



Capital Weather Gang

Wicked cool wave clouds crash over Boston area

By Matthew Cappucci

April 6, 2018 at 1:53 PM



Kelvin-Helmholtz wave clouds over the Boston region on Friday. (Matthew Cappucci/)

Surf's up! Commuters in Boston got a treat Friday morning with a rare display of "Kelvin-Helmholtz waves" gracing the skies just after sunrise.

The undulating clouds look a lot like an ocean wave. That's because they

behave in the same way. What one is seeing is literally a ripple propagating through the atmosphere. With just a bit of moisture, the wave becomes visible. Rarely, though, are they as striking as they were Friday morning.

Much like waves can cause rough seas, these waves can lead to bumpy flights for passengers on commercial airliners, particularly during takeoff and landing.



The Boston-area Kelvin-Helmholtz wave clouds Friday. (Matthew Cappucci/)

The clouds form because of differences in density. Though these differences are invisible, they're there.

Imagine filling a fish tank with oil and water. The fluids would become stratified, meaning they would organize into layers. If a perturbation were to jostle this fluid, a gravity wave would result. That would spread out in all directions, sloshing the fluid up and down.

This is exactly what happened in the atmosphere over Boston. Meteorologists also use an equation known as “Brunt-Vaisala” to figure out how long one period — a rise and fall — of the wave should take. Using the density of the atmosphere and the dynamics at that level, it should take about 10 minutes.



Kelvin-Helmholtz wave clouds decay over the Boston region on Friday. (Matthew Cappucci/)

“They were breathtaking,” said Rebecca Cleveland-Stout, an earth and planetary sciences student at Harvard. “You could see the waves just like in the ocean.”

The wavelike forms were even visible from the GOES-16 weather satellite perched in space:



Matthew Cappucci @MatthewCappucci

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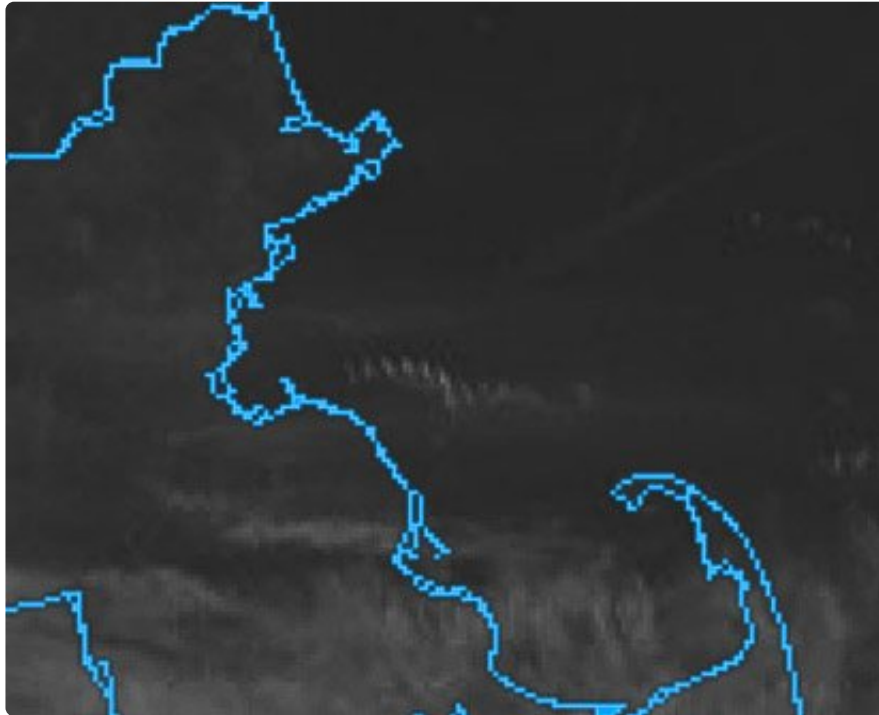
@Met_CindyFitz @DanielleWBZ4 Beautiful Kelvin-Helmholtz waves cresting over Quincy this morning. Best I've seen in these parts for years. pic.twitter.com/r3rUlu3frD



Cape Ann Weather
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GOES16 at 747am pic.twitter.com/cA9Qtw0jiQ

9:23 AM - Apr 6, 2018



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Eli Tziperman is a professor of oceanography at Harvard. Last week, he taught his students about the dynamics of gravity waves. Friday morning, his class featured a field trip with 13 students to the Woods Hole Oceanographic Institute. Once the waves were noticed, all the students huddled around the windows.

Much like typical water waves, Kelvin-Helmholtz exhibit a breaking behavior toward the end of their life cycles. This takes place as the wave breaks down into vortices as they entrain the air and evaporate. As one Twitter user pointed out, it's not often that you see the ocean in the sky!

More on Kelvin-Helmholtz wave clouds

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