

Here we value respectful dialogue, please...

WELCOME!



CESM EARTH SYSTEM PREDICTION WINTER WORKING GROUP MEETING

Wednesday, February 22 2023

* All times are MST; **Speakers:** please leave 5 min at the end of your slot for questions.

Time	Topic	Speakers
	JOINT WITH CVCWG	
9:00	Welcome	Co-chairs
9:05	Mechanisms of Multi-year ENSO predictability	Nathan Lenssen
9:20	Assessing future ENSO predictability using perfect model analogs in large ensembles	Dillon Amaya
9:35	Characterizing Nonlinearities in CESM2 ENSO Dynamics using Machine Learning Technique	Jakob Schloer
9:50	ENSO forecast skill in a changing climate	Jiale Lou
10:05	Is ENSO predictability limited by the Atlantic?	Steve Yeager
10:20	BREAK	
10:40	Increase in MJO Predictability Under Global Warming	Danni Du
10:55	Investigation of skill of the ECMWF-S2S real-time precipitation forecast during the 2020 and 2021 boreal summer monsoon seasons	Eniola Olaniyan
11:10	Subseasonal prediction skill from atmospheric, ocean, and land initial states	Yaga Richter
11:25	Land surface initializations contribute most to the sub-seasonal soil moisture forecast skill	Yanan Duan
11:40	Impact of stochastic parameterization on S2S forecasts	Judith Berner
11:55	CESM2(WACCM6) forecast of the February 2023 SSW	Nick Davis
12:05	LUNCH	
1:15	Evaluating skill in predicting the IPO in initialized decadal climate prediction hindcasts in CESM1 and E3SMv1 using a small set of start years	Jerry Meehl
1:30	Predictability of tropical Pacific decadal variability and associated oceanic mechanisms	Xian Wu
1:45	Predictable Decadal Forcing of the North Atlantic Jet Stream by <u>Sub-Polar</u> North Atlantic Sea Surface Temperatures	Kristian Strommen

2:00	Physical Insights from the Prediction of Atlantic Multidecadal Variability in CESM1 using Explainable Deep Neural Networks	Glenn Liu
2:15	Dynamical forecasts of coastal upwelling in the California Current System	Dillon Amaya
2:30	Co-chairs update and wrap-up discussion	Co-chairs
3:00	ADJOURN	

ESPWG: Co-chairs Update

Winter WG Meeting 2023

Jadwiga (Yaga) Richter, Stephen Yeager, Kathy Pegion



22 February 2023



ESPWG Datasets

<https://www.cesm.ucar.edu/working-groups/earth-system-prediction/>

- CESM1 **Subseasonal-to-Seasonal (S2S)** reforecasts
 - Richter et al (2020), *W&F*, Data in IRI SubX library
- CESM1 **Seasonal** reforecasts
 - 10-member, 12-month ensembles initialized monthly (1st of month 1980-2010)
 - NMME (<https://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME/.NCAR-CESM1/>)
- CESM1.1 **Decadal Prediction Large Ensemble (DPLE)**
 - 40-member, 122-month ensembles initialized annually (Nov. 1st 1954-2017)
 - Ref: Yeager et al., 2018 (doi:[10.1175/BAMS-D-17-0098.1](https://doi.org/10.1175/BAMS-D-17-0098.1))
- CESM2 **S2S** reforecast sets (CAM6)
 - 11-member, 45-day ensembles initialized weekly (2000-2020)
 - also, weekly real-time S2S forecasts
 - Ref: Richter et al., 2022 (doi:[10.1175/WAF-D-21-0163.1](https://doi.org/10.1175/WAF-D-21-0163.1))
- CESM2 **S2S** reforecast sets (WACCM6)
 - 5-member, 45-day ensembles initialized weekly (Sep - Mar, 1999-2020)
 - Ref: Richter et al., 2022 (doi:[10.1175/WAF-D-21-0163.1](https://doi.org/10.1175/WAF-D-21-0163.1))
- CESM2 **Seasonal-to-MultiYear Large Ensemble (SMYLE)**
 - 20-member, 24-month hindcasts initialized quarterly (Feb, May, Aug, Nov 1970-2019)
 - Ref: Yeager et al., 2022 (doi:[10.5194/gmd-2022-60](https://doi.org/10.5194/gmd-2022-60))
- CESM2 Decadal Prediction (**CESM2-DP**) hindcasts
 - 10-member, 122-month hindcasts initialized annually (Nov. 1st 1958-2020)
 - extensions of SMYLE-NOV

