

EDITORIAL

This special section is devoted to papers concerned with the Airborne Polar Experiment (APE). APE, a project approved as an official program by the European Science Foundation, is a study of the physics and chemistry of the stratosphere both in the Arctic and the Antarctic polar region. The main scientific objectives are related to the understanding of the production and loss mechanisms of the stratospheric ozone, the chemistry of inner and outer regions of the polar vortex, the chemistry and microphysics of stratospheric cloud formation, and the role of aerosol on the mechanisms of ozone depletion.

To obtain this kind of information, the Russian stratospheric aircraft M-55 Geophysica is utilized as a new platform, and its peculiar characteristics are described in the paper by Stefanutti et al. The payload was arranged to furnish the best balance between remote sensing and in situ instrumentation, in terms of detected chemical species and particles and detailed high-frequency characterization of physiochemical qualities. Because of the severe environment of the stratospheric missions, new remote sensing and in situ instruments have been specifically designed to form the scientific payload.

This technical effort saw its first “baptism of fire” during the APE 1 Arctic Mission performed from the airport of Rovaniemi in Lapland (Finland) during the winter of 1996/97. Six different flights were made, achieving very successful mission objectives and demonstrating good performances of the payload as a whole. All the instruments on board worked well in temperatures down to -80°C and at altitudes reaching 21 km.

After this first Arctic experiment, two other missions are scheduled for the future to study the role of the Tropics in the ozone chemistry exchange processes (APE–THESEO) and the Antarctic ozone chemistry and microphysics (APE–GAIA). These new missions will raise technical discussions and bring improvements to the instrumentation, presented in this special issue of the journal, to be fitted for the future flights.

Dr. Teodoro Georgiadis
Guest Editor