

# Supporting Information for “Fast atmospheric response to a cold oceanic mesoscale patch in the north-western tropical Atlantic”

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## Additional Supporting Information (Files uploaded separately)

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## Introduction

Figure S1 shows the time series of some relevant ERA5 surface variables, used to characterize the synoptic scale evolution in the time frame of interest (data between 0000UTC on the 1st and 0000UTC on the 4th of February are shown). In particular, the spatial averages computed over the white dashed rectangle shown in Fig. 1(a) of the main manuscript

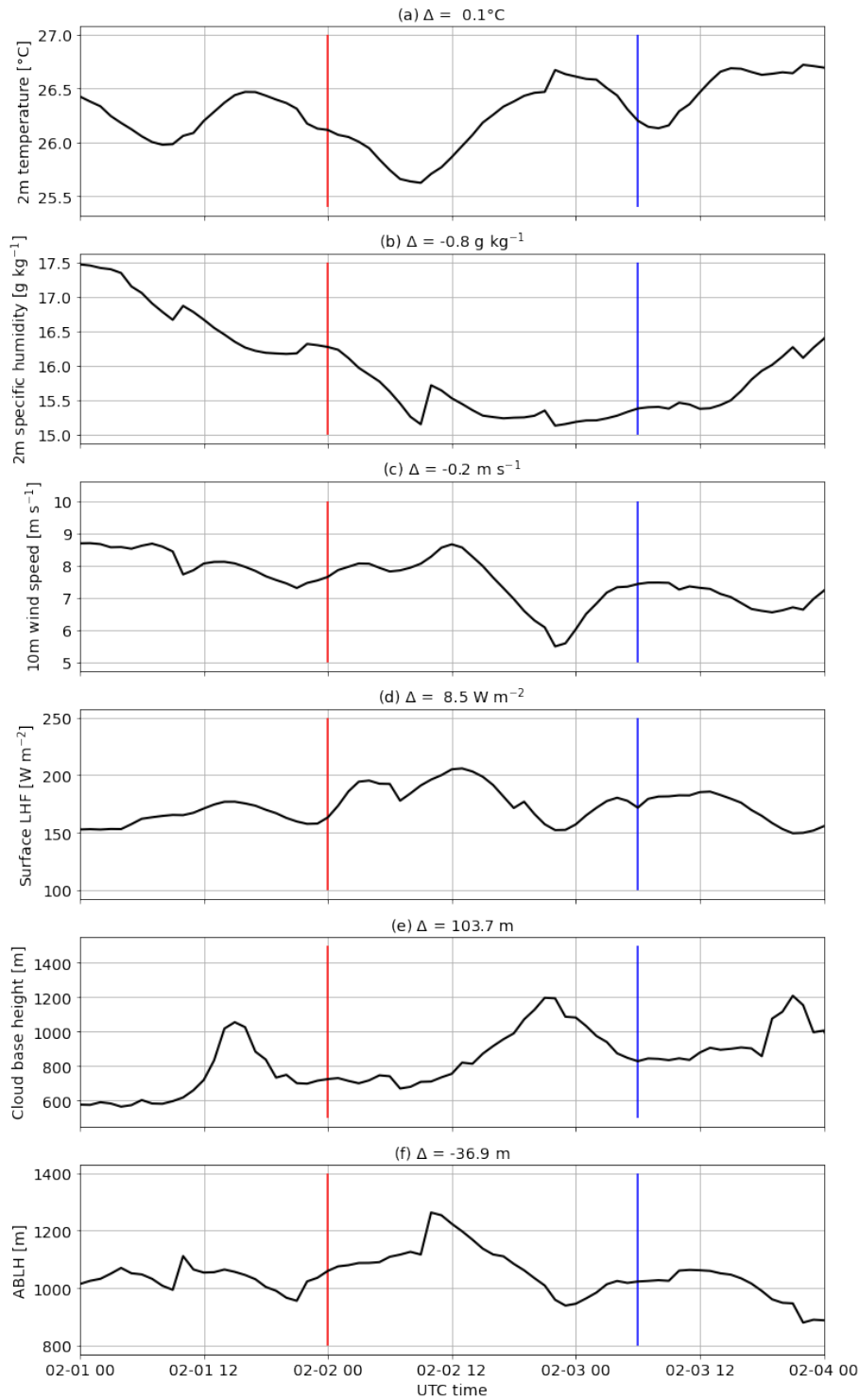
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are considered. This is done to quantitatively estimate the temporal variability between the warm and cold points in a way that avoids any signal due to the differential SST forcing. In each panel, the title displays the difference of the field between the cold and the warm points. Such differences are used to better estimate the local signal measured over the cold oceanic structure under study.

**Movie S1.** Animation of the GOES-East cloud mask product between the 2nd and the 3rd of February 2020 with a 10 minute time step. Grey pixels indicate the presence of clouds. Contour lines show the daily MUR SST product. The red line indicates the full trajectory of the R/V MS Merian, with the black dot showing the instantaneous position of the R/V.

**Movie S2.** Same as the previous animation, with the cloud optical depth (COD) field shown with the colors.

**Movie S3.** Animation of the hourly GOES-East (skin) SST product together with the position of the R/V MS Merian denoted with the black dot.



**Figure S1.** Time series of some spatially-averaged fields from ERA5: (a) 2m air temperature, (b) 2m specific humidity, (c) 10m wind speed, (d) surface latent heat flux (positive upwards), (e) cloud base height, (f) ABLH. Vertical red and blue lines denote the instant where the R/V L'Atalante was in the warm and cold points. In the titles the difference between the cold and the warm points.

September 15, 2022, 9:54am