Land Model Working Group

Will Wieder & Rosie Fisher

LMWG co-chairs

February 6, 2023

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Code of Conduct

NCAR | NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Here we value respectful dialogue, please...

- Offer Constructive Feedback
- Consider New Ideas
- Share The Air
- NCAR UCAR
- Show Appreciation
- Acknowledge Teamwork
- Encourage Innovation

www.cgd.ucar.edu/diversity

- LMWG Wins
- CTSM6 Development
- Andrew Slater Award

- Raise hands
- Use the chat, even in the room
- 10-minute presentations
- Provide feedback!

YOU, the LMWG

Water Resources Research

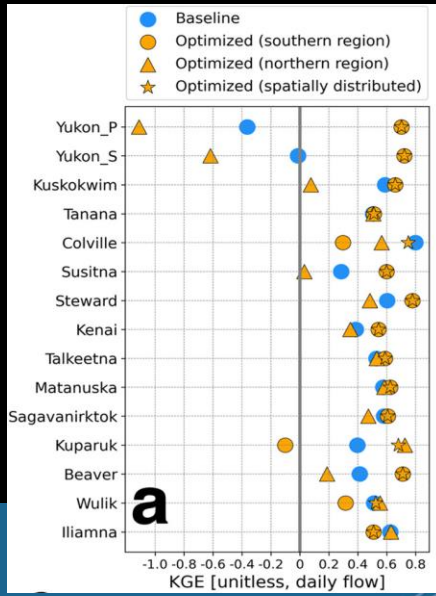
Research Article | Open Access

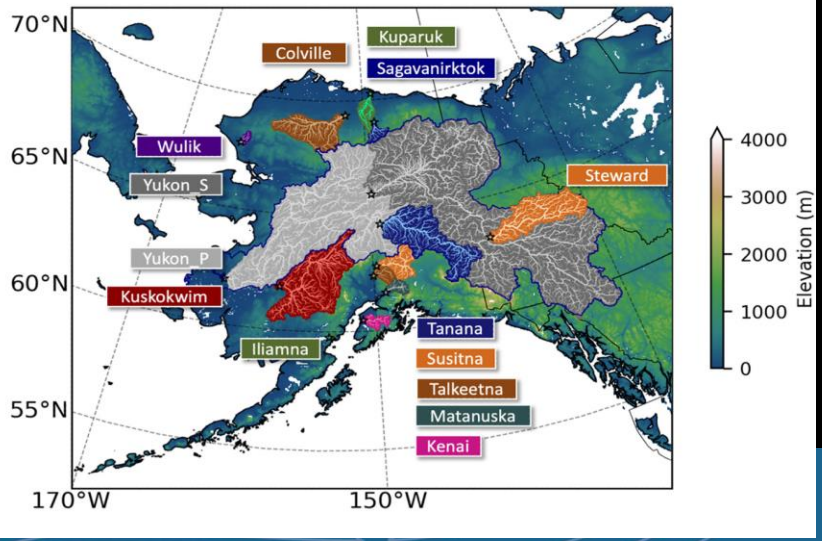
Moving Land Models Toward More Actionable Science: A Novel Application of the Community Terrestrial Systems Model Across Alaska and the Yukon River Basin

Yifan Cheng, Keith N. Musselman, Sean Swenson, David Lawrence, Joseph Hamman, Katherine Dagon, Daniel Kennedy, Andrew J. Newman

Hillslope Hydrology
+
PPE Infrastructure
+
Regionally calibrated High resolution model for Actionable science

