

Finding the World's Ship Tracks With Deep Learning A. I.

Improving Our Models of How Pollution Changes Clouds



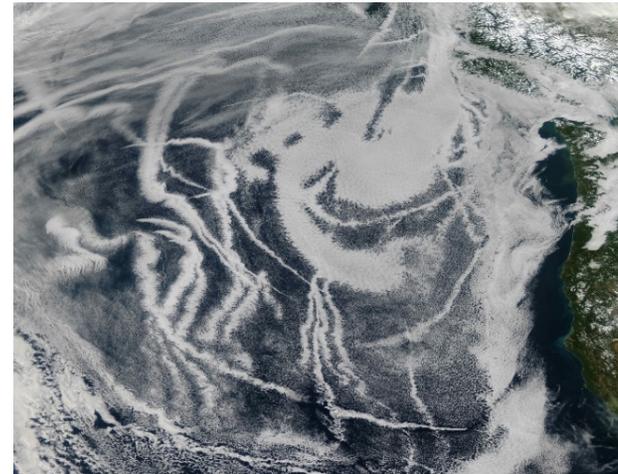
Author Tianle Yuan

What is the Science Question? The effect of human-produced pollution (aerosols) on clouds is one of the most important and least understood factors in climate forcing. Ship tracks provide an ideal laboratory: there are marine clouds that have been modified by ship emissions as well as a background of pristine clouds, both in the same local environmental conditions.

What were your findings? We have developed a deep learning-based artificial intelligence model that probes satellite images off the coast of California to automatically identify ship tracks. Changes in clouds due to aerosols are complex, and many observations in different locations and conditions will improve our understanding of the effects of aerosols on clouds.

What was the impact? This paves the way for routine automatic detection of ship tracks worldwide and the creation of a unique dataset for detailed aerosol-cloud interactions studies.

Why does it matter? Our methodology can be used to study aerosol-cloud interactions and improve our models of how this affects climate. In addition, we can use ship tracks as proxies for the effects of low-cloud geoengineering.



Example ship tracks in NE Pacific, MODIS Terra, 15 Jan. 2013

