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Inclusion of subtropical anticyclonic wave breaking in North Atlantic seasonal tropical cyclone forecasts

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Anticyclonic Rossby wave breaking (AWB) impacts North Atlantic tropical cyclone activity through its modulation of tropical vertical wind shear and environmental moisture on subseasonal to seasonal timescales. Increased AWB is associated with increased vertical wind shear and effective suppression of tropical cyclone activity, but these effects are not explicitly included in current seasonal forecasts from Colorado State University. Given the complex variability of AWB, we examine the distinct features of seasonal subtropical AWB activity in tropical North Atlantic vertical wind shear and how its impacts on the environment differ from the dominant effects of El Nino Southern Oscillation (ENSO). Our analyses show that, while ENSO accounts for the leading mode of structured linear variability in North Atlantic shear, subtropical AWB accounts for the second leading mode of variability. We develop an index of subtropical North Atlantic vertical wind shear anomalies that may effectively represent the dynamical impact of AWB on the tropical environment and TC activity. Furthermore, we assess whether this AWB-associated shear (AWB-VWS) index provides any additional skill to Colorado State University's extended range tropical cyclone predictions. Preliminary results suggest that environmental parameters related to AWB can improve seasonal forecasts of accumulated cyclone energy in the North Atlantic, especially in years with low hurricane activity. Further research will analyze the dynamical relationship between the AWB-VWS index and key environmental parameters in an early-April statistical/dynamical hybrid model.