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## **Digital methods for processing images of noctilucent cloud fields to determine the structural and temporal parameters of the polar vortex**

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The influence of a near-space phenomena complex on the geophysical processes, as well as the state and seasonal changes in the Earth's atmosphere, and, as a result, on the climate, and through this on the state of the biosphere, attracts the attention of astronomers and specialists in close scientific fields. This issue harmonically combines fundamental and purely practical significance. Those studies, that are related to the problem of climate and geophysical changes and that have been repeatedly noted in the history of the Earth and can be repeated in the near future, are especially important. One of the markers that allows us to objectively judge the general state of the atmosphere and climate and the direction of development (trends) of their characteristic processes is the upper layers of the Earth's atmosphere, in particular, the mesosphere. At the level of the mesosphere, there are processes that are the subject of astrophysics: the genesis and evolution of mesospheric noctilucent clouds (MNC) and a complex of meteor phenomena. Their study has points of contact not only from the point of view of their high-altitude localization or historical tradition, but also because of the real physical connection of these phenomena. The peculiarity of this research area is given by the fact that its objects are located at the intersection of interests of near-space astrophysics, meteorology and climatology, geophysics, physics of solar-terrestrial relations, as well as applied problems of cosmonautics.

One of the main problems of upper atmosphere physics is the lack of a physical concept that would link the largest movements in the troposphere (polar vortices) with their seasonal changes, the phenomena of the upper atmosphere, in the development of which there are constant patterns and climate trends. As a result, the development of specialized information systems will allow you to get close to solving this problem.

Most of the scientists, studying various atmospheric processes, use standard applications, which is not always convenient. It happens, they provide unreliable data because the embedded algorithms are focused to perform only common functions of a standard image.

Efficient algorithms are necessary to process, or possibly re-process large amounts of data. Methods based on reflection spectra of the upper atmosphere for single-pixel images without the use of external data or spatial context have the greatest potential for parallel data processing and high optimized bandwidth. Such algorithms can be considered as a basis for possible trade-offs in processing performance discussing the application of more sophisticated methods that are applicable to our research.