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It is well known that tropical cyclone (TC) activity in the Atlantic has increased over the past several decades due to an increase in sea surface temperature (SST) and decrease in vertical wind shear in the TC main development region. Here we show that there has also been a substantial increase in early-season (June-July) TC activity and that the environmental factors responsible for it are distinct from those operating during the peak season (August-October). During the early season, we find significant changes in SST, wind shear, and mid-level (600 hPa) relative humidity in the western subtropical Atlantic and Gulf of Mexico, the preferred locations for TC genesis and intensification during the early season. The changes in wind shear and humidity can be traced to SST warming in the western tropical Pacific, which through atmospheric teleconnections has decreased low-level easterly winds, generated mid-level atmospheric cooling, and increased mid-level humidity in the northern Gulf of Mexico and western subtropical Atlantic. All of these trends are conducive to TC genesis and intensification. These results suggest that future changes in early-season TC activity are likely to be sensitive to changes in both western Pacific and Atlantic SST.
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