

# Temporal trends in perfluorinated alkylated substances (PFASs) in north Atlantic seawater and pilot whales

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Perfluorinated alkylated substances (PFASs) are a broad class of extremely persistent organic contaminants that have been produced in large quantities since the 1950s and are now ubiquitously detectable in wildlife and humans globally. These compounds have been associated with severe immunotoxicity in children and a variety of metabolic and developmental disorders. Concerns about human and ecological health have prompted global regulations of the most prevalent PFASs and replacement by shorter and longer chained compounds with poor understanding of their timescales of cycling in the environment and propensity for accumulation in marine food webs. Here we present results from a global ocean general circulation model (MITgcm) forced with loading from wastewater and rivers from the onset of chemical production to present-day. We use this analysis to quantify changes in PFAS concentrations in the North Atlantic Ocean and compare modelling results to measured concentrations in pilot whales from the Faroe Islands between the early 1990s and 2013. Changes in composition of individual PFASs in pilot whales are used to understand the timescales of response of marine food webs to changes in chemical production. Preliminary results indicate a heterogeneous spatial distribution of PFASs in the ocean and relatively faster declines in pilot whale concentrations than expected based on estimates of persistence and half-lives from previous work. Implications of our findings for future exposure risks from these compounds will be discussed.