Ecological impacts of emerging pollutants in a coastal region of China

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A dozen of organic pollutants, including eight kinds of organochlorine pesticides , two kinds of industrial chemicals (polychlorinated biphenyls) and hexachlorobenzene , and two kinds of byproducts (polychlorinated dibenzo-p-dioxins (and polychlorinated dibenzofurans , are restricted as "legacy persistent organic pollutants (POPs)" by the Stockholm Convention in 2001. because of POPs' physical and chemical properties, they're environmental persistent; (2) cosmopolitan throughout the environment; (3) accumulate through natural phenomenon including humans; (4) toxic to humans and wildlife [1]. Stockholm Convention is hospitable compounds which have met the screening criteria for POPs. Emerging contaminants are presently mentioned as pharmaceuticals and personal-care products, drugs of abuse, steroids and hormones, surfactants, flame retardants, industrial additives and agents, then on , among which polybromodiphenyl ether , perfluorinated compounds (PFCs), short-chained chlorinated paraffins, and hexabromocyclododecane were the foremost concerned. With the tactic of the work of POPs review committee, nine types emerging organic pollutants including perfluorooctane sulfonic acid commercial pentabromodiphenyl ether (penta-BDE) and commercial octabromodiphenyl ether (octa-BDE) have already been added to Stockholm Convention in 2009. Recently, SCCPs, HBCDs and other three emerging contaminants were proposed for being listed under the Convention. China could also be an enormous country in producing and using chemicals, and thus the pollution problem of legacy POPs has continuously attracted public attention. Candidate POPs, also called "emerging POPs," became a hotspot within the environmental research and management. Chinese Bohai Sea is found within the arms of Liaodong and Shandong Peninsula (Figure 1) and is taken under consideration to be one of the foremost POPs polluted areas within the planet together of the foremost developed regions in China, it's embraced by several metropolises, like Beijing, Tianjin, and Dalian. Several rivers empty into Bohai Sea, meaning that the economic and municipal wastewater from the encircling cities is additionally discharged into it. Additionally, the semienclosed terrain makes the water exchange between Bohai Sea and thus the open ocean relatively slow. Thus, pollutants in Bohai Sea are difficult to diffuse. Bohai Sea has become one of the foremost heavily polluted sea areas in China at this and might act as a sink of the various pollutants including POPs [5–7]. However, Bohai Sea is one of the foremost important fisheries in China. It provides amounts of seafood to peripheral cities. Therefore the pollution in Bohai Sea had caused great concerns within the past decades. Many studies have focused on the pollution status of various chemicals like heavy metals, organic metals, OCPs, and PCBs . As a very good bioindicator, a series of works of pollutants in mollusks along the coastline of the Bohai Sea has been reported since 2000s. Liang et al. evaluated mollusks as biomonitors to research heavy metal contaminations along the Chinese Bohai Sea in 2004; Wang et al. further studied the correlations among heavy metals in moas case study area for coastal ecosystem research. Multi-disciplinary methods, including ecological field survey, eco-toxicological analysis, spatial analysis using geographic information system , simulation and modeling, social survey and policy analysis, are applied. For a decade, my research group has made extensive investigation of perfluoroalkyl acids (PFASs) along the coast of the Bohai Sea in north China. Major efforts are dedicated to source identification of the emerging pollutants through sampling analysis and its correlation with industrial and domestic emissions. We found that industrialization and urbanization along the coast have had great impacts on the source and fate of emerging pollutants in environmental media. Compared the world data with modeling results, natural degradation and new input are found and spatial diffusion of their environmental risks in multi-media has been simulated and validated. Strategies and management guidelines were presented for prevention and remediation of ecological and health impacts of the emerging pollutants

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