Geophysical Research Letters

Supporting Information for

A Scalable Framework for Post Fire Debris Flow Hazard Assessment Using Satellite Precipitation Data

Elijah Orland[a,b], Dalia Kirschbaum[b], Thomas Stanley[a,b]
[a] University of Maryland Baltimore County, GESTAR II, Baltimore, Maryland, United States of America
[b] Earth Sciences Division, NASA Goddard Space Flight Center, Greenbelt, Maryland, United States of America

Contents of this file:

State	Staley et al (2020) Reported Geometric Mean	Median RI of DF Inducing Storm via IMERG Late Run
California	0.85 (N = 201)	3 (N = 109)
Arizona	3.1 (N = 41)	< 1, Median Proportion of Min Yearly Max Intensity: 0.19 (N = 12)
Colorado	0.6 (N = 33)	< 1, Median Proportion of Min Yearly Max Intensity: 0.31 (N = 14)
New Mexico	0.8 (N = 35)	< 1, Median Proportion of Min Yearly Max Intensity: 0.45 (N = 15)

Table S1. RI data comparison for the storms within the model training dataset. To calculate RI values within the IMERG Dataset, we use the following equation:

$$RI = \frac{n+1}{r}$$

Where *n* is the number of years on record (~20), and *r* is the rank of the annual maximum value closest to the observed peak intensity for a given storm. The spatial extent of these calculations varies based on the size of each fire perimeter, and all values are aggregated on a state-by-state basis. This is to provide a direct comparison with one of the aggregation methods used by Staley et al (2020). Ranks are determined in descending order such that the year with the highest annual maximum is given a rank of 1. For example, a given storm intensity value closest to an annual maximum with rank 10, the corresponding RI will be

$$2.1\ yrs = \frac{20+1}{10}$$

As such, RI values are only approximated here to calculate the return period of the closest ranking storm. This is an intentional decision given that replicating the extensive methodologies of the NOAA Atlas 14 products goes beyond the scope of our study. Thus, we instead opt to provide simple, approximate values which still allow for a general comparison with the results of Staley et al. (2020).

For all states except California, the median return period of DF-inducing rainfall was less than 1, such that the storm peak intensities did not exceed the even lowest ranked annual maximum value. We still provide some context by reporting the median proportion, or ratio, between the recorded storm peak intensity values and the lowest annual maximum value. For example, a median proportion value of 0.5 indicates that after dividing all recorded peak intensities by their corresponding lowest ranked annual maximum intensity values, the median of these fractions is 0.5.

The results of these comparisons show significant variance, which is reflective of the limited data available for the calculation of only approximated RI values. As such, it is hard to draw broad conclusions with the exception that RI values from the IMERG dataset suggest rainfall recorded during the storm periods associated with DF events appear to be routine events—a similar conclusion to that of Staley et al. (2020). This is an important conclusion, as it shows IMERG derived intensities roughly align with the trends observed in gauge records.