ESPWG Datasets

<https://www.cesm.ucar.edu/working-groups/earth-system-prediction/>

- CESM2 **S2S** perturbed initialization experiments
 - Ref: Richter et al., 2023 (in prep)
- CESM2 **SMYLE** TBI CoEx pacemaker experiments
 - preliminary set of TBI-ATL-FEB hindcasts complete
- CESM2-DP
 - NOV-init from 1958-2022
 - expanded ensemble size (to 15 from 10)



ESPWG CSL Allocation (Nov 2022 - Oct 2024)

	Year 1	Year 2
Development	5M	17.2M
Production	17.4M	7.4M
Total	22.4M	24.6M

D1: S2D sensitivity studies (1.5M, 1.5M)
 – ocean ic spread, land initialization

D2: S2D CESM3-beta (0M, 3.2M)
 – test S2D hindcasts using CESM3

D3: S2S CESM3-beta (0M, 4.6M)
 – test S2S hindcasts using CESM3

D4: DA-CESM2 (0.6M, 0.6M)
 – test benefits of initialization using DA

D5: S2D-bias (2.9M, 7.3M)
 – explore online bias correction methods (including ML)

P1: S2S-2023 (0.6M, 0M)
 – extend S2S realtime forecasts through OCT 2023

P2: S2S-2024 (0M, 0.6M)
 – extend S2S realtime forecasts through OCT 2024

P3: S2S-LABO (3.7M, 3.2M)
 – rerun S2S set with “land all-but-one” initialization method

P4: S2D-2023 (1.2M, 0M)
 – update SMYLE & CESM2-DP to include initializations through NOV 2022

P5: S2D-2024 (0M, 0.7M)
 – update SMYLE & CESM2-DP to include initializations through NOV 2023

P6: CESM2-DP (8M, 0M)
 – expand CESM2-DP ensemble size to 15 from 10

P7: TBI SMYLE Pacemakers (3.5M, 0M)
 – {ATL, PAC, IND}-FEB with 10-mem, 12-mon, 1982-2021

P8: TBI Decadal Pacemaker (0M, 2.9M)
 – CESM2-DP as control
 – 1982-2020 (every other), 10-mem, 5-year

P9: VolRes-RE (0.44M, 0M)
 – contribute to WCRP-SPARC/DCPP Volcanic Readiness Exercise

ESP-Lab

- Goal: Community-developed toolkit for efficient interactive analysis of initialized prediction ensembles

<https://github.com/CESM-ESPGW/ESP-Lab>

The screenshot shows the GitHub repository page for CESM-ESPGW/ESP-Lab. The repository is public and generated from the ncar-xdev/python-project-template. The main content area displays a list of files and folders with their respective commit messages and dates. The sidebar on the right provides information about the repository, including its description, license, and contributors.

File/Folder	Commit Message	Commit Date
.github	update ci.yaml to include check on PR	last month
ci	Update environment.yml	29 days ago
docs	add regional average sst index skill tutorial notebook	20 days ago
esp_lab	Update data_access.py	22 hours ago
tests	Update test_data_access.py	22 hours ago
.gitignore	ignore DS_store	2 months ago
.pre-commit-config.yaml	Initial commit	3 months ago
.prettierrc.toml	Initial commit	3 months ago
CHANGELOG.md	Update CHANGELOG.md	7 days ago
LICENSE	Initial commit	3 months ago
MANIFEST.in	change xdev-project to esp-lab	3 months ago
README.md	Add conda link	2 days ago
codecov.yml	Update codecov.yml	27 days ago
environment.yml	click=8.0 updates to avoid dask failures	2 days ago
pyproject.toml	Initial commit	3 months ago



Open Discussion

Get Involved!

- Would like to see **more community involvement** in analysis of existing datasets, planning and setting up new experiments, & contributions to diagnostics
- Email: Yaga Richter (jrichter@ucar.edu) & Steve Yeager (yeager@ucar.edu)
Kathy Pegion: (kpegion@gmu.edu)