

# Science for Environment Policy

## Tourist cruise ships increase atmospheric pollution in the Arctic

**Levels of air pollution** significantly increase on the island of Svalbard in the Norwegian Arctic when tourist cruise ships are present, according to a recent study. With shipping levels rising in the region, the researchers recommend that stricter emissions regulations are introduced in order to limit the impact of pollution on the Arctic environment.

**Ship traffic is a major source of pollution globally.** It is a particular concern in regions with heavy ship traffic, or where few other sources of pollution exist, such as the Arctic and Antarctic regions. Shipping in the high Arctic region is currently limited by sea ice. However, a warming climate is shrinking summer sea ice cover which means more ships can take shorter routes through the Arctic to cut journey times.

Ship traffic is also likely to increase as oil and gas extraction in the Arctic becomes more intensive. During the last 20 years, the number of tourist cruise ships has also increased greatly in the polar regions, and there is concern that the associated emissions could affect [polar atmospheres](#) and fragile ecosystems.

In this study, which was partly-conducted under the EU ECLIPSE project<sup>1</sup>, researchers investigated the influence of tourist ship emissions on levels of atmospheric sulphur dioxide, ozone, 60 nanometre (nm) aerosol particles (solid or liquid particles suspended in gas), and black carbon (a pollutant produced by the incomplete burning of fossil fuels). They used data recorded at the Svalbard village of Ny Ålesund, which is a popular stop-off point for cruise ships, and at the Arctic background monitoring station at Zeppelin Mountain, during June, July and August, from 2000 to 2011.

Data were categorised according to the presence or absence of ships with 50 or more passengers in the fjord at Ny Ålesund when measurements were taken. As ships normally arrive during the daytime and leave before the evening, data recorded between 8:00am and 8:00pm local time were considered.

Average summer concentrations of sulphur dioxide, black carbon and 60nm particles at times when ships were present were found to be 15%, 11% and 18% higher, respectively, than background conditions when no ships were present. Larger differences were found when wind speed was low.

The researchers acknowledge the limitations in the methods of data collection, including a lack of records on some ship visits. Also, their method does not consider the length of time that ships spend cruising in the fjord, or the influence of ships cruising outside, but close to the study area.

However, they do conclude that cruise ships have a substantial influence on the concentration of atmospheric pollutants during the summer months. If Arctic shipping increases as predicted during the coming decades, the entire Arctic could be affected by ship emissions, and the impact could become much greater. They suggest that stronger regulations on emissions from shipping could help to reduce this impact. The results also demonstrate that emissions from ships can contaminate [air pollution](#) data monitoring stations in 'pristine' (untouched) sites. The researchers warn that this could have an impact on the interpretation of air pollution data on a much wider geographical scale.



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Doi:10.5194/acpd-13-3071-2013. This study is free to view at:

[www.atmos-chem-phys-discuss.net/13/3071/2013/acpd-13-3071-2013.html](http://www.atmos-chem-phys-discuss.net/13/3071/2013/acpd-13-3071-2013.html)

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