

地磁场长期变化和日长十年尺度变化的周期特征

康国发¹, 白春华², 高国明¹

1 云南大学地球物理系, 昆明 650091; 2 中国科学院地质与地球物理研究所, 北京 100029

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摘要 根据历史地磁场模型GUFM1、第10代国际参考地磁场(IGRF10)模型和日长资料, 采用小波变换方法, 分析了地磁场磁矩、能量、西向漂移等参数的长期变化和日长十年尺度变化的周期分量及其时变特征. 结果表明, 1800~2005年期间, 偶极子磁场长期变化有82年和48年准周期分量, 它们与日长变化的周期没有直接关系. 非偶极子磁场参数的长期变化与日长变化有66年和32年准周期分量, 66年准周期比32年准周期强. 在66年准周期分量, 西向漂移比日长变化超前8.8年, 非偶极子磁场能量比日长变化滞后15.6年. 日长十年尺度波动和地磁场长期变化的起源不存在因果关系.

关键词 [地磁长期变化](#), [日长](#), [小波变换](#), [周期](#)

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Periodical characteristics of the geomagnetic secular variation and length-of-day variation

KANG Guo-Fa¹, BAI Chun-Hua², GAO Guo-Ming¹

1 Department of Geophysics, Yunnan University, Kunming 650091, China; 2 Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

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Abstract Based on the historical geomagnetic model GUFM1 and the 10th International Geomagnetic Reference Field models (IGRF10) and the length-of-day data series, the secular variation of some parameters, including geomagnetic moment and its energy and westward drift etc, are analyzed with the wavelet transform method, in addition to the periodical components and time-varying characteristics of decadal length-of-day variation. As the results suggest that, during the period of 1800~2005, the 82-year and 48-year quasi-periodic components are available for the secular variation of dipole magnetic field, which are not directly related to the periodicity of the length-of-day variation. And both the 66-year and 32-year quasi-periodic components can be found for the secular variation of non-dipole magnetic field parameters and length-of-day variation, and the 66-year quasi-periodicity is stronger than the 32-year one. As far as the 66-year quasi-periodic component is concerned, the western drift exceeds the length-of-day 8.8 years; and the non-dipole magnetic field energy lags behind the length-of-day 15.6 years. We consider that the causality between the origins of the decadal length-of-day fluctuation and the geomagnetic secular variation can not be found.

Key words [Geomagnetic secular variation](#) [Length-of-day](#) [Wavelet transform](#) [Periodicity](#)

通讯作者:

康国发 gfkang@ynu.edu.cn

作者个人主页: [康国发¹](#); [白春华²](#); [高国明¹](#)

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