Improved model performance in regional basins





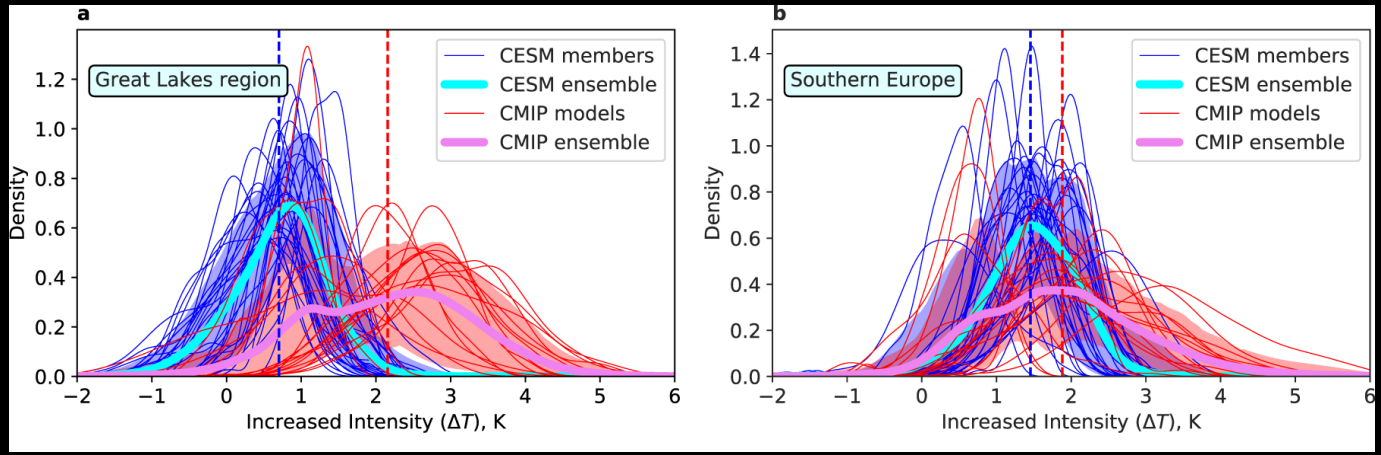
Large model structural uncertainty in global projections of urban heat waves

Zhonghua Zheng, Lei Zhao ✉ & Keith W. Oleson

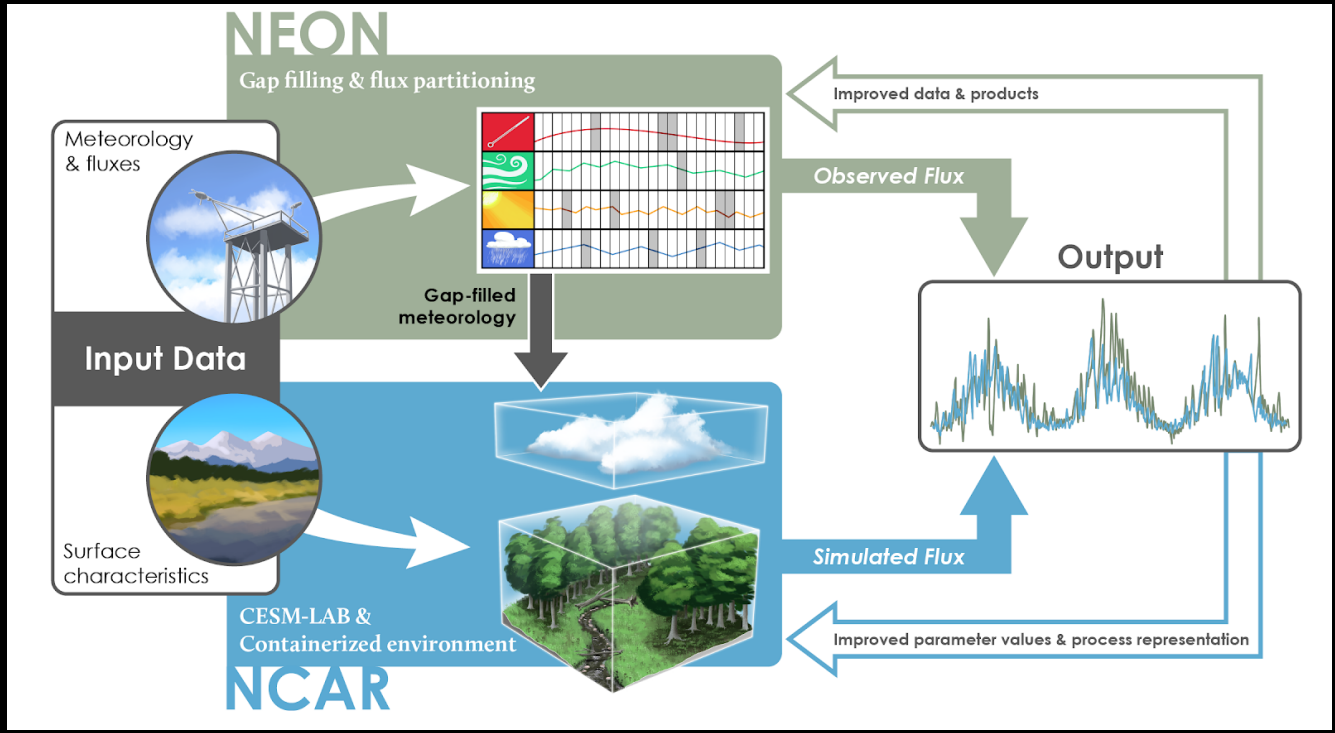
Nature Communications **12**, Article number: 3736 (2021) | Cite this article

