

**This supplement provides a short summary of the anomalies in the North Atlantic circulation during the isoTrades campaign in January-February 2018**

In the paper, we show that the isoTrades campaign period in January and February 2018 is associated with an unusually large influence of air parcels originating from relatively far north compared to the climatology (see Fig. 2 in the paper). This anomalous behaviour is linked to a poleward shift of the North Atlantic jet (see Fig. S2.1 below) during isoTrades, and a strongly positive North Atlantic Oscillation index (NAO, 1.5 during isoTrades compared to an average value of 0.46 for all January and February during 2009 - 2018). Enhanced subsidence over the western North Atlantic can be observed due to the more frequent occurrence of anticyclonic Rossby wave breaking (ARWB) over the central North Atlantic (Fig. S2.2, below). Furthermore, the subsidence in front of the North African coast is also strongly enhanced, reinforcing the subtropical jet (Fig. S2.1, S2.2). Interestingly a slightly reduced subsidence over North Africa and the trade wind region can be observed. The effect of the northward shift of the midlatitude jet stream on ARWB over the Atlantic results in a positive PV anomaly on the 320 K isentropes in the central North Atlantic and along the North African coast (Fig. S2.3). In the anomaly of precipitation patterns during isoTrades a clear southward shift of the ITCZ in the South Atlantic can be observed and an overall slightly reduced deep convective activity over the northern part of South America (Fig. S2.4). All the figures below are based on ERA5 reanalysis data.

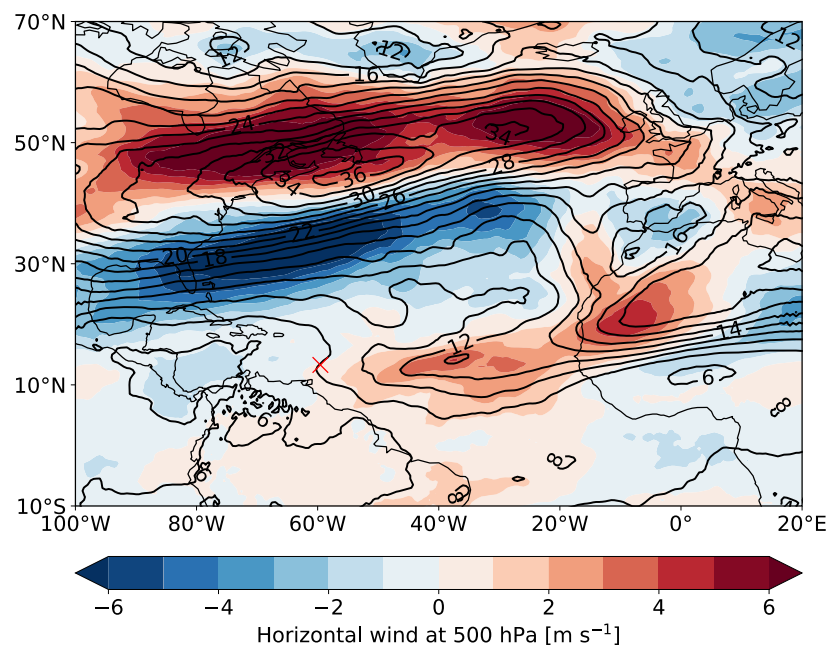


Figure S2.1: Horizontal wind speeds at 500 hPa: mean during isoTrades in black contours, anomaly during isoTrades compared to the 2009-2018 climatology in filled contours.

