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Oral
We will illustrate how plumes of freshened Amazon water contribute to the surface water stratification of the northwest tropical Atlantic, east of the Antilles, even during ‘salty’ boreal winter. In February 2020, a 120km-wide freshwater plume was documented by satellite and in situ observations of the EUREC4A-OA/ATOMIC programs near the Demerara Rise (7°N/54-56°W). It was initially stratified in the upper 10 m with a freshwater content of 2 to 3 meters of Amazon water distributed down to 40 m. On February 2nd, ship transects indicate an inhomogeneous shelf structure with a propagating front in its midst, whereas minimum salinity close to 30 pss was observed close to the shelf break on February 5th. The salinity minimum eroded in time but was still observed 13 to 16 days later with 33.3 pss minimum value up to 400 km from the shelf break. At this time, the mixed layer depth was close to 20 m. The off-shelf flow lasted 10 days, contributing to a plume area extending over 100000 km2 and associated with a 0.15 106 m3 s-1 freshwater transport. The off-shelf plume was steered northward by a North Brazil Current ring up to 12°N and then extended westward toward the Caribbean Sea. Its occurrence follows 3 days of favourable wind direction closer to the Amazon estuary, which contributed to north-westward freshwater transport on the shelf. Other such events of freshwater transport in January-March are documented since 2010 in salinity satellite products in 7 out of 10 years, and in 6 of those years, they are preceded by a change in wind direction between the Amazon estuary and the Guianas that is favorable for north-westward freshwater transport toward the shelf break. The 2020 February plume was also associated with low surface pCO2, probably associated to bloom conditions, and we will speculate how they can contribute to the overall budget of the air-sea CO2 exchanges in this region.
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