

## January 19, 2024 Joint Methods & CI Working Group Call

Attendees: John Smith, Brittany Barker, Emma Mendelsohn, Bruce Wilson, Saeed Shafiei Sabet, Cole Brookson, Quinn Thomas, Chris Jones, Cole Brookson, Carl Boettiger, David Durden

Regrets: Jake Zwart

Agenda/Notes:

1. Announcement: Abstracts due for the EFI 2024 conference in 2 weeks on Feb 1
  - a. Details about the conference and links to abstract submissions and registration are on the conference webpage: <https://bit.ly/efi2024>
  - b. RMetS is accepting submissions for the joint Special Issue: **"For a future informed by science at the climate-ecology interface"** in *Meteorological Applications* and *Climate Resilience and Sustainability*. The deadline has been extended to August 29 so anyone can submit manuscripts, but also to allow people attending the conference to consider submitting manuscripts.
  - c. Details about the Special Issue: <https://rmets.onlinelibrary.wiley.com/hub/journal/14698080/call-for-papers/si-2022-011060>
  
2. Project Updates: Forecasting Wildfire Recovery Using MODIS Leaf Area Index (LAI)
  - a. Background - wanted to develop a spatially explicit forecast that could be used with the NEON Forecast Challenge cyberinfrastructure. Started this discussion at the EFI Unconference held in summer 2023. And decided to work on wildfire recovery
    - i. This is a prototype for working with spatial data and for managing large datasets in geotiff format instead of the csv/netcdf format that had already been developed for the Forecast Challenge
    - ii. Here is the example of the standard Forecast Challenge CI: <https://github.com/eco4cast/neon4cast-ci> wanted to replicate this and apply to a spatial example for this project. This repo has workflows with GitHub actions that do tasks automatically - it gives a modular way to see what actions need to take place which we can use to check off what is done for the modis-lai spatial forecast example
    - iii. We are using the [STAC](#) framework - spatial temporal assets catalog - this allows for the Challenges to be discoverable
  - b. GitHub repo: <https://github.com/eco4cast/modis-lai-forecast/>
  - c. TERN example to use as reference: <https://projects.ecoforecast.org/tern4cast/>
  - d. Tasks to set up GitHub Action Workflow: <https://github.com/eco4cast/modis-lai-forecast/issues/10>
  - e. Check in with John - how is the parametric scoring going?
  - f. Any more thoughts about submitting a proposal?

- g. Went over David's pull request for target generation;  
<https://github.com/eco4cast/modis-lai-forecast/pull/14>
  - i. Spatial targets so far is focused on the August Complex fire boundary, but this can be updated
  - ii. Bounding box and mask layer are used to incorporate area around the fire
  - iii. Want to think about if we want to run at a different temporal resolution - right now it is run at the first of the month
  - iv. Extracting metadata from the read step - the tooling won't pay attention to it
  - v. Site ID is ID of the whole polygon?
    - 1. Haven't defined conventions. Right now it is just a name from the Cal Fire ID column
    - 2. Good to consider to pull names from the database from Justin Welty if the fire is in there
      - a. Fed government gives specific names for the fires so will want to use that
      - b. What fires does Justin's database use?
      - c. Will want a range of fires - so people can have examples of places that have recovered from fires and other places were recently burned and can be forecasted
      - d. With MODIS we don't get many pixels with the fires - gets to the question of do we get to an interesting ecological scale with the target data. Should we consider other data sources for fire recovery - will be good to connect with practitioners to know what target data is most useful ecologically
      - e. Different stakeholders making different decisions will also influence what is most useful - managers dealing at the state level vs the local level
      - f. Good to present this at meetings or reach out to people to get feedback early
      - g. Want to make concrete questions to bring to managers and have concrete actions for next steps for the group
      - h. Some fires in Justin's database have had repeat fires, so may be useful for model validation or calibrating the models
      - i. Would be good to have a subtask force to dive into the data to find those repeat fire areas
      - j. Would be great to have a list of types of disturbances and would be great to have someone tell us how many fire burns in a site we want
    - 3. We need people developing forecasts
      - a. The experience from the beetles theme is that there were a number of people interested in the design of the theme, but

- no one submitted to the theme. Don't need everyone to submit, but want to have forecasts that are getting submitted by someone
- b. What would be submitted - forecast submitter would be submitting a geotiff(s) for LAI for a month - what you think the LAI will be for the next month in that fire polygon.
    - i. If there is a pipeline, Brittany would be willing to do so
  - c. Opportunity - someone can have an idea of how they would create a forecast. Write it in words on how to forecast LAI in a month - state the process and others in the group can help set up the code to work on it
  - d. John is planning to submit forecasts
  - e. Majority of the work will be pulling in the data and pushing it through the models once the model structure is set up
  - f. If we have a couple of examples that show the code it will make it easy for people to swap in
4. David's question about the targets
    - a. File organization question
      - i. How do we know if it an ensemble forecast, or how do we know that someone has submitted a mean and SD as two different tiffs?
      - ii. What about if you are submitting the mean and SD as 2 bands in one tiff and if submitting ensemble that is multiple tiff?
      - iii. Targets will be project-id [spac4forecast - tells which Challenge], duration [ISO duration - P1M] , variable [LAI], site-id[fire polygon], date[]
        1. Polygons could be anything for insect death, any polygons that can get added to the database
      - iv. Forecasts: project-id [spac4forecast - tells which Challenge], duration [ISO duration - P1M] , variable [LAI], model-id, site-id[fire polygon], reference-date[], ensemble
    - b. Have people look at the repo. Will merge David's PR and then will work on John's scoring
    - c. Another task to work on is building a dashboard
    - d. Next time - discuss putting in a grant application to support this work
  5. Emma has a pull request for handling merge for submissions
  6. John is working on a piece on a forecast for a benchmark example

- a. John's model is the icar model - analog of the random walk. Still needs to check with Chris about spatial expertise to make it more efficient
    7. John's grad student is working the parametric scoring
    8. From Bruce: Part of my thought is that we generate subsets for about 3400 sites around the world. It's not hard to add to this list, but our cutouts are fairly small — 7 km x 7 km.  
<https://modis.ornl.gov/sites/>
  - h. Who will be the primary end-users? Any luck contacting other folks at USGS and beyond?
    - i. Currently figuring out the infrastructure and science questions for the proof of principle, but want to keep this question in mind.
    - ii. May want to work on this in parallel to get feedback as we go
    - iii. There will be ways to swap out things such as the source data set and the infrastructure will continue for the forecast CI to work
3. This is for reference: Resources from Justin Welty's visit on the November call (see full list of notes from the call in the link to the Nov calls above)
- a. Databases and tools mentioned
    - i. [Geodatabase of wildfires](#)
    - ii. [Wildfire Fire Trends Tool](#)
    - iii. [Land Treatment Exploration Tool](#)
    - iv. [RAD framework](#)