

# **Regional climate index generation using pattern extraction from spatial precipitation data**

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As communities observe recurring regional weather patterns they will often ascribe colloquial names to them such as the Meiyu in East Asia or the Santa Ana winds of California. However, attaching quantitative characterizations to these same names often proves challenging. Heuristics have been developed for particular locations and particular weather phenomena, but their inherent subjectivity undermine the robustness of any subsequent quantitative analysis. To develop a neutral universal metric we start by observing that the spatial distribution of rain in a given region is in large part controlled by the complex interplay between the climate and the Earth's topography. Consequently each individual recurring weather pattern exhibits a unique regional signature/distribution. Leveraging these signatures and pattern extraction algorithms we've developed a generic method for constructing regional climatic indices which allow us to objectively gauge the presence of the weather phenomena. As a case study we use gridded precipitation data from NASA's Global Precipitation Measurement (GPM) mission (compiled in to the IMERG dataset) to look at annual and diurnal cycles in several regions of particular interest.

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