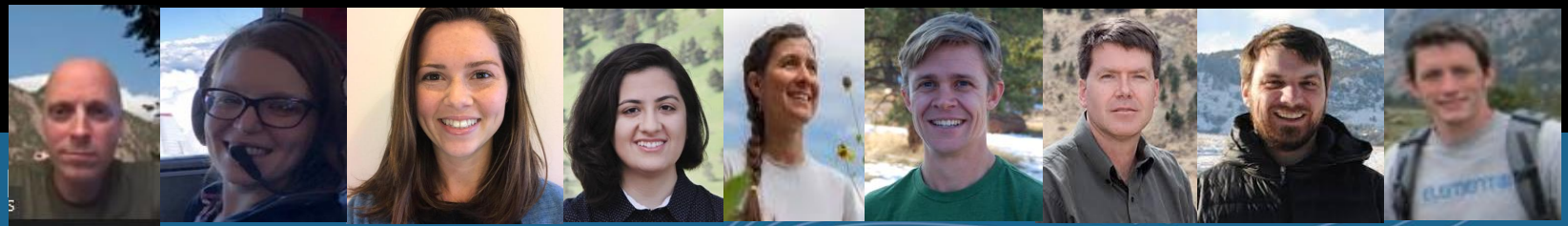
CLM Urban model
+
CESM2-LE
+
CMIP models
Urban Heat Wave Intensity

Changes in urban heat wave intensity by 2061–2070



NEON Observations
+
Improved Infrastructure
+
Cloud & Container
+
Tutorials & Visualizations
+
Expanded Data (PRISM)
+
New Functionality (FATES)
+
May 2023 Workshop













