In August 2018, long, narrow clouds stood out against the backdrop of marine clouds blanketing much of the North Pacific Ocean. Known as ship tracks, the distinctive clouds form when water vapor condenses around the tiny particles emitted by ships in their exhaust. Ship tracks typically form in areas where thin, low-lying stratus and cumulus clouds are present.

Some particles generated by ships (especially sulfates) are soluble in water and serve as the seeds around which cloud droplets form. Clouds infused with ship exhaust have more and smaller droplets than unpolluted clouds. As a result, the light hitting the polluted clouds scatters in many directions, making them appear especially bright and thick.

The Moderate Resolution Imaging Spectroradiometer (MODIS) on Aqua captured this natural-color image of several ship tracks extending northward on August 26, 2018. The clouds were located about 1,000 kilometers (600 miles) west of the California-Oregon border. Similar environmental conditions also triggered the formation of ship tracks in this part of the Pacific on August 27 and 28.

An analysis of one year of satellite observations from the Advanced Along Track Scanning Radiometer (AATSR) on the European Space Agency's Envisat indicates that very low clouds are most often present off the west coasts of North and South America.

The large number of ships traversing the North Pacific, combined with all of the low clouds, make ship tracks more common here than anywhere else in the world. Roughly two-thirds of the world's ship tracks are found in the Pacific, according to the study. Other ship track hotspots were in the North Atlantic, off the west coast of southern Africa, and off the west coast of South America.

The research team also detected a clear seasonality in their occurrence: they are most often observed in May, June, and July, and only occasionally present in December, January, and February. Ship traffic is roughly constant throughout the year, so the cycle is mostly due to seasonal changes in the abundance of very low clouds.

Provided by NASA