Noctilucent clouds (NLC) are a beautiful summertime phenomena that have been observed at high-latitudes (> 55°) for over a 100 years. They are seen during the hours of twilight by the scattering of sunlight from sub-micron-sized ice particles that form in the vicinity of the cold mesopause region. In recent years there has been a marked increase in their frequency of occurrence, possibly due to an increase in mesospheric water vapor and/or to a cooling of the mesopause region, prompting speculation that they are “harbingers” of potentially serious changes in the mesospheric climate. In concert with this trend there are also a growing number of ground-based NLC sightings at significantly lower latitudes than expected. This remarkable panoramic image shows NLC observed at mid-latitudes from Logan, Utah, USA. (41.8° N), on the night of 22/23 June 1999, representing their lowest latitude recordings to date. The NLC display consisted of two bright “patches” containing diffuse and billow-type wave structures that appeared bluish-white in the twilit sky (the dark silhouettes are due to tropospheric cloud). This view shows the NLC looking northwards over Utah State University campus when the sun was ~13° below the horizon.

The map shows the location of several other sites in the USA and Canada from which this spectacular NLC display was observed. Simultaneous temperature measurements from Delaware Observatory indicate unusually low mesospheric temperatures ~156 K. On the following night, NLC were again observed visually from Logan and this time detected by a Rayleigh-scatter lidar system confirming the altitude of the mesospheric clouds at ~ 82 km. Subsequently, NLC have been observed on at least three other occasions. These data provide new evidence for the occasional expansion of NLC to unusually low latitudes possibly due to exceptional dynamical forcing. Alternatively, they may be an early indicator of significant long-term changes taking place in the upper mesospheric summertime environment.