A recent study suggests that mercury deposited from the atmosphere is the main source of mercury pollution in the open oceans. Curbing mercury emissions will slowly lead to a decrease in contaminated fish, as eaten by humans, within a few years to decades after the cuts have been made, the researchers suggest.

Benefits of reduced mercury emissions could be felt several years to decades after cuts

Eating fish as part of a balanced diet is known to have health benefits, but people who regularly eat fish contaminated with mercury may be at risk as it can cause developmental delays in children and has been linked to cardiovascular health problems in adults. For most people, consumption of contaminated fish is the main means of exposure to mercury, thus the best long-term policy to reduce human exposure to mercury is to curb the amount of mercury that is released to the environment, for example, from coal-fired power plants and small-scale gold mining, among other major sources of pollution. In the shorter-term, improved advice on the best fish to eat can be provided for different groups of people.

This study reviews the sources of mercury that pollute the oceans, as well as the physical and biological processes that cause changes in the levels of mercury contamination in fish in response to this pollution. Such understanding can help policymakers devise and monitor suitable measures to limit mercury entering the oceans and contaminating fish. Most of the mercury entering the open oceans comes from the direct deposition of mercury in the atmosphere, the study found. The amount from other sources, such as rivers, estuaries, groundwater, sediments and hydrothermal vents, is much smaller at the global level, although mercury contributions from river systems can be significant at a regional level.

Human activity has increased the concentration of atmospheric mercury at least three times over the last century. However, mercury concentrations are not evenly distributed across oceans and change at different rates in response to variations in atmospheric emissions. Historically high concentrations of mercury in the North Atlantic Ocean and the Mediterranean Sea have decreased over the last few decades, suggesting that emission reduction policies in North America and Europe have had a positive impact. However, rising emissions from industrialisation in Asia will probably double mercury concentrations in the North Pacific within the next few decades.

Once in the oceans, mercury can be transported to deep water, trapped in sediments, re-emitted to the atmosphere and converted into methylmercury by microorganisms breaking down plankton and other organic matter. Methylmercury is the organic form of mercury that easily accumulates in living organisms. Most of the methylmercury that contaminates fish is formed in seawater, in the subsurface (intermediate) layer (between 100 and 1000 metres deep). Methylmercury increases in concentration from the bottom of ocean food chains to the top of the chain. Predator fish, such as shark, swordfish and tuna, at the top of the food chain contain the highest levels of methylmercury. Reducing mercury emissions is likely to reduce the amount of mercury deposited in the oceans, which will lead to a proportionate reduction in concentrations of methylmercury in marine fish. The researchers suggest this would happen within a few years to decades after reduction strategies come into effect.

In January 2013, agreement was reached on The Minamata Convention on Mercury\(^1\), a globally binding treaty to reduce mercury in the environment. The treaty aims to phase out the use of mercury in many products and cut emissions from major polluting sources.