

Use of Climate Predictions for Fire, Smoke, and Forest Management

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Climate forecasts are becoming increasingly used when making fire, smoke, and forest management decisions, especially for planning and timing of prescribed fire treatments, resource allocations for upcoming fire seasons, and responding to environmental regulations such as air quality and regional haze standards. However, the applicability and uncertainties inherent of climate forecasts for these applications are not well understood within these management communities. The Fire and Environmental Research Applications (FERA) Team of the USDA Forest Service is currently working on several projects focusing on trying to quantify and improve the uncertainties of forecasts for land management, as well as creating forecast products tailored for particular management questions.

The use of climate forecasts for fire and smoke management present interesting challenges for climate prediction as critical periods of interest are relatively quietest hot/dry spells during summer as opposed to the traditionally focus of comparatively energetic winter storms. Additionally, the critical variables, such as relative humidity recovery at night, are subtle and not amenable to accurate forecasting. Further complicating use of climate forecasts in this arena is the need to downscale forecasts to give spatially localized forecasts down to extremely fine (order 5km) scales in complex terrain. Finally, fire and smoke management requires having accurate forecasts of statistics of daily values, such as length of time since last rain, instead of month summaries, due to the large difference in fire potential between rainfall that is spread evenly in a month versus rainfall that occurs at the beginning of the month followed by a dry spell. Working closely with a variety of research groups, the National Interagency Fire Center Geographic Area Coordination Centers, and the fire, smoke, and forest management community itself, FERA is currently working on a number of projects centered on providing tailored forecasts and estimates of forecast uncertainty for use in fire, smoke, and forest decisions. These include: examining the statistical relationships between climate variables and dry lightning occurrence; examination and comparison of various statistical and dynamical downscaling techniques; and uncertainty estimations of fire behavior predictions and climate predictions for 2018 and 2064 currently being used in federal, state, and local implementation plans responses to the new EPA regional haze rule. We hope that by presenting this work here we can continue to build communication between the climate and the land management communities.