“Net thermal flux profile calculation of the Venus atmosphere below the clouds”
- 10:35 – 11:00 Tyler Robinson (invited)
“Completely Colorblind: Advances in Gray Techniques and Applications to Planets Near and Far”
- 11:00 – 11:15 Hannah Wakeford
“Cloud condensates in hot Jupiter exoplanet atmospheres”
- 11:15 – 11:55 Discussion (Moderators: Yung & Jensen)

11:55-1:25 Lunch

**Wednesday, September 9 Comparative Climatology of Terrestrial Planets II:
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Wednesday, September 9 (continue)

1:25-3:05

Upper Atmosphere, Thermosphere, Exosphere, and Escape I (Hakan Svedham, Chair)

- 1:25 – 1:50 Tom Immel (invited)
“Features and Drivers of Large Scale Changes in the Space
Environments of Earth and Mars”
- 1:50 – 2:05 Vladimir Airapetian
“Effects of Space Weather from The Young Sun on Atmospheric Escape:
Implications for the Early Earth”
- 2:05 – 2:30 Bruce Jakosky (invited)
“Early results from the MAVEN mission to Mars”
- 2:30 – 2:45 Michael Chaffin
“H Escape: The Story at Mars as Revealed by MAVEN and Mars Express”
- 2:45 – 3:00 Dave Brain
“MAVEN measurements of ion escape from the atmosphere of Mars”

3:05-3:35 Break

3:35-5:00

Upper Atmosphere, Thermosphere, Exosphere, and Escape II (Michael Chaffin, Chair)

- 3:35 – 4:00 Amanda Brecht (invited)
“Twinkling Lights in the Nightside Upper Atmosphere: How Nightglow
Contributes to our Understanding of Global Dynamics”
- 4:00 – 4:15 Candace Gray
“Under Pressure: The Venusian Aurora and its Connection to the Solar Wind”
- 4:15 – 4:30 Hakan Svedhem
“Contribution to Comparative Climatology by Venus Express”
- 4:30 – 5:00 Discussion (Moderators: Svedham & Chaffin)

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Thursday, September 10

8:00 – 9:25 am

Comparative Atmospheric Dynamical Processes I (Jeffery Hollingsworth, Chair)

- 8:00 – 8:25 Adam Showman (invited)
“Atmospheric dynamics of terrestrial and giant exoplanets”
- 8:25 – 8:40 Daniel Koll
“Atmospheric Dynamics of Terrestrial Planets in the Era of Comparative Planetology”
- 8:40 – 8:55 Alejandro Soto
“Meridional Transport in the Atmospheres of Earth and Mars”
- 8:55 – 9:10 Priscilla Nowajewski
“Atmospheric Dynamic response to obliquity forcing”
- 9:10 – 9:25 Fachreddin Tabataba-Vakili
“Effects of diurnal cycles on planetary circulation regimes of terrestrial atmospheres using simple GCMs”

9:25am – 9:55am Break

9:55am – 11:30am

Comparative Atmospheric Dynamical Processes II (Alejandro Soto, Chair)

- 9:55 – 10:20 Jonathan Mitchell (invited)
“The influence of moisture and seasons in climates of terrestrial planets: Lessons from Earth, Titan and beyond”
- 10:20 – 10:35 Sebastien Lebonnois
“A comparative study of wave activity in the region of maximum zonal wind in the IPSL Venus and Titan GCMs”
- 10:35 – 10:50 Sean Faulk
“The effect of rotation rate on seasonally migrating tropical precipitation zones on terrestrial planets”
- 10:50 – 11:05 Scott Guzewich
“Comparing the Polar Vortices of Earth and Mars”

11:05 – 11:30 Discussion (Moderators: Hollingsworth & Soto)

11:30 – 1:00 Lunch

1:00 – 3:00

Atmospheric Planetary Boundary Layer (PBL) Processes (Tim Titus, Chair)

- 1:00 – 1:25 Ralph Lorenz (invited)
“Comparative Climatology : Aeolian Processes”
- 1:25 – 1:50 Scot Rafkin (invited)
“Mesoscale Processes and Dynamics of Earth, Mars and Titan: Variation on a Theme”
- 1:50 – 2:05 Murali Natarajan
“Intercomparison of Martian lower atmosphere simulated using different planetary boundary layer parameterization schemes”
- 2:05 – 2:20 Cecilia Leung
“Mesoscale Atmospheric Modeling of Hydrological and Dust Processes in the Present Climate on Mars”
- 2:20 – 2:35 Alexandre Kling
“Past and Present Circulations Inside Gale Crater: Implications for the Geological Framework Observed by MSL”
- 2:35 – 3:00 Discussion (Moderator: Titus)

3:00 – 3:30pm Break

3:30 – 5:40pm

Oceanic Processes, Atmospheric Condensation, Ice Caps, and Cryospheres (Francois Forget, Chair)

- 3:30 – 3:55 Nicolas Cowan (invited)
“Deep Water Cycling and the Surface Character of Terrestrial Planets”
- 3:55 – 4:10 Nancy Kiang
“Climate of Earth-like planets with and without ocean heat transport orbiting a range of M and K stars”
- 4:10 – 4:35 Linda Sohl (invited)
“The Evolution of Proterozoic Snowball Earth Episodes in a 3D Climate Model”
- 4:35 – 5:00 Candice Hansen (invited)

“The Drama of Climates and Seasons on Mars, Triton, and Pluto”

- 5:00 – 5:15 Angela Zalucha
“Condensation Flows and Frost Cycles on Bodies with Volatile Atmospheres: The Case of Pluto, Triton, and Mars”
- 5:15 – 5:40 Discussion (Moderator: Forget)

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Friday, September 11, 2015

8:00-9:25

THE FUTURE I: Modeling and Observations (Jeffery Hollingsworth, Chair)

- 8:00 – 8:25 Francois Forget (invited)
“The Future of Planetary Global Climate Modeling”
- 8:25 – 8:50 Paul Ullrich (invited)
“Recent Advances in the Development of Next-Generation Global Modeling Systems”
- 8:50 – 9:05 Radhika Ramachandran
“Short-range Weather Predictions at the Space Physics Laboratory of VSSC/ISRO: A Saga of two decades”
- 9:05 – 9:20 Jun Yang
“Where is the Inner Edge of the Habitable Zone of the Sun and M dwarfs?”

9:25-9:55 Break

9:55-12:30

THE FUTURE II: Modeling, Observation and Discussions (Lori Glaze, Chair)

- 9:55 – 10:20 Jay Herman (invited)
“The Future of Atmosphere & Climate Observations”
- 10:20 – 10:45 Bruce Wielicki (invited)
“Climate Change Accuracy: Requirements and Economic Value”
- 10:45 – 11:00 Scot Rafkin
“Towards an International Exploration Program for Mars and Venus In Situ Climate Science”
- 11:00 Madhulika [Lika] Guhathakurta
“Introduction to Path Forward Panel Discussion”
- 11:15 Discussion (Panel: Guhathakurta, Ocampo, Eckman, Still)

12:30 Conclude

(12:30-2:30 SOC working lunch: Prep for CCTP III)