

January 22, 2025 Joint Methods & CI Working Group Call

Attendees: Dave Durden, Caroline Owens, Jody Peters, Chris Jones, Will Hammond, Brittany Barker, John Smith

1. EFI2025 May 19-22, 2025 Conference Updates; <https://bit.ly/efi2025>
 - a. Today is the submission deadline
 - b. Registration opens: February 14, 2025
 - c. Notes about workshop submission from the December call
 - i. Would like to have enough of a working example to introduce the spatial forecast challenge and let people know it is open to accept forecasts - could be a talk or a workshop to walk people through it
 - ii. Focal project right now is post fire recovery. But other spatial data of interest Would be good to discuss what things to extend this to in addition to LAI post burn and starting to think about code and data (sentinel, climate data, soil moisture datasets)
 1. Example of how we could extend the forecast challenge to other aspects of recovery. For example, Brittany and colleagues submitted USFS grant - proposed to develop decision support tool to model risk of tree mortality induced by beetles (western pine beetle focus to start with) - would like to use the infrastructure for this to provide framework
 - iii. Future ideas of implementing spatial forecast - GPP/NEE are also prime candidates for data sets. Would be useful for carbon credits and management implementation
 - iv. John planning to submit an abstract - not sure if we want to do an abstract for a talk or a workshop
 1. John to keep thinking about what will work best for the conference
 2. If workshop it would be to get people up and running to submit their own forecasts
 3. Think this would be more useful and would get people to jump into the spatial forecast
 4. Chris would be willing to help run the workshop
 - d. 2 example tutorials
 - i. Beetles Challenge forecast: <https://www.neonscience.org/resources/learning-hub/tutorials/neon-beetle-forecasting>
 - ii. NEON Challenge tutorial with aquatics example
 1. <https://github.com/eco4cast/NEON-forecast-challenge-workshop/tree/main>
 - e. Plan will be to create a tutorial similar to the Beetles challenge
 - f. Will emphasize that fire recovery won't be the only thing
 - g. Create simple forecast, compare to null models, will go over the different format of submission for a spatial challenge

- h. Share explanation of the null models and the way they are fitting
 - i. Visualizing scoring - this is where it is different from the
 - j. Share info about how a spatial forecast could be done in a course
 - k. Discuss differences between spatial forecasts and non-spatial forecasts
 - l. Where are we going in the future - have follow-up survey. What other processes would others like to have in a spatial forecast in the future
 - m. Do we need to share general background info on things like: ILAM benchmarking of site-specific model runs for C
 - n. How much development needs to be done before the conference?
 - i. Some of the null models (linear regression or single grid analyses) are good places to start
 - ii. Need to make sure that everything is begin scored properly and make sure GitHub actions is working so people can submit
2. GitHub action update
- a. GitHub actions seems to be working okay
 - b. When we pull satellite data, it can time out and that can throw errors
 - i. Dave can look at this with Will
 - ii. John has fixed it locally, Will will make the change on GitHub to see if we get past this error
 - iii. Is this just happening for the targets, but also going back in time
 - 1. The targets are fine because we are pulling one thing, but when we try to pull all the data since 2002
 - 2. Wonder if there is a way to store it and add to it when there is new data available - this would be a good change
 - 3. Getting it from the Planetary Computer - Microsoft's catalog
 - 4. Only concern is if we change a bounding box going back in time
 - iv. Don't have to worry about space right now, but if we go to a higher resolution product or add more fires then space may be a consideration
 - v. Currently have ~260 months and a 10x21 grid - don't necessarily need all of that, but it is the grid that encompasses the bounding box. It is pretty small all things considered.
 - vi. More efficient to store it then re-download it. Just need to be explicit about the spatial resolution and as long as that won't change. But if spatial resolution will change, then better to pull on the fly
 - vii. Other option is to go to a different catalog
 - 1. If we go to Google Earth engine, people would need to sign up for an account. Can be used for scholarly use, but would be closed to private individuals
 - 2. For a soft launch be explicit about the resolution
 - 3. Brittany has a cron job that downloads and clips the Earth data (<https://www.earthdata.nasa.gov/>) and stores on the server, could share that code if it is helpful

