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Mother Nature & Pre-Industrial Revolution Man Are/Were Also Polluters

Who's to blame for carbon dioxide emissions to the atmosphere, persistent dioxins, PCBs, lead, and mercury in our environment, elevated concentrations of nitrates in stream water throughout the world, and unusual fish kills? The initial knee-jerk reaction is to lay the blame on present day humans (read-ourselves) who are endlessly accused of fouling their own nest, and certainly there's truth to this. No doubt we humans are responsible for many egregious environmental actions, but here's something new. Recent research has shown that some of the pollutants heretofore blamed on industrial revolution activities can now also be laid at the doorstep of Mother Nature and pre-industrial revolution man.

Some Examples

Dioxins are ubiquitous, toxic, and environmentally persistent organochlorine compounds, which have been assumed to be by-products of the organochlorine-based industries that underwent rapid expansion during the 1950s. Recently, Andrew Meharg and Kenneth Killham reported in *Nature* that the burning of coastal peat was a significant source of dioxins long before the industrial revolution. The burning of peat, which is decaying tropical plant matter, was how people in much of the British Isles kept themselves warm during the 18th and 19th centuries, and the researchers report that Scotland with well under half a million people probably produced as much as a tenth of the amount produced by municipal waste incinerators in the entire United Kingdom today. The Scotland Isle of Hirta, which was evacuated in 1930, still has dioxin in the soil from peat burning, clear evidence that modern humans were not the first to generate large amounts of dioxins.[1]

Peat burning can also spew massive amounts of carbon into the atmosphere. Emissions from the 1997-1998 wildfires in Indonesia consumed vast amounts of peat and released a total of 0.81 to 2.57 billion tons of carbon into the air. This amounts to 13 to 40 percent of the average annual amount produced globally from combustion of fossil fuels. Susan Page and her colleagues report that the Indonesia fires contributed greatly to the largest annual increase in atmospheric carbon dioxide concentration detected since records began in 1957.[2]

The emissions from the Indonesia fires were comparable to the global carbon uptake by the terrestrial biosphere in a typical year, yet they came from a relatively tiny area of the globe.[3] These data support the case that some events can significantly affect atmospheric carbon worldwide and throw a monkey wrench into most global temperature modeling model strategies.

Another source of pollution from Mother Nature is pristine forests.[4] Peretti Hari and his colleagues report that global NOx emissions from boreal coniferous forests may be comparable to those produced by worldwide industrial and traffic sources. Hari suspects that other evergreens and perhaps even all plants might also release the compounds under many natural conditions.[5] Jessica Gorman adds, that tree emissions can react with human made compounds to make chemicals that further pollute the air or contribute to climate change. She quotes Alex Guenther of the National Center for Atmospheric Research in Boulder, Colorado, regarding large poplar plantations in Oregon that "actually are changing the chemistry of that region because they have much higher emissions rates of organic gases than many other trees do."[6]

Extensive contamination of Arctic atmosphere with lead began before the Industrial Revolution.[7] Brannvall and co-authors report that sediments from four lakes in northern Sweden reveal peaks in atmospheric lead pollution at 1200 and 1530 AD comparable to present day levels.[8] Ancient copper smelting produced atmospheric pollution from copper that was one order of magnitude greater than that from the industrial revolution to the present.[9] Spanish American silver mines from 1580 to 1900 were partly responsible for the high background concentrations of mercury now being reported in the global environment.[10]

Elevated concentrations of nitrates in stream water throughout the world have been blamed on human activities. Again, recent research lays some of the blame on Mother Nature, which until now had been considered innocent. Seawater has been shown to be a possible significant source of some nitrates in one study[11] and another revealed that bedrock contains fixed nitrogen that contributes appreciable concentrations of nitrate to surface waters in certain California watersheds.[12] Nitrates are discussed in more detail in a previous column (see March 2004 *P&SF*, page 22.)

Lastly, an unusual brominated and chlorinated chemical that behaves likes PCBs, some of the most criticized industrial wastes, has been found naturally occurring in the oceans.[13]

Summary

Note the dates on the references discussed in this article. These are all very recent findings. Remember this the next time you hear about how we humans are adding pollutants to the atmosphere. Mother Nature is providing a lot of help, and as time goes on we're finding she's not an innocent

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