# Assessing Persistent Flood Threat in GFE

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## Abstract

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GFE is used as a diagnostic tool that makes use of observed and near term model data to assess hourly flood threat and then persistent flood threat in the near term, 0 to 6 hours out. A procedure written for GFE is used to assess dynamics and moisture from near term, centrally and locally run model data, together with gridded basin flash flood guidance data, to determine the level of threat for flooding. The threat areas for each hour are assessed to see where the threat persists and to what degree.

Still in development, the smart tool written for use by this procedure looks at low, mid and upper level forcing. Low level forcing parameters assessed include convergence, moisture flux convergence and advection of convergence (negative divergence advection). Mid level forcing parameters include lift and deformation, while upper level parameters used include divergence and advection of convergence (negative divergence advection). The latter parameter in the low and upper levels is designed to catch slant-wise forcing, with upper level divergence downstream and low level convergence upstream. Additional parameters will be added, including considerations for shear type and degree.

Each forcing parameter is scaled to an index. The highest index is taken from each of the three levels, and then the middle of these three values becomes the dynamics index. An option for light flow is included that will enhance the dynamics index where and when the flow through the column is light, or below a certain threshold. For flow below the threshold, the enhancement increases as the flow becomes lighter.

Next, a moisture index is generated based on either precipitable water or precipitation efficiency, together with flash flood guidance. This index is highest wherever and whenever moisture content is highest and one hour flash flood guidance is lowest.

Finally, the “instantaneous” flood threat index is defined from the lower of the dynamics and moisture indices for a particular hour. A scheme is then employed to

arrive at a three-hour persistent flood threat index, highest where the indices for the three hours are highest.

The goal is to pin-point areas where high atmospheric moisture content, low flash flood guidance, and favorable dynamics intersect.  The threat for excessive rainfall should be greatest in these areas.  Examples of tool output in heavy rain situations will be presented.