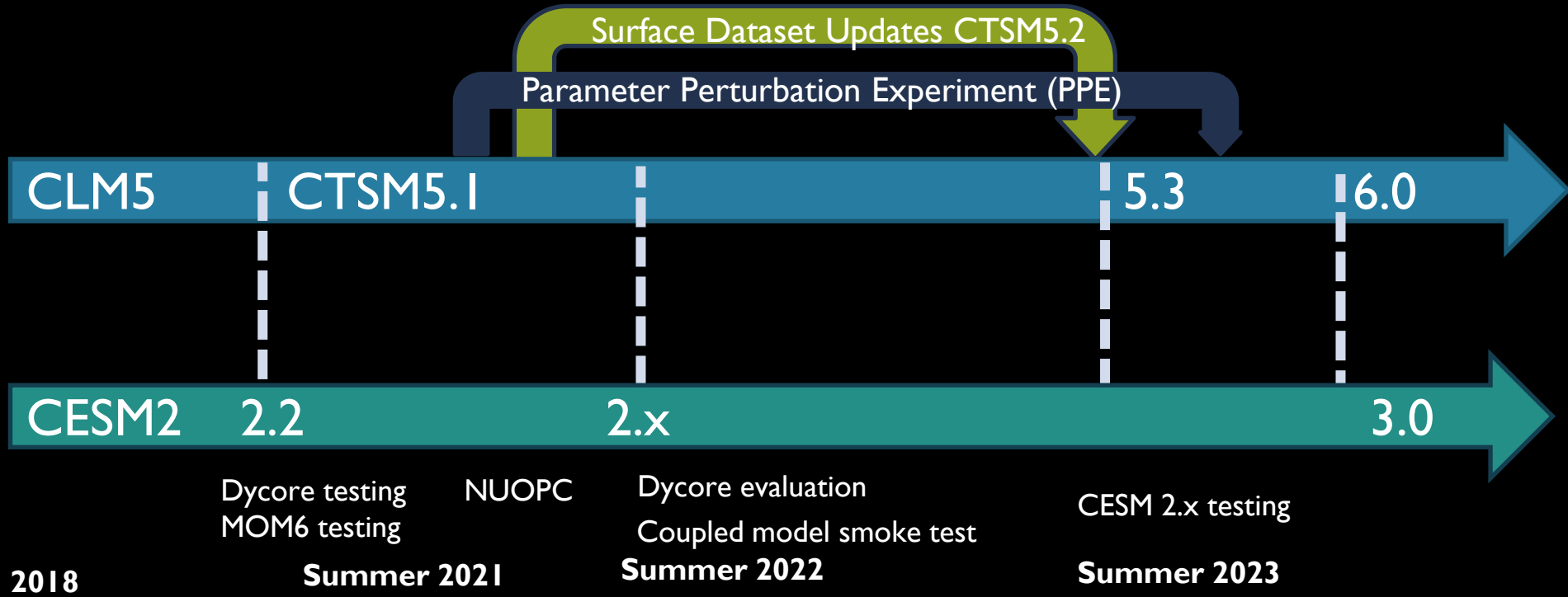




NCAR
UCAR

LMWG Wins

CESM-LMWG Development Timeline



CTSM6 Development Goals

Atmospheric Fluxes

- Dust emissions [Danny Leung]
- BVOC emissions from MEGANv3.1 [Hui Wang]
- Ozone deposition [Danica, Adrianna Foster, more]
- Lightning fluxes from CAM? [Dave Lawrence]
- Surface roughness [Ronnie Meier, Keith Oleson]
- Multi-layer canopy [Gordon B, Sam L, Keith O]

Hydrology

- Representative Hillslope model [Sean Swenson]
- mizuRoute [Naoki Mizukami & Erik Kluzek]
- SNICAR snow albedo updates [Cenlin He]
- Excess Ice [Matvey Debolskiy]

Ecosystems & Biogeochemistry

- **FATES fixed biogeography, no competition & other simplified configurations** [Rosie, Charlie Koven, Jackie Shuman, Adrianna Foster & more]
- FATES LULCC and C-based wood harvest
- MIMICS soil BGC model [Will, Sam L, Keith L]
- DOM production & transport [Marius Lambert, Dev]

Crop Model

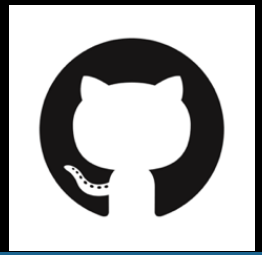
- Crop phenology, planting dates, & more[Sam Rabin]
- Create Pasture Land Unit [Sam Rabin]?
- APSIM crop phenology [Bin Peng & Bill Sacks]

Features

- Parameter Perturbation Experiment [Daniel Kennedy, Dave Lawrence, & Katie Dagon]
- NEON simulations [Danica, Will, Negin, Teagan]
- Simple Land Model, SLIM [Marysa Lague, Erik K.]
- Updated surface dataset [Sam L + many more]
  - Dynamic Urban + datasets [Keith Oleson]
  - Shifting cultivation [Peter Lawrence]
- Using CRU-JRA as datm input? [Will, Keith, Daniel]
- CLASP [Meg Fowler]?
- Simplified enthalpy fluxes [Dave, Keith, Sean]?

