Method for determining atmospheric distortions in an aerospace image of an Earth's surface section consists in forming a digital image over an observation area, processing the image, identifying cloud-free zones, and recording a time sequence of digital sky images into a database. Using Earth surface video recording means, a raster image is formed in clear cloudless weather, a region to be analyzed is identified on the image, and pixels forming the identified region are determined; pixels not belonging to the inner part of the identified region are assigned a background pixel code by encoding means; based on the obtained codes, an average value for the pixel codes of the identified region is determined; and using a difference element, a deviation interval from the determined average value is established. All pixels with code values deviating from the determined average by no more than the established deviation interval are reduced to a single code value. Using threshold elements, pixels with code values deviating from the determined average by more than the established deviation interval are identified. Using edge pixel extraction means, edge pixels in the given identified image area are extracted, a binary image of the extracted edge pixels is formed and assigned a logic "1" code, while all other pixels take a logic "0" value; in projection registers, projections of the obtained image are formed in the directions of 0, 30, 60, 90, 120, and 150°. The obtained projection codes are analyzed and stored as a reference sequence of numbers, and assigned a corresponding identifier matching clear cloudless weather. To determine distortions resulting from atmospheric influences, a raster image of the corresponding Earth's surface is formed in misty weather or in the presence of clouds, a region to be analyzed is identified on the image, and pixels not belonging to the inner part of the identified region are assigned a background pixel code. An average value for the pixels of the identified region is determined, and all pixels with code values deviating from the determined average by no more than the established deviation interval are reduced to a single code value. Pixels with code values deviating from the determined average by more than the established deviation interval are identified. Edge pixels in the given identified image area are extracted, a binary image of the extracted edge pixels is formed and assigned a logic "1" code, while all other pixels take a logic "0" value. In projection registers, projection codes of the obtained image are formed in the directions of 0, 30, 60, 90, 120, and 150°. In a comparison unit, the obtained sequences of numbers are compared with the reference sequences of numbers to determine deviations indicating image areas distorted by clouds; if the sequences of numbers match the reference sequences within a given deviation, then the determined average values of pixels from the clear weather image and the misty weather image are compared; based on the deviations of the average values, the level of Earth's surface obscuration by the atmosphere is determined, and the average value of pixels in the identified region distorted by the atmosphere is determined. In the comparison unit, the obtained average value is compared with the reference average value from the clear weather image, and based on the deviation from the reference average value at the output of the difference element, the magnitude of shading or cloud cover of the Earth's surface is determined.