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Man's footprint on the Arctic environment as revealed by analysis of ice and snow

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ABSTRACT

The date of the definitive start to the Anthropocene is still under debate, and although a lot of progress has been made, currently available data is not precise enough to define the start of the human-dominated geological epoch. We know that during and after the industrial revolution, humans started having a much greater impact on the Earth's environment. Increases in population have led to increases in resource and fossil fuel use, leaving a marked impact on our planet. This impact, in the Northern hemisphere, is effectively recorded in the snow and ice of the Arctic. Human activity has changed various biogeochemical cycles to such an extent, that the climate has started to change. This has disturbed the biosphere, pushing it to adapt in response to these changes through evolutionary pressure. The Arctic is a particularly vulnerable environment and mankind is having a profound impact on its fragile equilibrium. Higher concentrations of heavy metals, organic compounds and radionuclides have been detected in ice cores as well as snow. Although climatic changes are evident on a global scale, in the Arctic these changes have been amplified. Advances in laboratory analysis methods have been applied to ice cores and surface snow samples to help us understand the mechanisms governing this fragile environment and to evaluate the impact and amplitude of human activity. Despite these advances, the fluxes and distributions over time of anthropogenic organic compounds is largely unknown. Hopefully advances in analytical methods will mean that this is not the case in the future.

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