- a. We are using the MODIS LAI - need to look it up to see if it is in the Earth data.
 - b. Brittany can help with this
 - c. We've talked about switching to another data product since MODIS will be phased out soon
- viii. If we were to store data and update it every once in a while, it would be easier to pull from 2 sources and aggregate. Could keep the historically MODIS data and aggregate the new data as it comes in
- ix. If MODIS data was reprocessed it will be announced and flagged and we would have a lot of heads up
- c. Scoring functions were written last summer. They have been tested on small scale, but need to test on large scale
 - i. This is John's primary focus
- d. How is the data stored for the spatial forecast?
 - i. We archive target files used in forecast creation
 - ii. Use ingest planetary function to grab data, fit null model and store model performance and underlying parameters. We are currently only archiving targets - not the data used to train the models
- e. For the other forecasts - the forecast weather data is being stored

3. RFPs:

- a. [ESIP Lab RFP](#) (closed June 17, 2024) - \$20K; if they have an RFP in 2025, it might be worth considering. The 2024 priorities were no climate resilience and
 - i. Priority for projects focused on: Data management, analysis or visualization tools, or data-informed storytelling related to climate change and community resilience - following the principles of [open science](#) are strongly encouraged
 - ii. Proposals related to the following were also given consideration
 - 1. Extension of open sources software critical to collecting, distributing, fusing, or analyzing Earth science data
- b. [SERDP: Advancing Wildfire and Prescribed Fire Forecasting and Assessment Tools](#); released Jan 7, 2025
 - i. Objective: Demonstrations are sought of tools that forecast wildfire activities and prescribed fire opportunities at Department of Defense (DoD) Installation-relevant spatial scales for time horizons of 1-10 years. Demonstrating the accuracy and efficacy of wildfire and prescribed fire forecasts beyond the current operational year is necessary for improving the management of wildfire risks and optimizing the application of prescribed fires to meet military mission needs. Specific objectives include:
 - 1. Incorporating fire environmental conditions from weather-to-climate forecasting to assess wildfire exposure and prescribed burn windows.

2. Demonstrating proficiency in forecasting wildfire conditions for extremes in fire weather, such as drought, extreme thresholds of energy release components, excessive heat, etc., at 1-10 year time horizons.
 3. Demonstrating accuracy of modeling against past fire activities.
 4. Demonstrating accuracy of modeling prescribed burning windows using 1-10 year weather-to-climate forecasting tools.
 5. At no less than annually, incorporating high spatial resolution inputs of past fuel and vegetation conditions to forecasting future hazards.
 - ii. Brittany has a SERDP grant and watched presentations about this grant, so if anyone wants to move forward with this, she is willing to collaborate and share what she has learned.
 - iii. This is for FY2026
 1. SERDP has pre-proposal (5 pgs). If this is accepted then will be asked to submit a full proposal
 2. John has example 2 page from his EPSCoR so could re-tool that if it fits
 - iv. The importance for SERDP is that the work is on Dept of Defense lands or at least close
4. How is setting up the GitHub actions and adding the 2 parametric models for the spatial forecast going? (Will H/John)
- a. <https://github.com/eco4cast/modis-lai-forecast/>
 - b. What to still think about to get it up and running
 - i. What format do we want to archive submissions - having a spatial component may make it differently then the current standards
 1. Mike thinks the geotiff should fit with the EFI standard, but if it doesn't that will be good feedback
 - ii. For null and parametric functions - John needs to write some intermediate data processing functions to get the data pulled from NASA without his computer timing out.
 - iii. For scoring - think we are good there.
 - iv. Mainly need to work on storing results from null models
 - c. Will and Dave had connected on the GitHub actions. Figured out the dependency docker issues. Now working on the workflow. Also had some issues with timing out. John shared some code that Will can try out to see if it will work.
 - i. Does GitHub actions have hard limits on ingest planetary data function?
 1. Chris said - there is a 6 hour time limit
 2. It loses connections and then will just enter NANS
5. Any updates about incorporating other LAI products to replace MODIS

