

Recommendation ITU-R P.371-9

(08/2023)

P Series: Radiowave propagation

Choice of indices for long-term ionospheric predictions

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

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Series of ITU-R Recommendations

(Also available online at <https://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R P.371-9

Choice of indices for long-term ionospheric predictions

(1963-1970-1974-1978-1982-1986-1990-1995-1999-2023)

Scope

This Recommendation provides a series of relations to compute long-term ionospheric indices that are used for prediction of ionospheric characteristics.

Keywords

Ionospheric characteristics, solar radio noise flux, sun-spot number, M(3000)F2

Abbreviations/Glossary

MUF: Maximum usable frequency

R_{12} : 12-month running mean sunspot number

Φ : Solar radio noise flux at about 10 cm wavelength

Φ_{12} : 12-month running mean value of Φ , the 2 800 MHz solar radio noise flux (i.e.)

The ITU Radiocommunication Assembly,

recommends

- 1 that the 12-month running mean sunspot number R_{12} , or alternatively the 12-month running mean value of Φ , the 2 800 MHz solar radio noise flux (i.e. Φ_{12}), be adopted as the preferred index to be used for predicting monthly median values of foF2 and M(3000)F2 over all time-scales: substantially equivalent results should be obtainable by the use of either of these indices;
- 2 that Φ_{12} be adopted as the preferred index to be used for predicting monthly median values of foE and foF1 over all time-scales;
- 3 that predicted values of these indices should be determined by means of the modified McNish-Lincoln procedure (see Annex 1) using latest available measured monthly index values for the present solar cycle and the average of past cycle values for future cycles;
- 4 that where propagation predictions require simultaneous use of values of different ionospheric characteristics, the same index may be adopted for all such characteristics with little loss of accuracy;
- 5 that caution be shown in the use of the recommended indices at high magnetic latitudes, where the resulting ionospheric predictions may not be sufficiently accurate;
- 6 that caution be shown in the use of R_{12} indices for long-term ionospheric predictions with regards to the observatory factor.