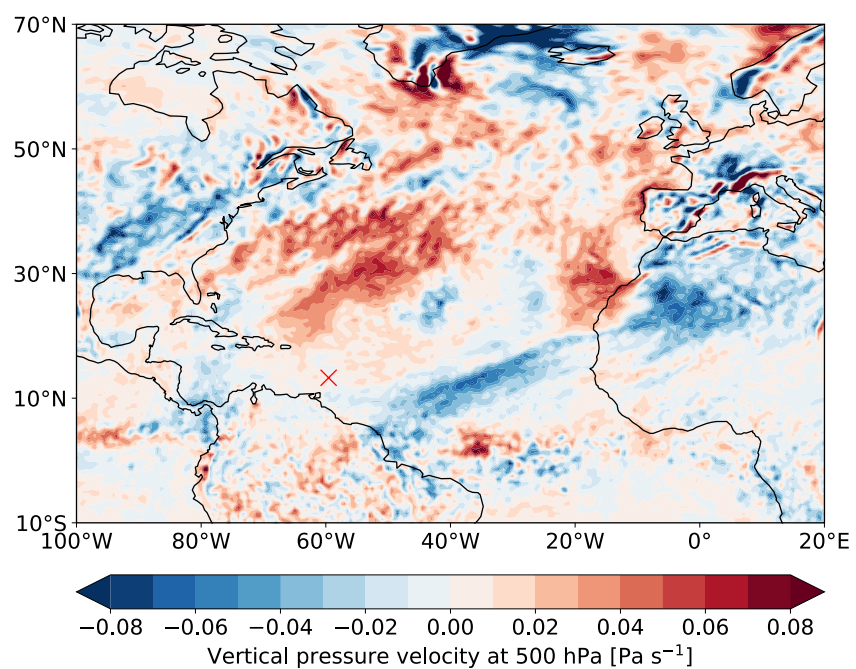


Figure S2.2: Vertical pressure velocity at 500 hPa: anomaly during isoTrades compared to the 2009-2018 climatology in filled contours.

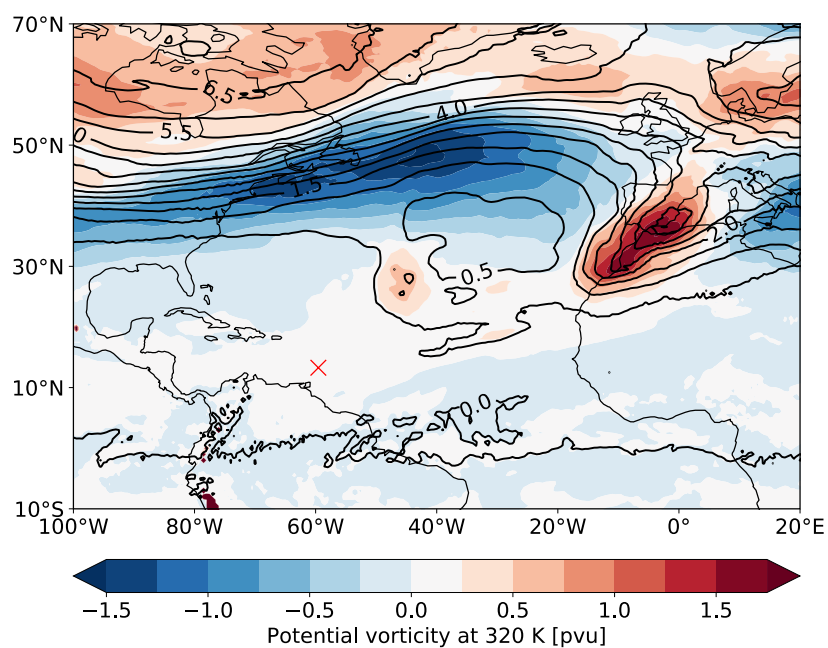


Figure S2.3: Potential vorticity at 320 K: mean during isoTrades in black contours, anomaly during isoTrades compared to the 2009-2018 climatology in filled contours.

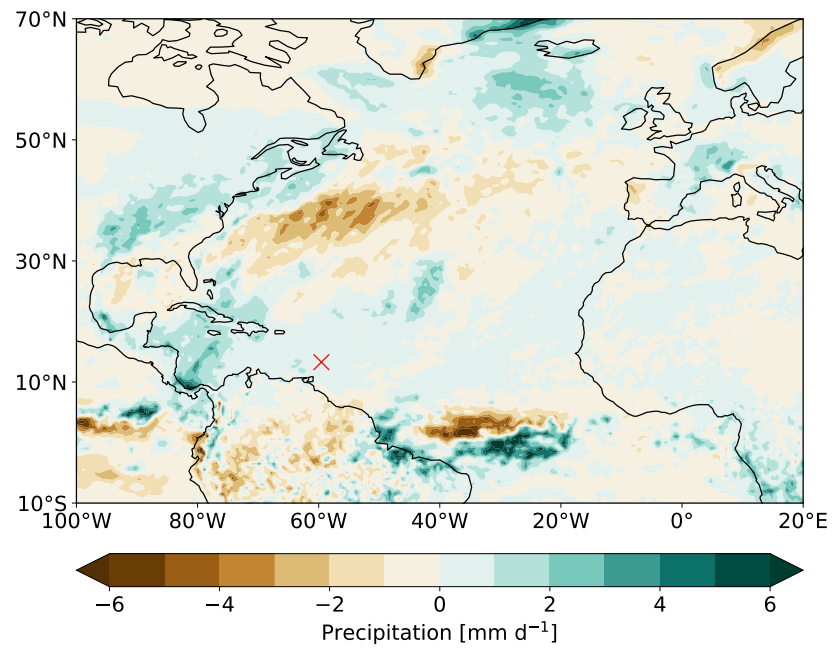


Figure S2.4: Total precipitation (sum of convective and large-scale precipitation) as a proxy for the location of the ITCZ during isoTrades compared to the 2009-2018 climatology in filled contours.