

FUEL BURNING EMISSIONS

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CHANGING THE FUEL CHANGES THE EMISSIONS

Total scheduled passenger traffic worldwide is forecast to increase at an average annual rate of 4.6 per cent for the period 2005–2025.

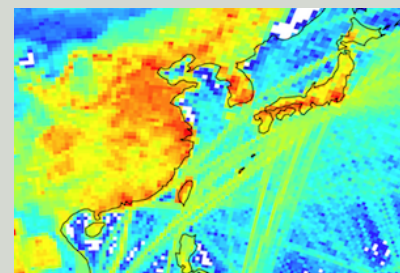
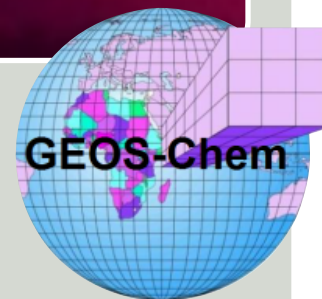
Subsonic aircraft-in-flight impact the environment through the same types of emissions as cars. The emissions are ~70% carbon dioxide (CO₂), just under 30% water vapor (H₂O), less than 1% each of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulates, partially burned or unburned volatile organic compounds (VOCs), and other trace compounds including hazardous air pollutants. These pollutants impact both air quality and the atmosphere's radiative balance.

Depending on whether these emissions occur near the ground during take off and landing or at altitude determines whether they are considered local air quality pollutants or greenhouse gases. Water from exhaust emissions may have a greenhouse effect and also lead to the formation of contrails.

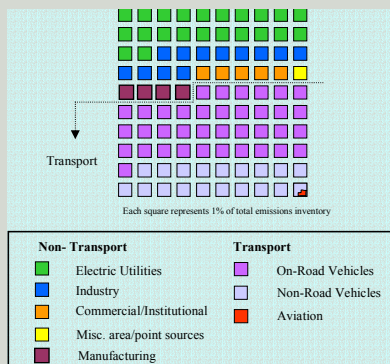
About 10% of all types of aircraft emissions (excluding hydrocarbons and CO) are produced during airport ground level operations and during take off and landing.

Aviation emissions reflect the level of overall aviation activity. The growth of air travel for the past several decades has been very rapid. Local air quality pollutants from aircraft have steadily declined over the last two decades. NO_x has been the most challenging to constrain and progress has lagged that of other pollutants.

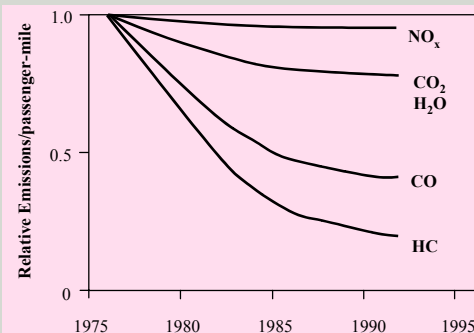
An ideal way to study the impact of changing fuels for industry, cars, aircraft and trucks on global air quality and climate is using a state of the art global 3D chemical transport model (CTM) for atmospheric composition (e.g. GeosCHEM) that incorporates a comprehensive chemical scheme, microphysics and state of the art emission inventories.



Asian Surface NO_x emissions



While all transportation makes up more than 55 percent of the total national NO_x inventory, aviation represents only about 0.4 percent.



Aircraft emissions of all species have declined over time, however, considerably more progress has been made with HC and CO than with NO_x.