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Ground-based spectroscopic studies of atmospheric gaseous composition

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The experimental ground-based spectral complex for determining the atmospheric gaseous content operating at Atmospheric Physics Department, SPbSU is described. The complex includes:
1.IR-spectrometer (SIKS-2) with a medium spectral resolution.
2.IR Fourier spectrometer with a high spectral resolution (Brueker).
3.Automated visible spectrometer (ASK-2).
4.UV and visible spectrometers (Ocean Optics).
5.Microwave ozonometer.
Ground-based spectral studies of atmospheric gaseous content were started at the Department in 1990 with measurements of the CO, CH4 and H2O total contents. At present the following measurements are carried out:
- spectra of direct solar IR radiation with different spectral resolutions,
- spectra of zenith scattered solar UV and visible radiation,
- spectra of atmospheric MW thermal radiation.
Brueker IR Fourier spectrometer with a high spectral resolution has given the possibility of the first in Russia trace gas measurements (more than 10 gases) with high quality.
Results of interpreting and analyzing the ground-based measurements of different types are followed:
- seasonal variations of different gases (CO, CO2, CH4, N2O, NO2, O3, HF, HCl, CFC-11 and etc.),
- long-time trends of CO, CH4, NO2 contents,
- comparison of trace gas measurements by different remote methods,
- comparison of trace gas measurements with middle and high IR spectral resolution,
- IR and MW synergetic ozone vertical profile measurement,
- validation of different satellite measurements,
- comparison with measurements on different NDACC stations.
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