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Recent ozone trends at Northern Mid-latitudes

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The ozone layer is under surveillance since the discovery of the ozone hole over Antarctica in the early eighties. The abundance of ozone-depleting substances (ODS) regulated by the Montreal Protocol are now decreasing and the detection of the small recovery signal is the new challenge for the current ozone global observing system, which includes successive satellite missions as well as ground-based networks that were set up for the validation and cross-calibration of satellite measurements. In this context, various measurement techniques have been deployed for the monitoring of ozone at Haute-Provence Observatory (44°N, 6°E) within the Network for the Detection of Atmospheric Composition Changes (NDACC) since the 1980s. These techniques include Dobson and UV-Visible spectrometer for the measurement of total ozone as well as ozone lidars, balloon soundings and Dobson Umkehr measurements for the measurement of ozone vertical distribution. The monitoring of ozone on such a long time span allows us to evaluate the strengths and weaknesses of the various techniques in terms of precision and vertical resolution for the characterization of ozone interannual variability and evaluation of long-term trends. This presentation will review the performance of the various experimental techniques deployed at OHP in terms of long-term trend evaluation, with a particular focus on the recovery period starting at the end of the nineties. Comparisons with long-term time series obtained at nearby stations within the so-called NDACC Alpine station and with satellite data will be performed. Regarding long-term trend, the main factors explaining the recent evolution of ozone, as a function of altitude will be documented.