

Figure S1: NWM short-range streamflow forecasts around the reference time during the flood event. The secondary Y-axis represents the NWM discharge values and the primary Y axis indicates the USGS gauge discharge. The dashed vertical line in blue represents the reference hour based on the peak of the USGS hydrograph.

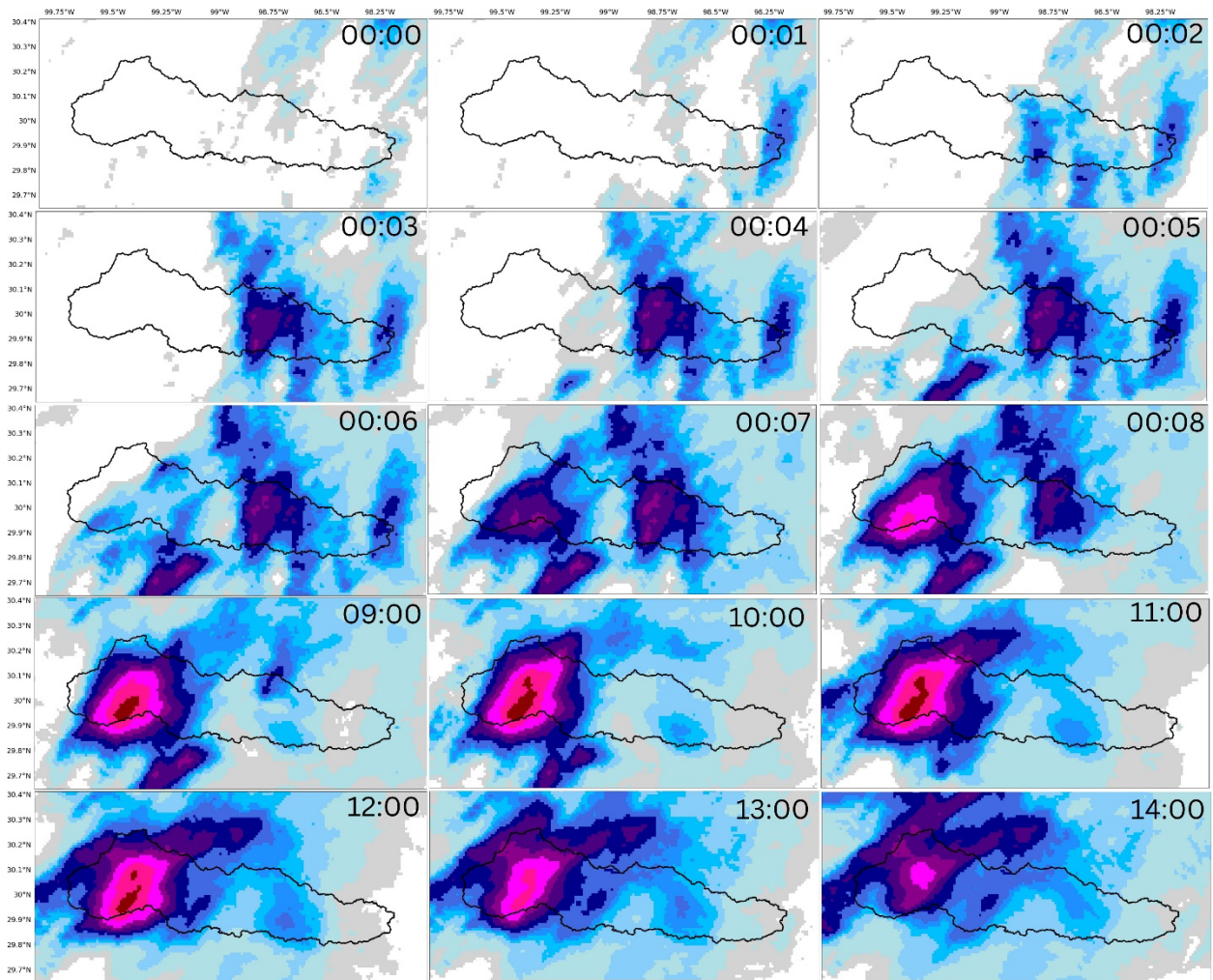


Figure S2: Showing the temporal evolution of six-hour precipitation accumulation from MRMS Pass 2 leading to the flash flooding event, with each subplot representing the six-hour accumulated precipitation up to the indicated hour from July 4th 00:00 to July 4th 14:00.

