



Impact of various emission scenarios for 1985-2010 on ozone in Switzerland

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Ozone levels often exceed the ambient air quality standards during summer time in Switzerland. In this study we investigated the effect of numerous regulations enforced since 1985 to improve air quality on ozone, with CAMx air quality model. Several emission scenarios for the year 2010 were also conducted. Model results show that ozone concentrations decreased by about 5% over the Swiss Plateau between 1985 and 2000. The highest decrease is 15% in the region of Zurich. These results suggest that the emission reductions of ozone precursors since 1985 should have been effective to reduce ozone production in northern Switzerland. However, observations do not indicate any significant change in surface ozone levels during the last decade, except in the region of Zurich. The model predictions match very well the observations at the surface stations after correcting for the increase in the background ozone (0.5 ppb/year) as suggested by the long-term observations at the high Alpine station Jungfrauoch. It seems that the decrease in local ozone production due to emission reductions might have been partly or completely compensated by the simultaneous increase in the background ozone. Scenario calculations also suggest that the peak ozone levels would have been 10-20 % higher in 2000 if no emission reduction measures were applied. In the future, applying the Gothenburg Protocol peak ozone concentrations could decrease by 5-6 % in Switzerland. Reducing the Gothenburg target emissions by half may improve the air quality with respect to ozone further. However, measures taken only in Switzerland would not be very effective. Even removing all anthropogenic emissions in Switzerland in a hypothetical case, would not prevent exceedances of legal threshold as long as emissions abroad remain the same. The question if half of the Gothenburg target emissions are enough to meet the legal standard for ozone in Switzerland needs to be answered by investigating air quality for longer

timescales and not only for an episode as in this case. The further development of the background ozone will in any case be very important for the ozone levels.