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## Development of a flash drought intensity index

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Flash droughts are characterized by a period of unusually rapid drought intensification over sub-seasonal time scales that often take vulnerable stakeholders by surprise given their rapid onset. Various studies have shown that flash drought is more likely to develop when extreme weather conditions persist over the same region for several weeks or longer. Though precipitation deficits over some period of time are a prerequisite for drought, their presence alone is unlikely to lead to flash drought because a lack of precipitation is only one of several factors that contribute to rapid drought development. When below normal precipitation occurs alongside other extreme weather anomalies such as intense heat that enhance atmospheric evaporative demand, their co-occurrence can lead to a rapid depletion of root zone soil moisture content due to increased evapotranspiration. This in turn can lead to a rapid increase in vegetation moisture stress and the onset of flash drought conditions.

Several recent studies have used quantitative definitions based on rapid changes in a given drought monitoring dataset to identify flash droughts in the climatological record. Here, we build upon these recent studies by developing a new flash drought intensity index that accounts not only for their rapid rate of intensification, but also for how severe the drought conditions become during and after the period of rapid intensification. The method includes two components that together capture the suddenness of flash drought development (faster intensification corresponds to a more severe flash drought) and the actual drought severity after the rapid intensification period ends (severe drought conditions lasting for a longer period correspond to a more severe flash drought). The motivation behind this method is the desire to account for both the “flash” and “drought” aspects of flash drought because both of these characteristics influence how people view flash droughts. Thus, a metric that considers both of these aspects provides a more comprehensive assessment of flash drought intensity and its impacts on the environment. In this talk, we will present the proposed flash drought intensity index methodology, along with results

from individual case studies and a 40-year climatology to illustrate its use.