

Session 1: High and Variable-Resolution Modeling

Q1. Which paleo processes or science questions would benefit from the higher atm/land resolution of regional VR? Which from the higher ocean resolution?

VR is most useful for improving precipitation over regions of complex terrain (perhaps for paleo, VR can help better interpret proxies from mtn regions)

resolving upwelling zones & associated impacts

Q2: What VR grids are you interested in having supported with CESM3 (Current grids supported: CONUS, ARCTIC, ARCTIC-GrIS)?

Himalayas VR grid

Q3. What CESM future (and past) configurations best fit your paleo research goals, i.e HR, VR, or LR resolution; regional or global; length of simulation?

Please engage!

1. Raise your hand in Zoom
2. Jamboard: https://bit.ly/cesm_pwg_2023

Session 2: Water Isotope Modeling

**water tagging
capability in
the land
component of
iCESM3**

**Why would
iCESM3 fit
your research
better than
iCESM1?**

**isotopes could help
us better
understand
convective
processes in iCESM3
due to higher
possible resolution**

**Develop 1 or 2 degree
grid with LGM
configuration for
CESM3! Very helpful
for continuing the
accessibility of
paleoclimate in future
development of CESM**

**Newer versions have
better mean states
of simulated clouds
and cloud radiative
effect, it might be
more superior at
simulating water
isotopes as well**

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Session 3: Vegetation Modeling

Q1: What are the limitations and challenges of vegetation modeling in CESM(CLM) for paleoclimate?

CN spin up in CLM4 can be a challenge and has potential bias/issues

The plant functional types in CLM are based on modern plants that do not always have direct analogs for paleoclimate (e.g. pre-Cenozoic intervals)

Soil composition affects vegetation modeling -- how should we handle this uncertainty for paleo cases?

Modeling the co-evolution of vegetation and precipitation in regions where they are highly codependent (e.g. N. Africa Green Sahara)

How allocation varies depending on environmental conditions and C-Sink

underestimating rainfall in the continental region

Q2: How can we start using FATES for paleoclimate research?

Perhaps offline simulations with high/low CO2

No competition mode of FATES, so you have each PFTs with own patch and not excluding any. Prescribed biogeography mode may also work well, PFTs in given locs

Q3: What is the best paleo-case for testing FATES and studying the vegetation feedback?

Pre-Industrial

C4 grass expansion during the late Miocene

Boreal forest and fire interaction

Green Sahara - but always hard to separate biases...

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Session 4: Ocean Biogeochemical Modeling

Q1: What are the major roadblocks for paleo-application of BGC & fast spin-up?

unknowns/poorly constrained components of BGC in the past is a challenge

NK solver developments occurring in MOM and may need some work using with POP

if LGM configuration will be released with CESM3, this could also help other users have an example of how to apply CESM3(MOM6) to other paleoclimate (if BGC included)

Q2: How can we develop & improve these capabilities? What are the required resources?

Personnel requirement for LR model development and tuning

Maintain lower resolution model configuration in future versions of CESM

Q3: What time period / science question would be the best starting point?

K-Pg of course

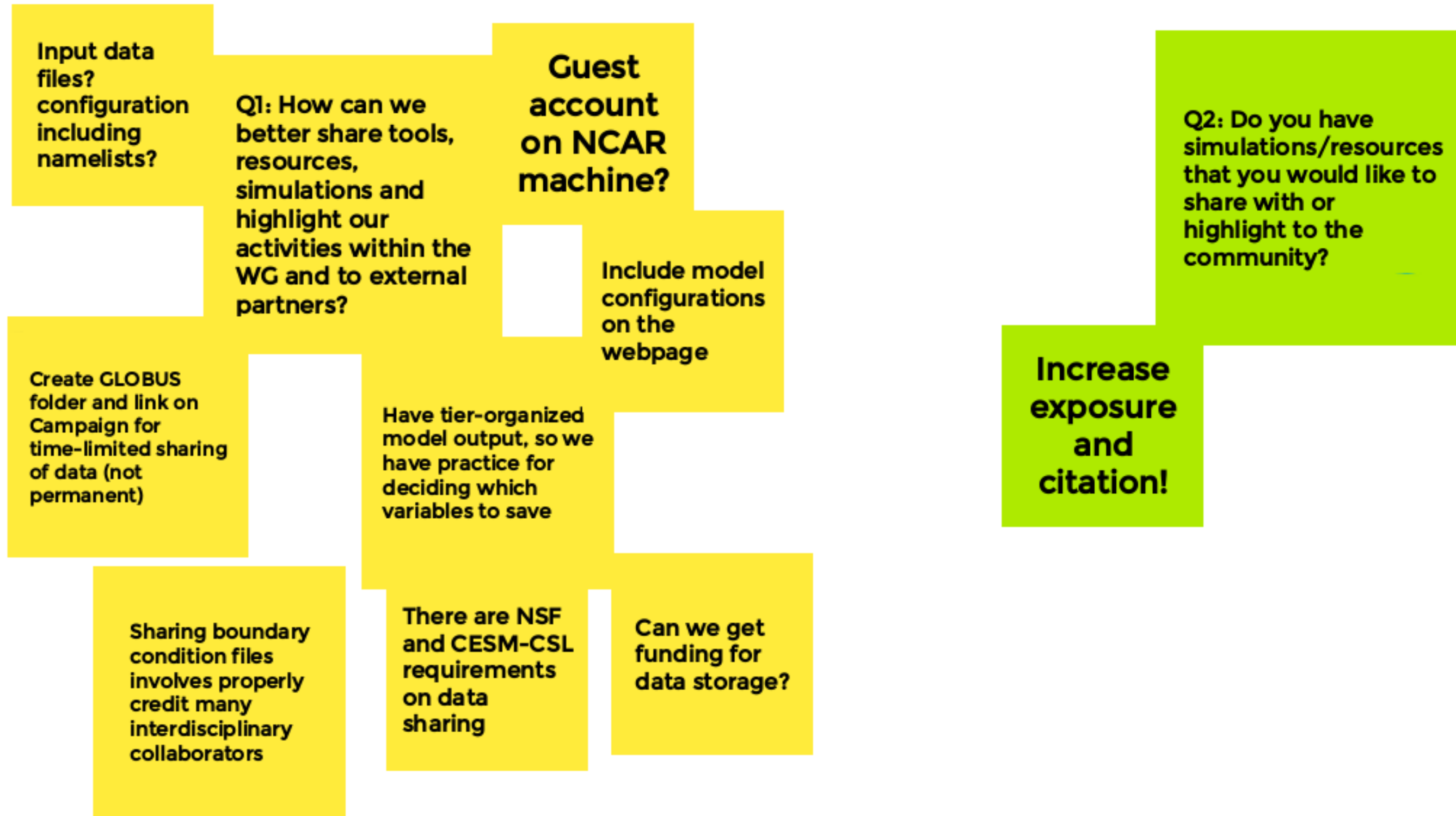
Pliocene

PETM?

LGM? Deglacial stadial/interstadials? more records could be available for comparison

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Special Session: Organizing and Sharing WG and Community Resources



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