- a. Landsat harmonized with Sentinel-2 option - Dave was going to work on getting the data into the function already in the repo - this is as raw bands. Still need to calculate LAI from Landsat
 - i. <https://planetarycomputer.microsoft.com/dataset/storage/hls>
 - ii. Dave - how did this go as you were prepping for AGU?
 - 1. Hasn't incorporated it into the function yet.
 - 2. Previously tried to add Sentinel-2 in hdfm format, but the other hdf5 format should be easier
 - 3. Brittany is also working with the SMAP in the hdf5 format. Was an issue with the intallation of gdal not being recognized.
 - 4. Dave will give it a shot to resolve the issue in the new year.
- 6. Any additional thoughts since the last call about options for additional fire sites and how the site history can inform hypotheses to test with the challenge
 - a. Brittany, did you find any additional sites with long term fire histories?
 - i. Yes. Did GIS analyses to look at fire histories at NEON sites and other long term sites (see Table on next page)
 - ii. Did spatial join of Justin's wildfire and NEON's sites - tallied the sites per year and by size and earliest
 - iii. Talladega National Forest had most fires, other top sites are Disney Wilderness, Santa Rita, LBJ Grasslands
 - iv. All the locations have recent fires
 - v. Additional places to consider adding: Several locations in Colorado, Wyoming, and New Mexico have recently had very large fires, such as Pike National Forest (e.g., Hayman and Waldo Canyon Fires), near Grand Junction (Pine Gulch Fire), Medicine Bow NF in WY (Mullen Fire), and the Gila NF in NM (e.g., Silver, Black, Whitewater-Baldy). These are also relatively dry forest ecosystems.
 - b. Side note from SERDP meeting in DC - has some ongoing awards that are specifically on wildfires

| siteID | siteName | state | n_fire_yrs | av_fire_km2 | earliest_yr | latest_yr | field_dominant_nlcd_classes |
|--------|--|-------|------------|-------------|-------------|-----------|---|
| TALL | Talladega National Forest | AL | 18 | 52.342968 | 1999 | 2020 | Deciduous Forest Evergreen Forest Mixed Forest |
| DSNY | Disney Wilderness Preserve | FL | 14 | 48.504342 | 1984 | 2012 | Pasture/Hay Woody Wetlands |
| SRER | Santa Rita Experimental Range | AZ | 12 | 214.897271 | 1960 | 2018 | Shrub/Scrub |
| CLBJ | LBJ National Grasslands | TX | 11 | 41.883456 | 1996 | 2019 | Deciduous Forest Grassland Herbaceous |
| GRSM | Great Smoky Mountain National Park, Twin Creeks | TN | 11 | 32.72719 | 1920 | 2016 | Deciduous Forest Evergreen Forest |
| SJER | San Joaquin | CA | 11 | 18.222906 | 1950 | 2020 | Evergreen Forest Grassland Herbaceous Shrub/Scrub |
| SOAP | Soaproot Saddle | CA | 9 | 5.822705 | 1932 | 2020 | Evergreen Forest Shrub/Scrub |
| ONAQ | Onaqui | UT | 8 | 67.774086 | 1986 | 2020 | Evergreen Forest Shrub/Scrub |
| KONZ | Konza Prairie Biological Station | KS | 6 | 34.868609 | 2013 | 2018 | Deciduous Forest Grassland Herbaceous |
| MLBS | Mountain Lake Biological Station Additional TOS Boundary | VA | 5 | 8.898438 | 2007 | 2017 | Deciduous Forest |
| KONA | Konza Prairie Biological Station | KS | 3 | 2.749077 | 2014 | 2018 | Cultivated Crops |
| BONA | Caribou-Poker Creeks Research Watershed | AK | 2 | 24.0199769 | 2004 | 2016 | Deciduous Forest Evergreen Forest Mixed Forest Woody Wetlands |
| DEJU | Delta Junction | AK | 2 | 29.903834 | 1999 | 2006 | Evergreen Forest Shrub/Scrub Woody Wetlands |

7. Proposal Options

- a. John - submitted preproposal for EPSCoR RII (research infrastructure improvement) to Montana State!
 - i. NSF deadline is April 8

- b. Brittany - NASA A.60 Earth Action Ecological Conservation and Forecasting Funding
 - i. **NASA is seeking proposals for projects that apply a combination of three components: NASA Earth observations (defined in Section 3.2.1), *in situ* biological observations (see Section 3.2.2 for examples), and ecological models to develop decision-support tools in ecological conservation and management.**
 - ii. More details on the specific scope and call are available [here](#).
 - iii. Full details available on NASA NSPIRES [here](#).
 - iv. Notices of intent are requested by February 14, 2025, and proposals are due March 14, 2025.
 - v. Note that there are virtual meetings for potential proposers on Friday, November 15th (13 PM Eastern Time) and Monday, January 13th (1-3 PM Eastern Time) so these will be good to keep in mind as well.
 - vi. Brittany is thinking about submitting a proposal about invasive species and SMAP - still considering what biological datasets to use