PD ISO/TR 23989:2020

BSI Standards Publication

# Space environment (natural and artificial) — Operational estimation of the solar wind energy input into the Earth's magnetosphere by means of the ground-based magnetic polar cap (*PC*) index

Documents
Document Sharing Hub

Full document details: PD ISO/TR 23989:2020

# National foreword

This Published Document is the UK implementation of ISO/TR 23989:2020.

The UK participation in its preparation was entrusted to Technical Committee ACE/68, Space systems and operations.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 03432 5

ICS 49.140

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2020.

**Amendments/corrigenda issued since publication**

| Date | Text affected |
|---|---|

Documents
Document Sharing Hub

Full document details: PD ISO/TR 23989:2020

TECHNICAL REPORT

# ISO/TR 23989

First edition
2020-01

# Space environment (natural and artificial) — Operational estimation of the solar wind energy input into the Earth's magnetosphere by means of the ground-based magnetic polar cap (*PC*) index

Reference number
ISO/TR 23989:2020(E)

Documents
Document Sharing Hub

© ISO 2020

Full document details: PD ISO/TR 23989:2020

**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland



© ISO 2020 – All rights reserved

Documents
Document Sharing Hub

Full document details: PD ISO/TR 23989:2020

# Contents

Page

**Foreword** ... **iv**

**Introduction** ... **v**

**1 Scope** ... **1**

**2 Normative references** ... **1**

**3 Terms and definitions** ... **1**

**4 Symbols and abbreviated terms** ... **2**

**5 General parameters** ... **3**
- 5.1 Solar wind parameters determining the magnetosphere state ... 3
- 5.2 Magnetic activity in the polar cap and its relation to the solar wind parameters ... 3
- 5.3 The ***PC***-index: method of derivation ... 4
- 5.4 Relationship between the ***PC*** index and magnetic substorms and storms ... 4
- 5.5 Relation of the ***PC*** index to the interplanetary electric field, $E_{KL}$ ... 5
- 5.6 ***PC*** index as a verifier of the solar wind parameters presented at OMNI website ... 5
- 5.7 ***PC*** index as a proxy of the solar wind energy input into the magnetosphere ... 6
- 5.8 ***PC*** index as a standard for calibration of the magnetospheric disturbances power ... 6

**6 Availability of the *PC* index** ... **6**
- 6.1 Production of the ***PC*** index ... 6
- 6.2 Access to the ***PC*** data ... 6

**7 Compliance criteria for use of the *PC* index as a calibrator of the magnetospheric disturbance** ... **7**
- 7.1 Rationale ... 7
- 7.2 Reporting ... 7
- 7.3 Documenting ... 7
- 7.4 Publishing ... 7
- 7.5 Archiving ... 7

**Annex A** (informative) **Resolution No. 3 of XXII Scientific Assembly of International Geomagnetism and Aeronomy Association (12th IAGA), Merida, Mexico, August 2013: *PC* index** ... **8**

**Annex B** (informative) **Map of spreading of the auroral absorption calibrated by the *PC* index value** ... **9**

**Bibliography** ... **10**

© ISO 2020 – All rights reserved



Documents
Document Sharing Hub

Full document details: PD ISO/TR 23989:2020

# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.


© ISO 2020 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TR 23989:2020

# Introduction

The polar cap magnetic activity *PC* index was introduced as a measure of the magnetic activity generated in the Earth's polar caps by interplanetary electric field and is regarded at present as a proxy of the solar wind energy input into the magnetosphere in course of solar wind – magnetosphere coupling.

The *PC* index can be required as input parameter for monitoring and nowcasting the space weather influence on various characteristics of magnetosphere and high-latitude ionosphere.

The *PC* index can be applicable for a variety of engineering and scientific domains and can be used to monitor the state of the magnetosphere and high-latitude ionosphere to solve the problems of navigation, radio-connection and induced currents typical of high-latitude regions during magnetospheric disturbances.

© ISO 2020 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TR 23989:2020