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Influence of routine discharges from nuclear power plants in the Florida peninsula on the radioxenon background in the northern Caribbean Sea

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INTRODUCTION AND MAIN RESULTS

There are several civilian nuclear facilities in North America that contribute to the atmospheric background of radioxenon in the northern Caribbean Sea. Previous studies on the trajectories of air masses from these nuclear power plants in the Florida peninsula showed that they contribute to the radioxenon background in the northern Caribbean Sea when the center of the migratory anticyclone was in the Gulf of Mexico and in the vicinity of Loussiana, North America. The objective of this work is to study the influence of the synoptic configurations of the migratory anticyclone when its center is over North America.

The trajectories of the air masses deviated toward the Gulf of Mexico when the center of the anticyclone was located in the southeast and northeast regions of the USA. Nevertheless, the trajectories transited the northern Caribbean Sea when the center of the anticyclone was in the center of North America and in the state of Texas.

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Objective

Determine whether the Turkey Point and Saint Lucie NPPs discharges transit the northern Caribbean Sea for different synoptic configurations of the migratory anticyclone when its center is in North America.

Methods/Data

The progressive trajectories of the air masses were simulated with the HYSPLIT trajectory model at an altitude of 500 m and for the subtypes 17 and subtype 18 of the migratory anticyclone. Configurations of the migratory anticyclone:

-Subtype 17: migratory anticyclone with center over North America,

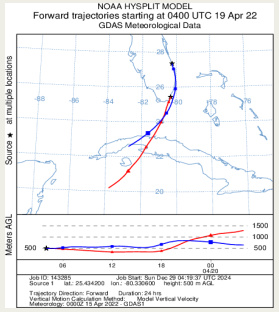
-Subtype 18: Influence of the migratory anticyclone with center over the Gulf of Mexico, the southeast of the United States of America (USA) or its eastern coast and

-Subtype 19: Influence of the migratory anticyclone with center over the eastern coast of the USA or in areas of the adjacent Atlantic Ocean.

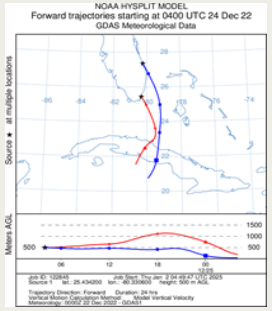
Results/Conclusions

Air masses transited the northern Caribbean Sea when the center of the anticyclone was in the center of North America and in the state of Texas.

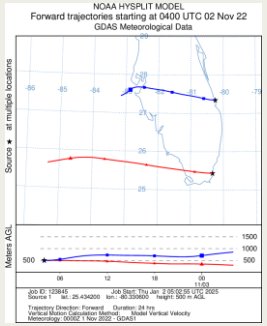
Subtype 17



Center of North America



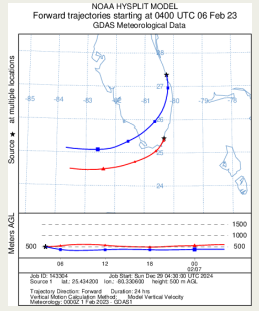
Texas



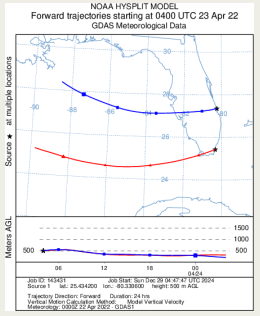
Air masses deviated toward the Gulf of Mexico when the center of the anticyclone was located in the northeast of the Great Lakes

Air masses deviated toward the Gulf of Mexico when the center of the anticyclone was located southeast of the USA (Alabama, South Carolina, Florida, Georgia, and Tennessee).

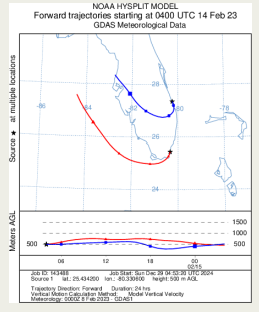
Subtype 18



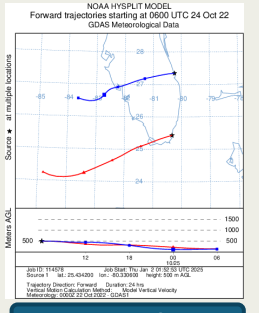
Alabama



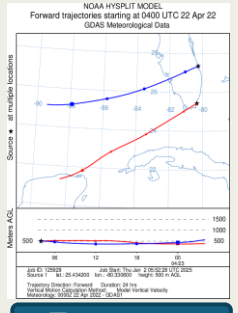
South Carolina



Florida



Georgia



Tennessee

The contribution of the routine discharges from both facilities to the radioxenon background depends on the location of the center of the migratory anticyclone in North America. They contributed when the center of the anticyclone was in the center of North America and in the state of Texas.

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