

'Forever chemicals' latch onto sea spray to become airborne

December 15 2021



Credit: Pixabay/CC0 Public Domain

When ocean waves break, microscopic particles break free into the air. For beachgoers, aerosolized sea salts contribute to the tousled "beach hair" look. But other compounds found in seawater, including perfluoroalkyl substances (PFASs), could become airborne as bubbles

pop at the water's surface. Now, researchers reporting in ACS' *Environmental Science & Technology* have observed in a thorough field study that sea spray pollutes the air in coastal areas with these potentially harmful chemicals.

PFASs, which include perfluoroalkyl acids (PFAAs), don't break down easily, so they've garnered the label "forever chemicals." These persistent, potentially harmful compounds were widely used in industrial processes, food packaging, personal care products and water-repellant coatings before being phased out from these products in some countries. They're now found worldwide, including in the oceans, where they've been expected to diffuse enough to not be a major concern. However, with previous laboratory experiments, Bo Sha, Jana Johansson, Ian Cousins, Matthew Salter and colleagues showed that when bubbles containing PFAAs burst at the surface of saltwater, these compounds are ejected as aerosols—extremely small airborne particles. Their findings indicated that sea spray aerosols could be an important way that these contaminants are transported long distances. So, as the next step, the team wanted to conduct [field observations](#) to find out whether this was the case in the [real world](#).

At two coastal locations in Norway, the researchers collected over 100 air samples between 2018 and 2020. They analyzed the microscopic particles in the samples for 11 PFAAs, including the possible carcinogens perfluorooctanoic acid and perfluorooctane sulfonic acid, as well as [sodium ions](#), which are an indicator of sea spray aerosols. The researchers detected the contaminants in all of the air samples collected. When the team compared the levels of individual PFAAs to sodium ions, many of them were strongly related, especially [perfluorooctanoic acid](#), which they say indicates that these compounds leave the ocean with sea spray and could be blown inland. Finally, using the field measurements, the researchers estimated that for eight of the PFAAs, there could be 284 to 756 U.S. tons released globally from the oceans to the air each

year, a higher amount than in previous estimates. Based on their field measurements, the researchers conclude that sea spray is an important source of this class of PFASs to coastal communities. They add that because [sea spray](#) can travel far distances inland, this is also likely to be a route for PFASs to be transported, and potentially return, to terrestrial regions from the ocean.

More information: Sea Spray Aerosol (SSA) as a Source of Perfluoroalkyl Acids (PFAAs) to the Atmosphere: Field Evidence from Long-Term Air Monitoring, *Environmental Science & Technology* (2021). pubs.acs.org/doi/abs/10.1021/acs.est.1c04277

Provided by American Chemical Society

Citation: 'Forever chemicals' latch onto sea spray to become airborne (2021, December 15) retrieved 6 May 2024 from <https://phys.org/news/2021-12-chemicals-latch-sea-airborne.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--