Fire Danger Applications of NCEP's Downscaled CFS Forecasts

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The US National Centers for Environmental Prediction (NCEP) are currently making global spectral model (GSM) and regional spectral model (RSM) seasonal forecast ensemble forecasts. These forecasts are initialized and forced with the NCEP Climate Forecast System (CFS). In particular, an ensemble (3 prior to Oct. 2004, 10 thereafter) of 7-month global and US regional forecasts are now being made for every month beginning 1982 to present. These meteorological forecasts drive the US National Fire Danger Rating System (NFDRS), which is basically a collection of standard indices, including: Ignition Component (IC), Energy Release component (ER), Burning Index (BI), Spread Component (SC), and the Keetch Byram drought index (KB). The Fosberg Fire Weather Index (FWI), which is a simplified form of the BI, has been previously used not only for the US but also for other global regions and has also been included here. The forecast NFDRS indices are initialized from an initializing and validating set of NFDRS indices, which are developed from short 1-day RSM forecasts and observed precipitation. As will be shown, all of the fire danger indices can be predicted well at weekly times scales and there is also significant skill out to seasonal time scales over many US West locations. The most persistent indices (BI, ER, and KB) tend to have the greatest seasonal forecast skill although, FWI, ER and BI tend to be better related to observed fire characteristics such as fire counts (CN) and acres burned (AC). RSM forecasts tend to be mostly superior to GSM forecasts, which are mostly superior to persistence forecasts. These forecasts thus may be useful for the USFS and other fire communities, which need long-horizon and high-resolution fire danger forecasts for resource allocation and community preparedness.