AN ABBREVIATED FLASH FLOOD CLIMATOLOGY (1994-2007) FOR THE WFO BLACKSBURG, VIRGINIA COUNTY WARNING AREA

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The Blacksburg, VA NWS Forecast Office has flash flood forecast and warning responsibility for a County Warning Area (CWA) that includes 40 counties across Southeast West Virginia, Southwest Virginia, and Northwest North Carolina. There is a rapid increase in elevation from southeast to northwest, starting from less than 500 ft MSL in the Piedmont, to mountainous terrain of 3,200 to 5,000 ft MSL in the higher elevations of the Blue Ridge and Appalachian mountains. A low level flow from the east through the south often produces an efficient moisture flux (Gulf of Mexico and the Atlantic Ocean), and can result in upslope enhancement to precipitation as well. Steep terrain and increasingly populated river valleys contribute to an overall significant flash flood threat over most of the CWA. The majority of homes and populated areas are along rivers and smaller streams, making the threat of damage and loss of life high, particularly in the small basins with steep slopes along and west of the Blue Ridge Mountains.

WFO Blacksburg first opened in 1994 as part of the National Weather Service modernization. With modernization, there was an increased emphasis on verification for Storm Data, published by the National Climatic Data Center (NCDC). Fourteen years of flash flood event data from 1994 to 2007 for the WFO Blacksburg CWA were studied, during which time there were 766 separate events reported. The impact description in Storm Data for each event was used to stratify all of the events by the severity of flooding. In order to classify the severity of flash floods listed in Storm Data, a Flood Severity Index (FSI) was developed based on the impact description for each flood, which often lists monetary damages as well.

The Blacksburg NWS has recently begun exploring methods for displaying local historical flash flood reports across the CWA, which includes superimposing the reports on high resolution geospatial information, as well as physiographic gridded datasets (land use, slope, forest density, and soil texture) interpolated to small stream basins. One of the goals of combining these geospatial datasets is to provide forecasters with a high resolution analysis of the most flash flood prone locations across the CWA. Another goal is to integrate this climatological information (past flash flood events and high threat basins) into decision support tools such as the Flash Flood Monitoring and Prediction (FFMP) application, so that climatology, precipitation estimates/forecasts and gridded flash flood guidance can all be used together.

This local flash flood climatological study provides forecasters with an improved understanding of the frequency, severity and geographical distribution of seasonal and diurnal flood events across the Blacksburg CWA, and will improve situational awareness and help enhance flash flood warning decisions for the protection of life and property.