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Influence of El Niño flavours on the genesis of mid-latitude weather systems over the Gulf Stream

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There is emerging evidence that climate in the North Atlantic-European sector is sensitive to vacillations of tropical Pacific sea surface temperatures, in particular, the central Pacific flavour of the El Nino Southern Oscillation (ENSO) and concomitant trends in atmospheric heating. The frequency of central Pacific ENSOs appears to have increased over the last decades and some studies suggest it may continue increasing in the future, but the precise mechanisms by which these events affect the North Atlantic synoptic scale circulation are poorly understood. Here, we show that central Pacific ENSOs influence where midlatitude cyclogenesis occurs over the Gulf Stream, producing more cyclogenesis in the jet exit region rather than in the climatologically preferred jet entrance region. The cyclones forming over the Gulf Stream in central Pacific ENSO seasons tend to veer north, penetrating deeper into the Arctic rather than into continental Europe. The shift in cyclogenesis is linked to changes in the large scale circulation, namely, the upper-level trough formed in the lee of the Rocky Mountains.