

Accepted Manuscript

Observation of a 27-day solar signature in noctilucent cloud altitude

Merlin C. Köhnke, Christian von Savigny, Charles E. Robert

PII: S0273-1177(18)30177-7

DOI: <https://doi.org/10.1016/j.asr.2018.02.035>

Reference: JASR 13653

To appear in: *Advances in Space Research*

Received Date: 28 September 2017

Revised Date: 20 February 2018

Accepted Date: 26 February 2018



Please cite this article as: Köhnke, M.C., Savigny, C.v., Robert, C.E., Observation of a 27-day solar signature in noctilucent cloud altitude, *Advances in Space Research* (2018), doi: <https://doi.org/10.1016/j.asr.2018.02.035>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Observation of a 27-day solar signature in noctilucent cloud altitude

Merlin C. Köhnke^{a,*}, Christian von Savigny^b, Charles E. Robert^c

^a*Institute of Environmental Systems Research, School of Mathematics / Computer Science, Osnabrück University, Barbarastr. 12, 49076 Osnabrück, Germany, merlin.koehnke@uos.de*

^b*Institute of Physics, Ernst-Moritz-Arndt-University of Greifswald, Felix-Hausdorff-Str. 6, 17489 Greifswald, Germany, csavigny@physik.uni-greifswald.de*

^c*Royal Belgian Institute for Space Aeronomy, Ringlaan-3-Avenue Circulaire, B-1180 Brussels, Belgium, charlesr@aeronomie.be*

Abstract

Previous studies have identified solar 27-day signatures in several parameters in the Mesosphere/Lower thermosphere region, including temperature and Noctilucent cloud (NLC) occurrence frequency. In this study we report on a solar 27-day signature in NLC altitude with peak-to-peak variations of about 400 m. We use SCIAMACHY limb-scatter observations from 2002 to 2012 to detect NLCs. The superposed epoch analysis method is applied to extract solar 27-day signatures. A 27-day signature in NLC altitude can be identified in both hemispheres in the SCIAMACHY dataset, but the signature is more pronounced in the northern hemisphere. The solar signature in NLC altitude is found to be in phase with solar activity and temperature for latitudes $\gtrsim 70^\circ\text{N}$. We provide a qualitative explanation for the positive correlation between solar activity and NLC altitude based on published model simulations.

Keywords:

Noctilucent clouds, polar summer mesopause, solar variability, remote sensing

*Corresponding author

Download English Version:

<https://daneshyari.com/en/article/8131930>

Download Persian Version:

<https://daneshyari.com/article/8131930>

[Daneshyari.com](https://daneshyari.com)