Development of a ground-based automatic camera network for NLC observations: first steps

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Noctilucent clouds (NLC) are the highest clouds in the Earth's atmosphere observing around the mesopause at 80-90 km altitudes. They can be seen in night during summer time from May until September. These night clouds are comprised of small ice particles that provide a sunlight scatter and thus NLC are readily seen against the dark twilight arc. The basic physics of the NLC formation is well understood at present. However questions concerning secular trends in NLC characteristics, relationship between NLC and solar activity as well as global change effects, differences in the NLC statistical behavior between different observational sites and many others are still unanswered. In particular, there is not sufficient information on NLC distribution around the globe and what their characteristic scales are. A little knowledge is obtained with model simulations and with NLC observations from space. However, there are certain natural limitations to observing NLC from space as well as such observations are of a low spatial resolution (several hundreds km). On the other hand, all available ground-based NLC observations are not correlated, are conducted by different techniques and therefore there are a few chances to get a comprehensive representation of the NLC distribution above the Earth's surface.

That is why there is a need to develop a ground-based network for NLC observations using standard digital cameras. These cameras are intended to be combined in a common network, controlled by a standard program and should work continuously from May until September. It is desired to arrange such a network of automatic cameras evenly distributed around the globe in the 50-65 latitude circle. We have made the first step in this direction: two digital NLC cameras are successfully operating every summer since 2004. One camera is placed in the south of Sweden (Lund, 55N43; 13E13), the other one is in Moscow (56N00; 37E29). The advantage of these positions is that these points have nearly the same latitudes and are separated by a long distance in longitude (about 24). This provides comparable NLC observations in the same latitude circle and gives the possibility to study the NLC homogeneity on continental scales as well as the gravity and planetary wave activity. In the near future we hope to increase the number of NLC cameras to cover as many regions as possible.