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Dual Peak Cholera transmission in South Asia: A Hydroclimatological Explanation

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Cholera has reemerged as a global killer with the world witnessing an unprecedented rise in cholera infection and transmission since the 1990s. Cholera outbreaks across most affected areas show infection patterns with a single annual peak. However, cholera incidences in the Bengal Delta region, the native homeland of cholera, show bi-annual peaks. The mechanisms behind this unique seasonal dual peak phenomenon in cholera dynamics, especially the role of climatic and hydrologic variables, are not fully understood. We disaggregate regional streamflow and sea surface temperature data into seasonal components, and analyze their correlation with the two seasonal peaks in Bangladesh cholera incidence records. Low flow in the Brahmaputra and the Ganges during spring is associated with inward plankton transport from the ocean and the first cholera outbreaks of the year. Peak streamflow of these rivers, on the other hand, create a different cholera transmission environment; peak flood volumes and extent of flood-affected areas during monsoon are responsible for widespread water contamination and subsequent cholera outbreaks. Our preliminary results demonstrate that the seasonality and dual peaks of cholera transmission in this region may be explained by two distinctly different hydroclimatological drivers. We will quantify the roles of these processes and explain the nature of these drivers.