Notes

- Projects are relatively independent
- Some features may only be available for particular compsets.



CESM-LMWG Timeline, Goals, and Priorities

Surface Dataset Updates CTSM5.2

Parameter Perturbation Experiment (PPE)

CLM5

CESM2 2.

6.0

3.0

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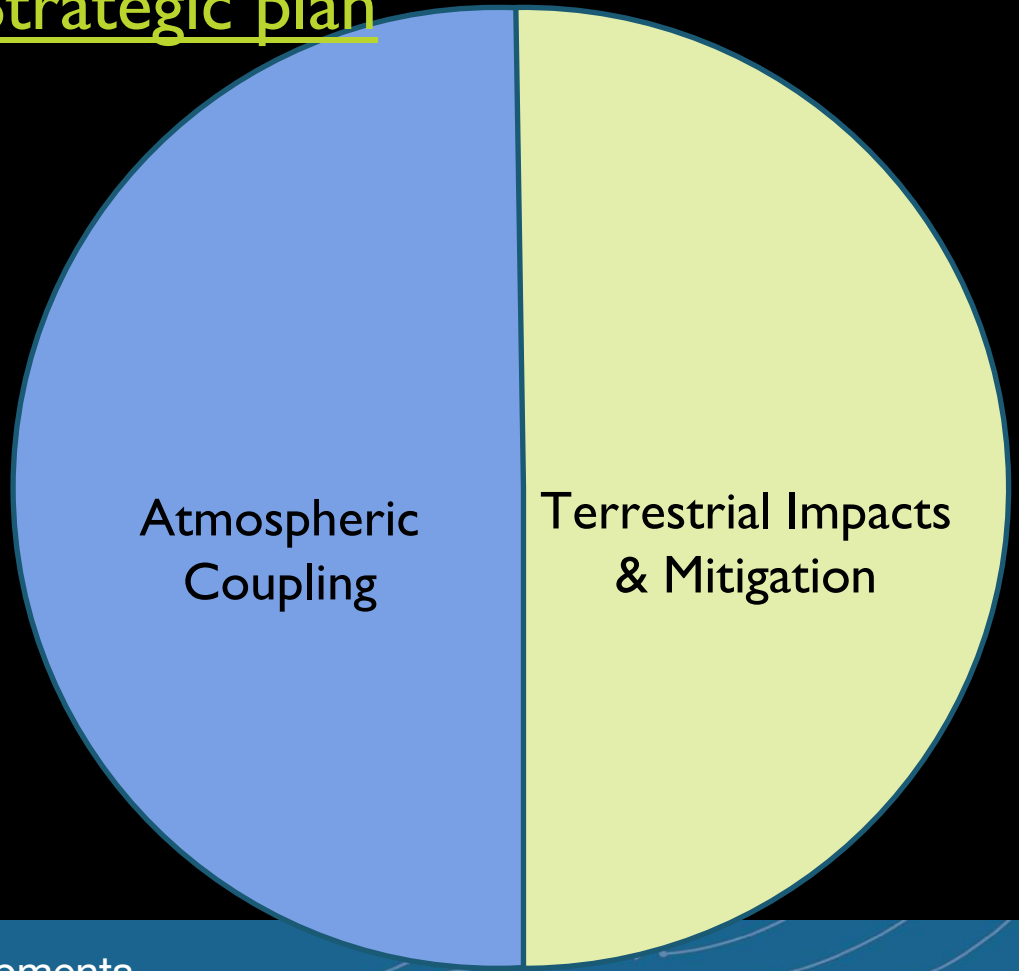
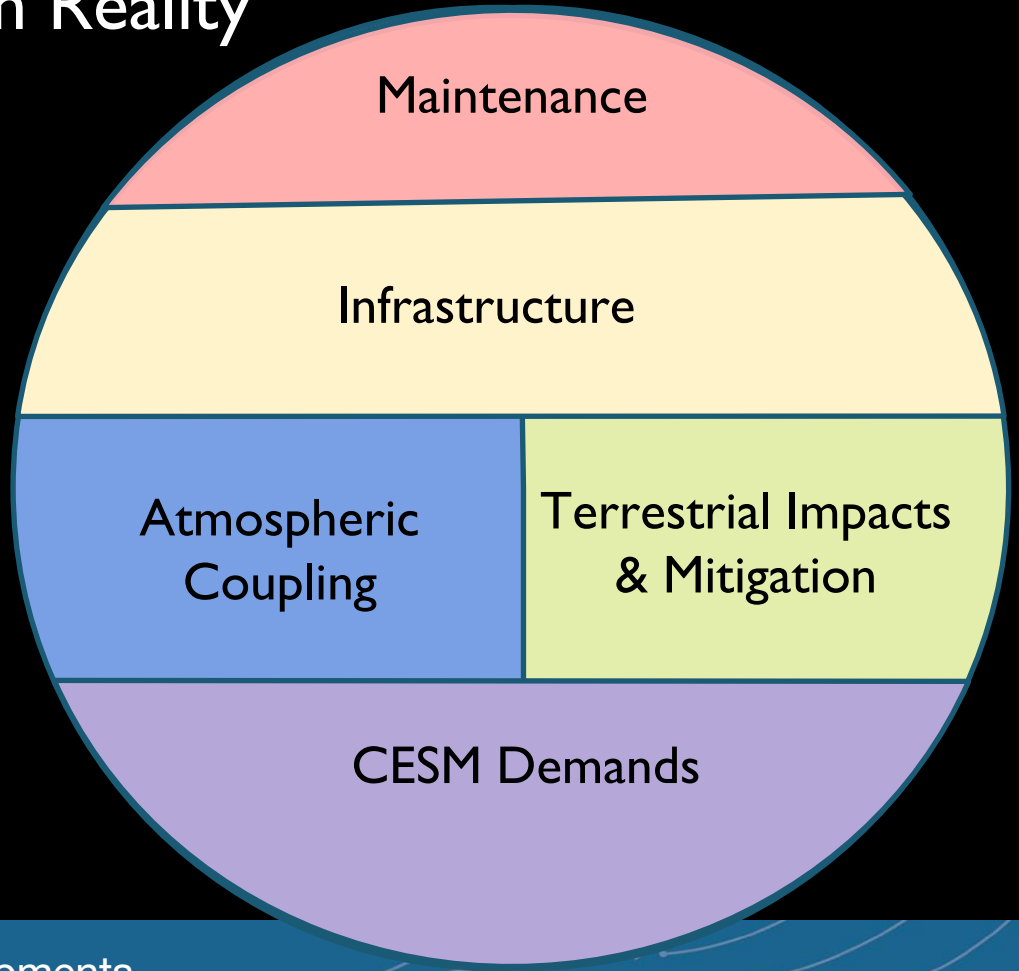
LMWG focus areas: Strategic plan



