Euro-Mediterranean rainfall and ENSO - a seasonally varying relationship

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Using observational datasets and atmospheric reanalyses, we show that interannual variability of rainfall in the Euro-Mediterranean sector is significantly influenced by ENSO in a way that is seasonally varying. Spatially coherent correlation patterns are found in central and eastern Europe during winter and spring, and in western Europe and the Mediterranean region during spring and autumn. A composite analysis of ENSO events indicates that during an El Nino western Mediterranean rainfall has a 10% increase (decrease) in the autumn preceeding (spring after) the mature phase of an event, corresponding to a rainy season arriving (retreating) approximately 2 weeks earlier compared to the climatology. The atmospheric reanalyses show that an anomalous atmospheric circulation and moisture transport extending from the Atlantic Ocean into the Euro-Mediterranean region accompanies the observed rainfall anomalies. Multidecadal variations characterize the ENSO Euro-Mediterranean relationship during the 20th century.