What is the BISA's contribution in this field?

The BISA contributes to the study of the mesosphere by participating in the development of a model for the mesosphere. In the field of aeronomy, designing a model consists in bringing together equations that describe the physics and the chemistry of the atmosphere in a particular area (chemical reactions, transport by wind, heating by solar rays, etc.) and in developing software to solve these equations. Software can simulate the temporal and spatial evolution of the atmosphere, often in several dimensions (i.e. degree of longitude, degree of latitude and altitude). Comparing results from these models with observed data allows to determine whether we indeed understand sufficiently the modelled phenomena. These comparisons also help researchers to develop new instruments, giving them a temporary idea of the quantities they will be measuring. In particular cases it is even possible to develop a scenario for the future evolution of the atmosphere and that way help the political decision makers in laying down new norms of protection for our environment.

Concerning the mesosphere, the BISA takes part in the development of an interactive 2-dimensional model of the Earth's atmosphere, named SOCRATES (Simulation Of Chemistry And Transport of Environmentally important Species), in collaboration with the National Centre for Atmospheric Research (NCAR) in the United States. This model calculates for every simulated day, the temperature, the winds and the concentrations of particular chemicals in function of altitude (from the Earth’s surface to an altitude of 120 km) and latitude (from 85° S to 85° N).

The SOCRATES model was installed on the CRAY J-90 supercomputer of the Ukkel platform. The researchers of BISA concentrate on the phenomena characteristic to the mesosphere, especially on the effect of the solar cycle, of the increase of carbon dioxide and on the appearance of polar mesospheric clouds.