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Tropical Forcing of the Summer East Atlantic Pattern

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The Summer East Atlantic (SEA) mode is the second dominant mode of summer low-frequency variability in the Euro-Atlantic region. Using reanalysis data, we show that SEA-related circulation anomalies significantly influence temperatures and precipitation over Europe. We present evidence that part of the interannual SEA variability is forced by diabatic heating anomalies of opposing signs in the tropical Pacific and Caribbean that induce an extratropical Rossby wave train. This precipitation dipole is related to SST anomalies characteristic of the developing El Niño–Southern Oscillation phases. Seasonal hindcast experiments forced with observed sea surface temperatures (SSTs) exhibit skill at capturing the interannual SEA variability corroborating the proposed mechanism and highlighting the possibility for improved prediction of boreal summer variability. Our results indicate that tropical forcing of the SEA likely played a role in the dynamics of the 2015 European heat wave.