LMWG focus areas: In Reality

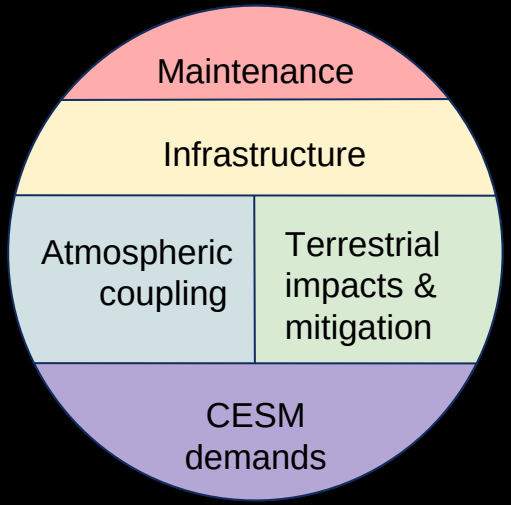
- ✓ This is very hard
- ✓ We're actually really good at it!
- ✓ We can also do better



The CESM LMWG will prioritize developments that:

Address LMWG focus areas:

Meet expectations for new pull requests



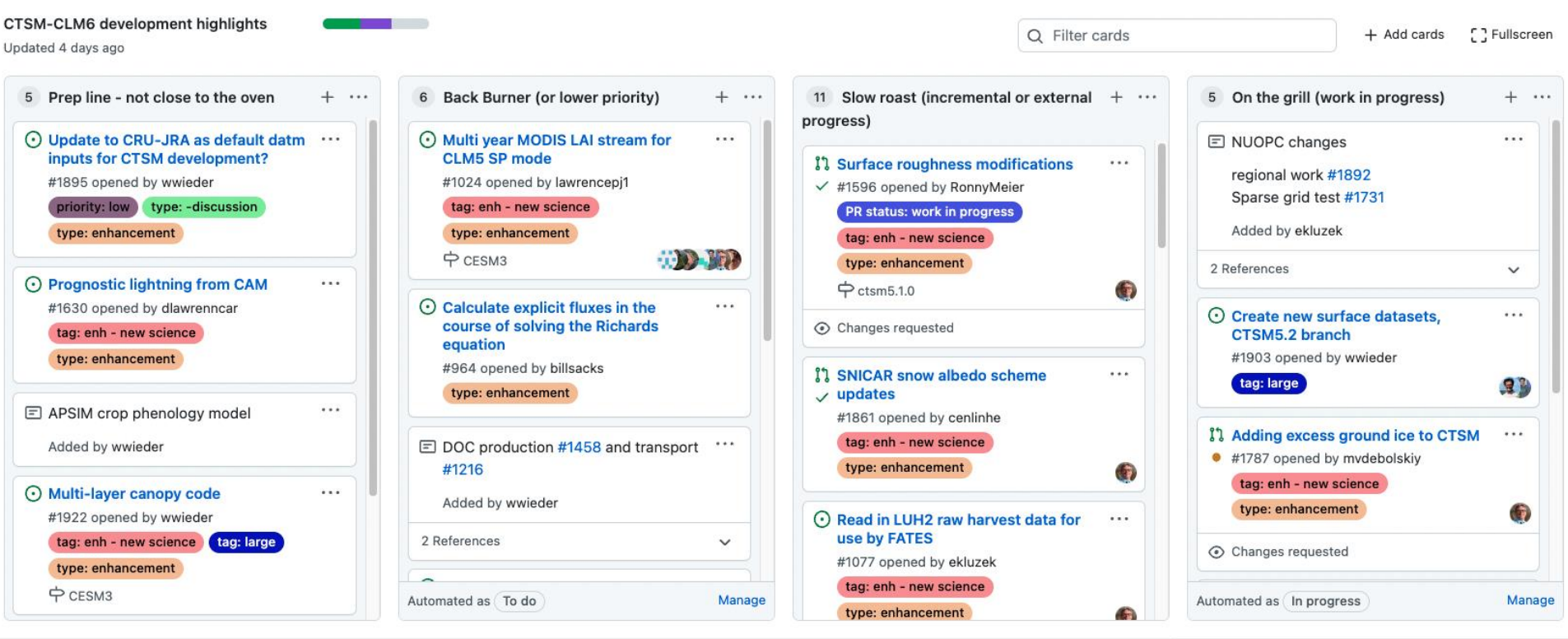
Additional criteria & practical considerations

- More mature & easier to integrate
- Broader benefits to CTSM and CESM communities
- Augment LMWG resources
- Timing of availability (students / postdocs / visitors)
- Encourage frequent communication with CTSM-SE team and LMWG co-chairs

Project priorities should be reviewed quarterly at the CLM science or TSS meetings

NOTE: This is an area that is tricky and we should spend some time clarifying.

