Accepted Manuscript

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 PII:
 S0273-1177(17)30338-1

 DOI:
 http://dx.doi.org/10.1016/j.asr.2017.05.009

 Reference:
 JASR 13217

 To appear in:
 Advances in Space Research

Received Date:25 November 2016Revised Date:6 April 2017Accepted Date:9 May 2017



Please cite this article as: Tlatov, A.G., Pevtsov, A.A., On the timing of the next great solar activity minimum, *Advances in Space Research* (2017), doi: http://dx.doi.org/10.1016/j.asr.2017.05.009

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ACCEPTED MANUSCRIPT

On the timing of the next great solar activity minimum

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Abstract

The long-term variations in solar activity are studied using the dataset comprised of sunspot number and ¹⁴C radioisotope timeseries. We use a novel S_{200} index to identify possible past Grand Minima (GM). The Maunder, Oort, Wolf and Spörer Minima fall in phase with the minimum of S_{200} index. We also show GM develop in clusters, with a separation of about 400-600 years between individual GM. Extending these found similarities to modern solar activity, it is predicted that next grand solar minimum may occur in about ~ 2090 ± 20. *Keywords:* Sun, Solar cycle, long-term prediction 2010 MSC: 00-01, 99-00

1. Introduction

One of the main questions in the physics of solar periodicity is the prediction of activity for the next decade. The modern era, especially the activity in the 20th century, has been characterized by high solar activity. However, there are indications this might be changing. The 22nd and 23rd solar cycles defied the Gnevyshev-Ohl (G-O) rule, which otherwise had been satisfied for approximately 150 years, starting with the 10th solar cycle. Following them,

Preprint submitted to Journal of LATEX Templates

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