



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Space environment (natural and artificial) - Methods for
estimation of future geomagnetic activity**

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foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules of Standardization Documents"

drafted:

This document is equivalent to ISO 16698:2019 "Prediction methods for geomagnetic activity in the space environment (natural and artificial)":

The following editorial changes have been made to this document:

--- In Chapter 4 of this document, the unit of F10:7 flow in Chapter 4 of ISO 16698:2019 is modified to be "10-22 W/

(m² Hz)", which are technical errata;

--- In 9:3c) of this document, the typographical error "Chapter 4" in 1) of 9:3c) of ISO 16698:2019 is modified to "Chapter 6";

--- In Appendix C of this document, the formula (C:3) and formula (C:5) missing in Appendix C of ISO 16698:2019 are added;

---Modified the references to references in this document, and referred to references to foreign institutions in the ISO 16698:2019 section:

Information or foreign literature should be changed to "See Reference [X]":

Please note that some content of this document may be patented: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

This document provides guidance for forecasting changes in geomagnetic activity:

---The geomagnetic index is used to describe the change of the magnetic field within a certain time range;

--- Geomagnetic index is a measure used to describe the disturbance of the magnetosphere:

This document measures the forecast accuracy and forecast method of the geomagnetic index based on three types of time scales:

- a) short-term forecast (1h to several days);
- b) medium-term forecast (weeks to months);
- c) Long-term forecast (six months to one solar activity week):

These geomagnetic indices at different time scales are used as the magnetospheric magnetic field (ISO 22009), upper atmosphere (ISO 14222), ionospheric plasma (ISO 16457), magnetospheric charged particles, and other input parameters for models of the near-Earth space environment, these geomagnetic indices are also used for orbital lifetime predictions

and electrostatic charging input parameters for the analysis of the harshest space environment:

The three standards dealing with the Earth's magnetic field include ISO 16695 on the internal magnetic field, ISO 22009 on the magnetic field of the magnetosphere, and this document:

Space environment (natural and artificial)

Prediction method of geomagnetic activity

1 Scope

This document describes the forecast of geomagnetic indices used to forecast time scales ranging from short-term (hours to months) to long-term (months to years)

method:

This document applies to the forecast of the geomagnetic index and the space environment:

2 Normative references

There are no normative references in this document:

3 Terms and Definitions

There are no terms and definitions that need to be defined in this document:

ISO and IEC maintain terminology databases for standardization at the following addresses:

---ISO online browsing platform: <https://www.iso.org/obp>;

---IEC Electropedia: <http://www.electropedia.org/>:

4 Symbols and Abbreviations

The following symbols and abbreviations apply to this document:

B_s Southward component of the interplanetary magnetic field (when $B_z \geq 0$, $B_s = 0$; when $B_z < 0$, $B_s = B_z$)

Combination of north-south components of the B_z interplanetary magnetic field

F10.7 flow The solar radio flow with a wavelength of 10.7 cm measured in Earth orbit, in units of 10⁻²² W/(m²·Hz)

Glat Geographic latitude

Glon Geographic longitude

IMF Interplanetary Magnetic field

Mlat Geomagnetic latitude

Mlon Geomagnetic longitude

MHD Magnetohydrodynamics

Sq Diurnal variation of geomagnetic field under solar quiet conditions (Solar quiet)

UT Universal time (Universal time)

5 basic parameters

5.1 Geomagnetic field changes

The geomagnetic field is composed of internal and external fields: Intrinsic field (major part) is caused by source currents present in Earth's core and extrinsic field time-varying

Induced currents in the solid Earth and oceans are generated over time, and exogenous fields are generated by magnetospheric and ionospheric currents: