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PFAS Environmental Burden in our Global Soils and Sediments

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Per- and polyfluoroalkyl substances (PFAS) are increasingly being detected across a wide range of environmental compartments, as a result of their decades of use in a range of industrial, firefighting, and consumer applications. While the presence of PFAS in water can be of significant concern due to the potential for human exposure through drinking water, PFAS in soils can also pose risks, providing a long-term secondary source of PFAS that can contaminate infiltrating water, or can lead to direct exposure of humans as well as terrestrial and aquatic animals. Although interaction with both surface and groundwater can lead to contamination of surface soils by PFAS, other pathways such as atmospheric deposition and rainfall infiltration can be important. The presentation will also discuss the extent to which PFAS is pervasive in global soils and sediment, drawing insights from concentration data from over 8,500 samples collected worldwide. The work described here combines a range of machine learning tools with fundamentally-based mathematical transformation to explore the dominant PFAS source types likely responsible for contamination in a large number of soil samples whose primary contamination source is unknown. Results will be discussed in context of international drinking advisories and regulations (e.g., US EPA, Australia) as well as in the context of the Stockholm Convention for the protection of human health and the environment from persistent organic pollutants.