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The winter atmospheric variability of western Europe as a response to Subtropical North Atlantic SST variability using the UCLA GCM

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During the spring and summer of 1995, SST anomalies in the northern Subtropical Atlantic, between 15-25žN and 20-30W, reached values of about 1 standard deviation above the mean. This positive SST anomalies were associated with a weakening of the northeast trade winds and the subtropical North Atlantic anticyclone. The SST anomalies persisted until the following fall and winter months. These seasons were characterized by negative values of the North Atlantic Oscillation index and heavy rainfall over southwestern Europe and northern Africa. In the present work we analyze the atmospheric response to Atlantic SST anomalies during fall and winter of 1995/1996 by using the UCLA atmospheric general circulation Model (AGCM). We compare a 10-member ensemble of simulations with Atlantic SST anomalies, and a 20-year long control run with climatological, seasonally varying SSTs prescribed globally. A 10-member ensemble of simulations using the same SST anomalies with the opposite sign is made in order to assess the linearity of the simulated atmospheric response. The results of the simulations with Atlantic SST anomalies show a weakening in the subtropical Atlantic high. Also, the simulated 200 hPa geopotential height shows the position of the jet stream in a very realistic way.