

November 17, 2023 Joint Methods & CI Working Group Call

Attendees: John Smith, Jody Peters, Alex Chubaty, Brittany Barker, Carl Boettiger, Justin Welty, David Durden, Emma Mendelsohn, Quinn

Regrets: Jake Zwart

Agenda/Notes:

1. Introductions and welcome Justin Welty (USGS)
2. Discuss Justin's [geodatabase of wildfires](#) and the [Wildfire Fire Trends Tool](#) and what Justin sees as important components for forecasting fires and fire recovery
 - a. Thoughts from Carl that could help guide the discussion
 - b. One immediate need of the challenge is to have a catalog of burn-area polygons we can use to add "sites" to the challenge -- sites around the US (or the world) spanning various vegetation types during the years covered by MODIS (i.e. 2002 - present).
 - c. Access to recent fire polygons is key, since we really want people to focus on forecasting the actual future. We've currently relied on the CalFire database, which is fantastic, but would love to look beyond just California.
 - d. Brainstorm more broadly about this spatial forecast challenge
 - i. What is most useful and interesting?
 - ii. The current prototype has focused on LAI recovery, rather than predicting burns, with the idea being that it's a bit more driven by somewhat predictable ecological processes than trying to predict fire onset, but really we're open to anything!
 - iii. Maybe we want a bigger spatial area and do fire risk maps? (all our forecasts and scoring are probability-based).
 - e. Notes from the call
 - i. Justin's work
 - ii. Land treatment digital library
 - iii. Conservation efforts database - tracking land treatments, Public and private efforts
 - iv. Fire dataset
 1. Get fire boundaries to put plots on the ground and now how many times an area has burned
 2. Existing datasets had issues
 - a. Need to go back further in time
 - b. Geographic limitations - ID, CA have good records, other states do not
 - c. Duplicate polygons
 - d. Geospatial accuracy, projection issues
 - e. MTBS - monitoring trends in burn severity
 - f. Polygons are not all created equal - some with generic boundaries, others with well defined boundaries

- g. Points were not always at the start of the fire location and some times were not even within the fire boundary
- 3. Needed something to compile all the fire records, clean up duplicates, combine all the attributes across datasets, QA/QC, wanted to automate it and fill in gaps of well recorded/non-digitized records, used tiers to process the polygons to get the best defined boundary and still bringing in all the data for the area from the other datasets
- 4. Even with the issues, have the most complete and most user friendly records of fire available
- 5. 2 polygon datasets
 - a. Merged and combined datasets
 - b. Merged has duplicate polygons
 - c. Combined cleaned up Merged to try to have 1 polygon per year
- 6. Dataset runs from 1860 to 2020. Hope to update the dataset very soon
 - a. Hope to expand to include some Canada and some Mexico fires as well in the next version
- 7. Date is not an easy to interpret field because there is uncertainty in the date field.
- 8. Warnings - data pre-1984 is not great, much information is missing. But nice to be able to look at some of the historical fire records at different times.
- 9. Try to create data visualizations for users so they can run with it
- v. Hope to have the updated dataset come out this winter/next spring
- vi. Satellite vs on the ground records and how to match
- vii. What latency to update the data on a regular basis after getting caught up
 - 1. Hope is yearly
 - 2. Fire community doesn't require getting fire polygons in until the middle of the following year. Won't have 2023 fire data confirmed until the middle of 2024.
 - 3. Landsat burned area dataset - try to use computers to map burn scars on the landscape. Don't work with this one because it has a 25% false positive error rate. That was too high of an error rate
- viii. What are ways we can make the Challenge most interesting to the larger scientific community, management decisions, long term use?
 - 1. We have started with looking at recovery.
 - 2. Reburning is a challenge for looking at recovery
 - 3. What spatial scale would be useful?
 - 4. Talk with Matt Germino (<https://www.usgs.gov/staff-profiles/matthew-j-germino>) - Park and Rangeland in Boise. Fire restoration specialist. Monitoring how to

- predict if a site will recover or not. Focuses on one to two spots. So may limit landscape level response.
5. Recovery depends on where you are at - amount of precip, past vegetation. Drought forecasts is helpful. Soil is important - cheatgrass modifies soil and makes it hard for natives to recover. Heatload of soils - composed of latitude, slope, aspect. This is hugely predictive in terms of vegetation recovery. The hotter/drier slope the harder to get things to grow. Topographic issues have major influence. In the west it is very patchy.
 6. Want to get at with the Challenge - the Challenge can be a tool to predict the patchiness. Don't expect to answer the questions directly, but want to design it so that the community can use the tools to broaden it to the landscape level.
- ix. Infrastructure side of things discussion
1. Big move to cloud native geospatial analysis
 2. Think there is an educational value of the Challenge to introduce students/scientists to these spaces.
 3. Democratize data source - for us that is sharing the forecasts and the processed targets
 4. What are the formats and tools used
 5. Justin is a big fan of interactive data tools - both for users who are good with R, Python, ArcGIS and those who are not
 - a. Nice to have visualizations for people to work with.
 - b. Think long game - how to make it easy for people to interact with the materials
 - c. How to teach users how to use the data properly - how to encourage them to read the metadata
- x. Wildfire Trends Tool - way to visualize the wildfire dataset
1. Uses tableau - it is slower than wanted right now because it has to be preprocessed rather than on the fly
 2. Fire rotation, fire frequency
 3. Interested in incorporating other pieces into the Wildfire Trends Tool
 - a. Once the Forecast Challenge is set up - could be nice to include that in this Tool
- xi. [Land Treatment Exploration Tool](#) - another tool Justin is working on
1. Planning tool to allow users to get info from their site
 2. Included a drought forecasting tool in that
 3. Recovery model might fit really nicely with that
 4. Most treatments are post-fire treatments
 5. [RAD framework](#) is big right now- resist, adapt, direct - how to figure out which sites to rehab and which sites to let go
- xii. The Forecasting Challenge could be a great tool to help managers figure out what areas to direct funds to for successful recovery and to know

what areas to now put in treatments but just leave alone since it will not be successful

3. We didn't get to this during the call. We'll circle back to it in December. Other Project Updates: Forecasting Wildfire Recovery Using MODIS Leaf Area Index
 - a. GitHub repo: <https://github.com/eco4cast/modis-lai-forecast/>
 - b. TERN example to use as reference: <https://projects.ecoforecast.org/tern4cast/>
 - c. Tasks to set up GitHub Action Workflow: <https://github.com/eco4cast/modis-lai-forecast/issues/10>
 - d. Check in with
 - i. John - random walk model and parametric scoring
 - ii. Emma - tiff submission and validation checks
 - iii. Dave - target generation
 - iv. People can claim GitHub issues - <https://github.com/eco4cast/modis-lai-forecast/issues/10>
 1. Select an issue from the list in the link above and save it as its own issue
 2. Carl is happy to help get people set up as they work through GitHub Action questions
4. Other Updates
 - a. CI Workshop Proposal Update (Jake, Jessica, Chris);
 - i. Goal: Identifying and filling gaps in CI/Methods for forecasting. Bringing together people from gov't agencies, academia, and private sector/NGO
 - ii. Invitations have gone out for the April 10-12, 2024 meeting.
 - b. Standards Manuscript Update - Mike checked and returned the page proofs so it should be coming out soon