



Transport of nitrogen oxides, carbon monoxide and ozone to the Alpine Global Atmosphere Watch stations Jungfraujoch (Switzerland), Zugspitze and Hohenpeissenberg (Germany), Sonnblick (Austria) and Mt. Kravavec (Slovenia). A contribution to the GAW-DACH co-operation

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The Alpine stations Zugspitze, Hohenpeissenberg, Sonnblick, Jungfraujoch and Mt. Kravavec contribute to the Global Atmosphere Watch Programme (GAW) of the World Meteorological Organization (WMO). The aim of GAW is the surveillance of the large scale chemical composition of the atmosphere. Thus, the detection of air pollution transport from regional sources is of particular interest. In this paper, the origin of NO_x , CO and O_3 at the four Alpine GAW stations is studied by trajectory residence time statistics.

The main source of NO_x and CO detected by the trajectory statistics is air with a long residence time over the European continent. The main NO_x source regions are the northwest of Europe and the region covering former east Germany, Czech Republic and southeast Poland, whereas the main CO source areas are the central, north eastern

and eastern parts of Europe with some gradient from low to high latitudes. Subsiding air masses from west and southwest are relatively poor in NO_x and CO.

The statistics for ozone show strong seasonal effects. Near ground air masses are poor in ozone in winter but rich in ozone in summer. The main source for high ozone concentration in winter are air masses that subside from higher elevations down to the stations, often enhanced by foehn effects at Hohenpeissenberg. During summer the Mediterranean constitutes an important additional source for high ozone concentrations.

Especially during winter, strong differences between Hohenpeissenberg and the higher elevated stations are found. Hohenpeissenberg is frequently within the inversion with relatively low ozone concentrations, whereas the high elevation stations are above the inversion and measure relatively high ozone, but low NO_x and CO concentrations.