CTSM6 Project Board



LMWG Andrew Slater Award

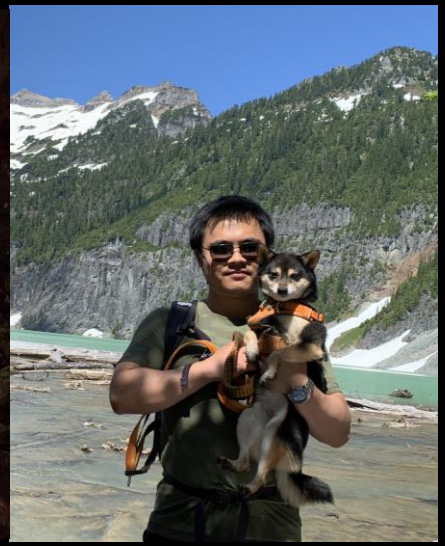
Drew was a key member of the LMWG community who brought a deep dedication, understanding, and joy to his research, which he shared with everyone around him. Winners of the Slater award make meaningful contributions to the LMWG including:

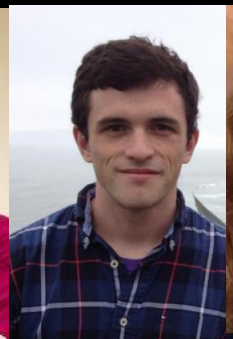
- Creative applications of the model;
- Significant model development activities;
- Identifying major issues, biases, or gaps in CTSM; and a
- High level of engagement with the LMWG

LMWG Andrew Slater Award

2023 ??
2022 Claire Zarakas
2021 Yue Li
2020 Leah Birch
2019 Katie Dagon
2018 Marysa Laguë

Yifan Cheng
Inne Vanderkelen
Jessica Needham
Meg Fowler
Daniel Kennedy

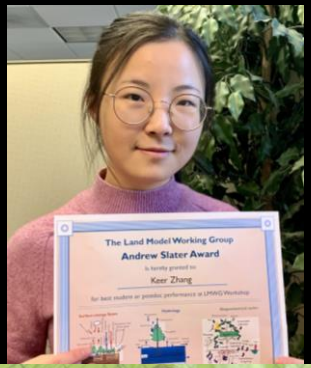



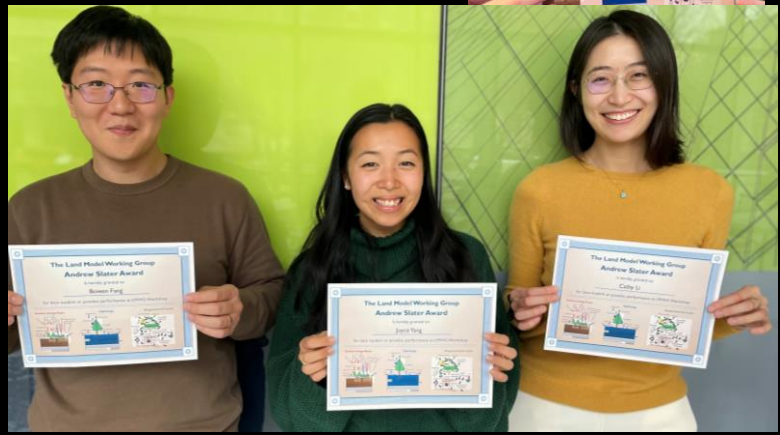






LMWG Andrew Slater Award

2023	Joshua Rady	CLM-U team: Bowen Fang, Cathy Li, Joyce Yang, Keer Zhang
2022	Claire Zarakas	Yifan Cheng
2021	Yue Li	Inne Vanderkelen
2020	Leah Birch	Jessica Needham
2019	Katie Dagon	Meg Fowler
2018	Marysa Laguë	Daniel Kennedy





Thank you!