

Unique weather phenomenon may have helped Ukraine identify and sink Russian ship Moskva

November 17 2023, by Bob Yirka



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A pair of radar experts at Swedish Defense Research working with a meteorologist from the Swedish Meteorological and Hydrological Institute has found evidence suggesting that the reason the Ukrainian military was able to spot and sink a distant Russian missile cruiser during the early part of the Ukraine war was due to a unique weather phenomenon.

In their paper [published](#) in the journal *Bulletin of the American Meteorological Society*, Lars Norin, Niklas Wellander and Abhay Devasthale describe how they conducted a meteorological reanalysis of data from the time and region to learn more about the events surrounding the sinking of the ship.

On February 24, 2022, Russia began an invasion of Ukraine—setting off a war that has continued to this day. During the early days of the war, the Ukrainian army surprised Russia, and most of the rest of the world, by fighting off the invasion by destroying very large numbers of Russian tanks and other armored vehicles and killing very large numbers of Russian soldiers. Ukraine once again surprised Russia, and many others, when just two months later it was discovered that the Ukrainian army had managed to sink the Russian warship Moskva, which many considered to be the flagship of the Russian navy in the Black Sea.

The ship was sunk after it was hit by guided missiles sent by Ukraine's army. But how this was accomplished has remained a mystery. The ship had been sailing at a distance from Ukraine that was considered to be beyond the reach of Ukraine's [radar systems](#).

As the ship was burning and found likely to sink, it was determined that it had been struck by two Neptune guided missiles and that it had been struck when sailing approximately 120 kilometers from Odessa. It was later determined that Ukraine had been given intelligence from the U.S.—but not enough to allow it to pinpoint the exact location of the Moskva. Ukrainian military officials reported that they were able to see the ship on their radar screens, and thus gave the order to strike.

In this new effort, the research trio has discovered how it was that the Ukraine military was able to see the ship on their radar screens. After studying [weather conditions](#) on February 24 for the area where the ship was sailing, they built a model to recreate the events that had unfolded. They found that a temperature inversion had occurred, with cooler air at lower altitudes and warmer air above it. That, they found, allowed the [radar](#) signals to refract off the atmosphere, carrying them much farther than would be case under normal conditions. And that, they conclude, appears to be why the Ukrainians were able to see the ship and identify its position.

More information: Lars Norin et al, Anomalous propagation and the sinking of the Russian warship Moskva, *Bulletin of the American Meteorological Society* (2023). [DOI: 10.1175/BAMS-D-23-0113.1](https://doi.org/10.1175/BAMS-D-23-0113.1)

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