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COMPOUNDS OF EMERGING CONCERN: RETROSPECTIVE TIME TRENDS AND SCREENING STUDIES IN THE AMAP CORE PROGRAMME

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ABSTRACT

The Danish/Greenland AMAP Core Programme monitors persistent organic pollutants (POPs), heavy metals and contaminants of emerging concern in biota and air of the Arctic. Time series have been established for POPs in various species of Arctic wildlife. The longest time series, those of polar bear and juvenile ringed seals, date back to the mid-1980s.

Archived samples of juvenile ringed seals have been used successfully to establish retrospective time trends for compounds of emerging concern in the Arctic. These have included the brominated flame retardants polybrominated diphenyl ethers (PBDEs) in ringed seals and hexabromocyclododecane (HBCD) in ringed seal and glaucous gull (Rigét et al., 2006; Vorkamp et al., 2008; 2011; 2012) as well as the perfluorinated alkylated substances (PFAS) in ringed seal (Rigét et al., 2013). Because of indications of increasing concentrations, the compounds were subsequently added to the biannual monitoring programme. Recent updates suggest changes towards decreasing trends.

Recently, a time trend was conducted for the insecticide endosulfan (consisting of the α - and β -isomer and the degradation product endosulfan-sulfate) in juvenile ringed seals from East Greenland. Endosulfan-sulfate was the only compound consistently above detection limits, but with a significant annual concentration decline of approximately 6%. The concentrations were low (1 ng/g wet weight) and thus did not indicate a substantial bioaccumulation in ringed seals.

In addition to the retrospective time trends, the AMAP Core Programme conducts screening studies of compounds of emerging concern. Recently, alternative flame retardants were found in ringed seal, glaucous gull, black guillemot eggs and polar bear samples (Vorkamp et al., 2015). Furthermore, short-chain chlorinated paraffins were analysed in the same samples and detected at relatively high concentrations. This database will be consolidated and extended this year, by adding analyses of octachlorostyrene, hexachlorobutadiene and pentachlorophenol in high trophic level species of the Arctic marine environment.

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