Importance of Dust Radiative Feedback on the Trans-Atlantic Evolution of the Saharan Air Layer

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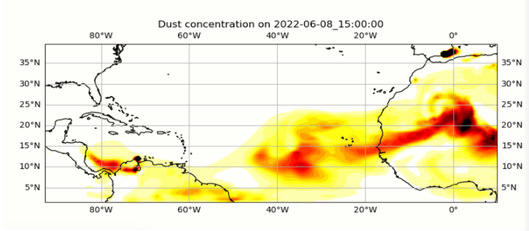
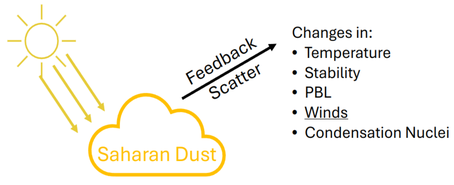
Sunlight absorbed and re-emitted by **dust** gives the air a **boost**, helping the dust move **farther away.**

Intro

The Saharan Air Layer (SAL) is a mass of dry and dusty air that is formed in the Sahara Desert and moves to the Nort Atlantic Ocean.



We want to understand what is the effect of the radiative feedback produced by the dust over the evolution of the SAL.



Methods

We selected 25 dates and simulate the SAL trajectories with feedback ON and OFF with WRF.

Star simulation	Start event	End event	End simulation	DUCMASS (g/m²)
1984-07-06	1984-07-16	—	1984-07-18	0.71
2000-05-20	2000-05-30	2000-05-31	2000-06-02	0.92
2001-06-10	2001-06-20	2001-06-21	2001-06-23	0.63
2002-06-20	2002-06-30	—	2002-07-02	0.64
2003-06-15	2003-06-25	—	2003-06-27	0.75

We did a particle analysis with hysplit to understand their maximum distance and speed

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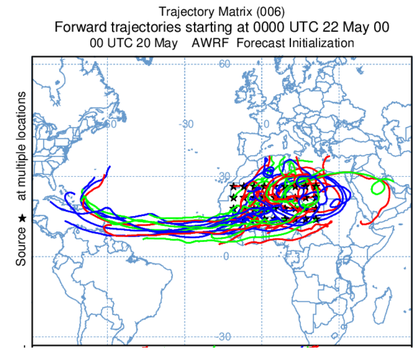
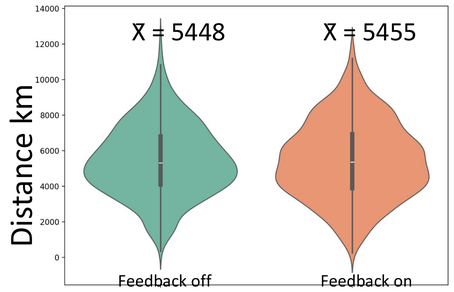
Results

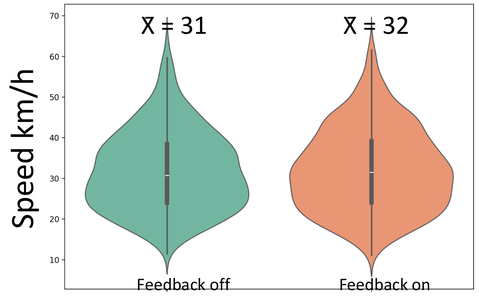
We ran the HYSPLIT simulations for all the cases.



In average feedback ON has a highest average on distance.



In average speed of feedback ON was higher.



We selected the top 10% highest values for distance and average speed. In this group, feedback ON produced 10% more long-distance trajectories and 3.6% more fast trajectories compared to feedback OFF.

	Feedback off	Feedback on
Distance km	44.5%	55.5%
Av speed km/h	48.2%	51.8%