To characterize the daily SPC pattern of each site, we grouped data by site and hour of the day which amounted to approximately 3500 data points per site and hour. These daily SPC data were then smoothed using a general additive model with a cubic spline. To compare site-specific daily SPC signals relativeto other sites, we calculated the normalized SPC by subtracting the mean and then dividing by the standard deviation of each site. To quantify numerically the similarity in daily patterns of SPC at each site, we analyzed the correlation between all sets of daily smoothed, normalized SPC signals using the diss function in the R package TSclust (Montero and Vilar 2014). We then performed hierarchical clustering on the correlation dissimilarity matrix to identify patterns among different daily signals using the R function hclust with the complete linkage method (R Core Team 2018).

We assessed the relationship between SPC and stage height with cross correlation function (CCF) analysis of the time series for each site. The time series used in the cross-correlation analyses were constructed by binning and averaging SPC and stage height data into 15-minute intervals to account for differences in the timing of the 5-minute collection intervals for each probe. To satisfy the stationarity assumption for conducting cross-correlation analyses (i.e., variables at time t, , are not related to variables at time *t-1*, *t-2*, etc.), we first-differenced each time series (i.e., ) (Hyndman and Athanasopoulos 2018). We interpreted sample cross-correlation analyses of SPC and stage height by assessing the correlations between and for and so on. A significant correlation between and for a positive h means that x lags y (or y leads x). We expected SPC to lag behind stage height by approximately one to two lags (15-30 minutes).

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