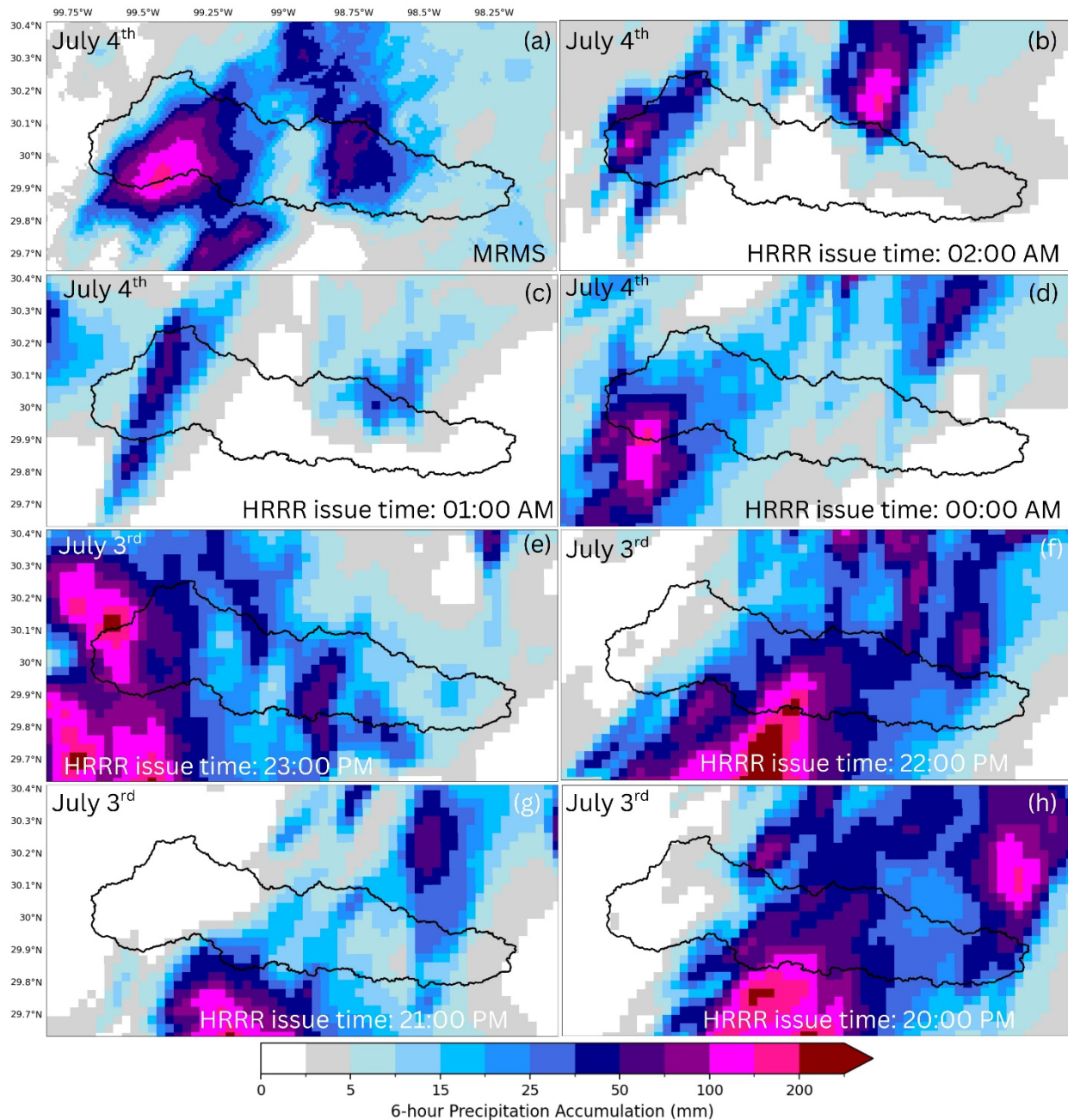


Figure S3: Comparison of six-hour rainfall accumulation at 8:00 AM derived from MRMS (1-km) Pass 2 observations and HRRR (3-km) forecasts issued at successive lead times, from 0 hour through 7-hour lead time. For hourly and cumulative evaluation of HRRR skill during the event, at different lead times, readers are referred to the MRMS versus HRRR evaluation framework described in Krajewski et al. (2025). (<https://visualriver.net/QPFversusQPE/>).

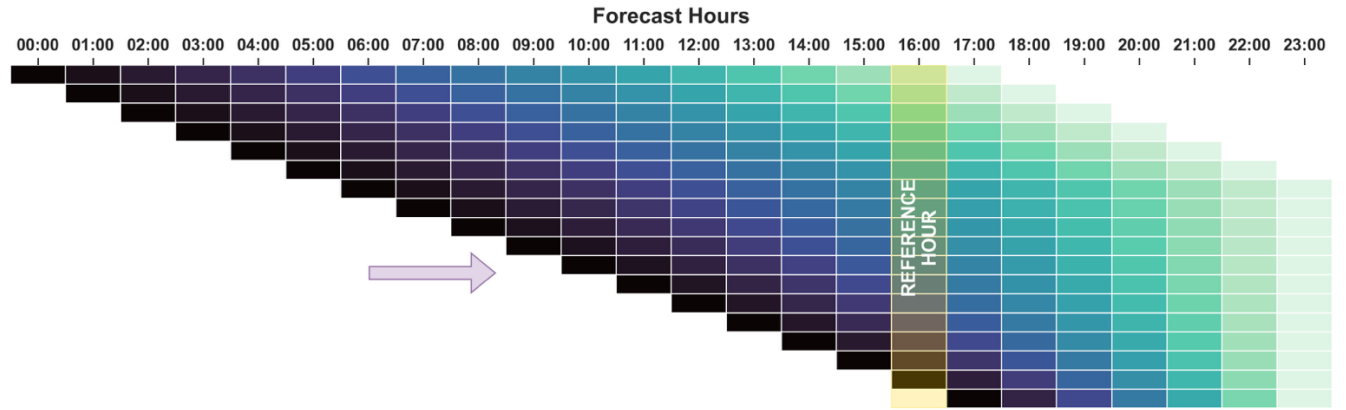


Figure S4: Conceptual illustration of vertical stacking of flood inundation maps at a reference hour using subsequent forecasts to obtain the maximum inundation extent. For reference, hour 16, forecasts initialized from hour 00 to hour 15 are aggregated.