Predicting Summer Wildfire Activity in Alaska Using Seasonal Forecasts at a 3-month Lead

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Motivation
• Peak of Alaskan fire season (1 Apr. – 30 Sep.) usually in June-late July
• Summer 2019 had two anomalous and costly late season fires in August
• With an increase in temperatures, fire season is expected to be longer with enhanced fire activity and rising fire suppression costs
• Canadian Fire Indices (Buildup Index) used by fire management community to evaluate fire likelihood and related to largest acres burnt (Partain et al. 2015, Ziel et al. 2020)

Application: 2020 Outlook Example
• All models predicted below average BUI for most of fire season, but still in middle tercile
• Based on observations:
  - 2020 was a very low fire season
  - Peak occurred end of May
  - Observed BUI were in lower tercile for all subspecies except wind-driven

Data and Methods
Studying three seasonal forecast models: NOAA CFSv2, ECMWF SEAS5, and MétéoFrance Sys. 6/7

• Use March forecasts from seasonal forecast models to prepare fire season outlook
• Calculate daily forecast Buildup Index (BUI) as given by Canadian Forest Fire Weather Index System at Predictive Service Area (PSA) level for each model
  - Duff Moisture Code (DMC) and Drought Code (DC)
  - Temperature, precipitation, and relative humidity
  - Moisture of how much fuel is available to burn
• Compare to daily observations from station data aggregated over PSAs in Alaska for fire season from 1994 to 2019
• Use reconstructed data sets in daily BUI calculations
• Separate model BUI and observed BUI into terciles: upper, middle, lower
• Ex: Models did not capture the second peak in 2019 season for Kenai Peninsula (Fig. 5)

Forecast Skill
• ROC curves and corresponding ROC skill scores for the upper tercile BUI values for PSA AK14 (Kenai Peninsula) for the entire fire season (1 April – 30 September) for each seasonal forecast model.

Summary & Next Steps
• Seasonal forecasts have potential to provide outlook for Alaska boreal wildfire season
• Combine models into MME and evaluate forecast skill
• Continue working with fire managers to determine best practices to communicate information and what information is useful

References
De Groote, W. 2004: Interpreting the Canadian forest fire weather index (FWI) system, technical reference paper.

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